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***10-12 November 2013***

***(UNESCO's World Science Day Celebration)***

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# TARGET COSTING BASED ON THE ACTIVITY-BASED COSTING METHOD AND A MODEL PROPOSAL

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## Abstract

Globalization arisen with the fast transformations in economy and technology, is also accompanied consequential changes in the competition environment of the businesses. Global competition environment obligated businesses to reach three important objectives at the same time and at the highest level. Businesses have had to design and produce high-quality, low-cost products to meet customer requests and expectations as soon as possible. In this environment, conventional cost methods and cost-plus pricing strategies have become insufficient, therefore new cost management methods have been developed.

One of these methods is **Target Costing** method. Target Costing is a method that aims to manage the costs before they realized and to realize target profit at a level of realizable cost without making any concessions on quality. With regard to realizing these objectives, accuracy of the managerial decisions have to be increased. However, conventional cost methods do not secure the accuracy of cost information and they are not beneficial for the prediction and decision mechanisms of the executives. **Activity-Based Costing** method that is based on activity-based information methods, is appeared in the 1980s. The method has eliminated insufficiencies of conventional methods due to its ability to provide more accurate cost information. Activity-based approach that is started with the activity-based costing also has been realized in budgeting. Thereby, functional-based conventional costing has gave way to activity-based costing. Both the activity-based costing and activity-based budgeting have been became tools that can be utilised effectively for determining and estimating target costs. Our study states that target costing method can be realized in conjunction with the Activity-based costing method for ensuring the desired efficiency of the target costing method. Furthermore, a target cost model based upon activity-based costing and activity-based budgeting, has been developed.

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**Keywords:** Target Costing, activity-based costing, activity-based budgeting

## Introduction

Globalization, technological advancements, increasingly shorter product life cycle, new competitors breaking into market, the growing and changing customer needs have greatly complicated today's business world. Businesses have started to change their manufacturing systems by means of using modern manufacturing technologies. Concordantly, present costing methods that are insufficient to provide efficient cost information in these conditions of competition, has been called into question. Cost information and cost management have become an essential fact for businesses that want to be more successful in the risen heat of the competition of today's economic climate. (Koşan and Geçgin, 2011:53) Today, new methods that consist of advanced and elaborate technical studies and approach to cost reduction factors individually, started to find their way into operations.

One of these methods emerged in this process is Target Costing (TC). TC that is described as an important tool of strategic cost management, emerged to ensure being focused on the market related to product development and pricing, and emerged as a strategic cost reduction and management method that is mostly used to advance product life cycle and used in product designing processes. Today, target costing that is used widely with the purpose of performance-based cost planning and controlling, aims to improve competitiveness of the businesses by means of ensuring their management of activities regarding the products they manufactured to be market oriented and cost-oriented. (Alagöz and Ceran, 2006: 62). It has become a modern approach that focuses on the planning and designing phases of the costing process, and aims to ensure the product is manufactured in accordance with the target cost acquired by subtracting the target profit from the determined target sale price. (Öndeş et al., 2010: 248)

In parallel with all of these developments, production environments has also changed; the rate of machinery utilization in production has increased, the share of direct labor costs within production costs have decreased and the share of production overheads have increased. Charging production overheads to products within the scope of conventional costing has started to cause problems. Therefore, cost informations provided by conventional costing methods have started to lose their accuracy. In advanced industrial environments, accuracy of present costing methods have been discussed intensively (Şakrak, 1997:175) and as a result to searches for the subject, activity-based approaches have led the way in 1980s. The first of these approaches was Activity-based Costing method (ABC) that is developed to ensure the desired accuracy of the informations used in managerial decisions of the businesses, and to ensure the monitoring thus controlling of the costs as required.

ABC method that uses activities as base while indirect costs are being allocated, eliminated the miscalculations caused by conventional costing method which undercharges the cost to small-scale products and overcharges the cost to large-scale products. The method also emerged as a system that provides cost data to the management about the decisions they make regarding the products and as a method that charges costs to products in accordance with the amount of activities they required. Following this, ABC has also been realized into budgets, thus activity-based budgets have been developed. In this way, ABC's connection to operational control has been established.

Under the hypothesis that TC and ABC, which are approached within the scope of strategic cost methods, are mutually complementary; the purpose of this study is to create a model based on activity-based costing in the processes of determining target cost and realizing target costing.

Basic informations related to Target Costing (TC), the purpose of the method, the principles and the implementation process are explained initially in the study. Following this, basic informations regarding activity-based costing and activity-based budgeting are presented, and their correlation to target costing is mentioned. Proposal of target cost model based on activity-based costing is presented at the final section. Indirect cost allocation in accordance with the ABC is used as a base for proposing the model.

### **Basic information regarding target costing**

Recent changes due to global competition of businesses and technological advancements, lead to innovations in the use of financial and non-financial informations, and the accounting became the most important tool of business management. (Gökçen, 2003:79)

Increases in costs especially after the industrial revolution, serious decreases in product prices on the other hand, prominent global competition critical subjects such as market, customer, quality, environment, have incapacitated conventional management and cost accounting methods. With this change, new approaches such as Total Quality

Management, Time-Based Management, Reengineering, Flexible Production Systems, Activity-based Costing have been developed; **target costing** is also emerged as a part of this process. (Can, 2004:5). In this method, operations are oriented with respect to customer, intensity on production design is highly risen and it extends to the whole life cycle of the product.

### **Conceptual Framework Regarding Target Costing**

Starting point of the target costing is *strategic management* consistent with all business activities in an ever-changing, ever-growing competition environment. And strategic management can be realized by manufacturing products that are based upon customer requests and market-oriented. Target costing is a product development strategy that is concentrated on customer expectations and new opportunities in the market, and it is identified as management process of strategical profit and cost. (Yükçü, 1999: 923). Target cost management is regarded as an activity that aims to reduce the costs of the product during its whole life cycle and to satisfy customer requests such as rapidity, quality and reliability, with the way of examining all of the presented alternatives to reduce the cost of planning, research and development processes of a new product. (Can, 2004: 9).

Despite it's mentioned that the main idea of target costing and the first applications are emerged at Ford Motor in USA in early 1900s and it's implemented at Volkswagen in Germany in early 1930s, the first systematical operation and development is realized in *Japanese Toyota Company* in the mid-1960s. After that, it's partially used in other European countries, particularly in Germany and USA. (Koçsoy and Gürdal, 2008:77) It has found a wide operation area in Japan with 100% in *transportation equipments* industry, 88% in *electrical and electronics* industry, 83% in *machine manufacturing* industry and 67% in *metalware* industry. (Yılmaz and Baral, 2009: 3) Cost reducing in planning and designing stages is an important matter in Japan since the production is substantially assembly-based. Japanese cost accountants have to calculate 100% of product costs in marketing and designing stages. And this indicates how the target costing concept is developed. (Gagne and Discenza, 1993: 68)

Since it's a cost management that is emerged and developed in Japan, mostly Japanese authors examined the concept of target costing and Hiromoto, Sakurai and Monden contributed important studies related to the subject. (Alagöz et al., 2005: 47-48) *Hiromoto* described target costing as market-oriented and as basic function of the dynamic cost management. *Sakurai and Monden* described target costing as an effective cost management tool for reducing the product cost comprehensively with the help of other departments in the business.

*According to Peter Horvarth and Werner Seidenschwarz*; "target costing is a strategic cost management tool that transforms information related to product, market and resources to quantitative measures, on strategic basis." (Lorino, 1995: 82-83)

The fact that large portion of product cost appear in the designing phase indicates the most part of cost reduction operations will also be realized in the same phase. Therefore, instead of determining the cost after the product is designed, target cost has to be determined initially and following this, product design has to be made in accordance with this target. (Acar, 2005: 56) Since its a market-oriented cost method, target costing *starts with the customer*. As market conditions effects product prices that are going to be marketed successfully, the most important factor is the demand and needs of the customer. When the substance is inspected, target costing that is extended to the whole product life cycle, means market-oriented management of the information related to business strategies, and presents a formulated cost management approach.

Target costing aims to determine required cost to manufacture the product by subtracting the expected profit from the expected sale price which is determined with market information instead of costs, before the product is developed. From this aspect, target cost management uses “market price minus” principle instead of “cost plus” principle. (Cengiz,2010:7) Target cost of the product is formed after the determination of the factors which are determined before the product design, such as target sale price, target profit and target sales volume.

### **Target Cost, Target Sale price and Target Profit**

Target costing method is developed as a result to the comprehension of two important facts related to the market and the costs. (Coşkun, 2003: 26). The first of these facts is that price is determined by the market. Businesses always thought that they are in control of the prices. Yet today, they realized they have less control over them than they have thought. The second of the facts is that the big portion of a product's cost is determined in designing stage. Because of that, instead of designing the product and trying to figure how much does it cost afterwards, target cost has to be determined initially and product has to be designed in accordance with this target afterwards. (Öndeş et al., 2010: 249)

**Target cost** that underlies target costing method, is a market oriented cost which is calculated in accordance with the sale price used to achieve target market share. (www.suleymanyukcu.com) In other words, target cost differs from “conventional cost plus” approach and instead of being a function of costs, it is a function of the sale price and the desired profit. (Ertaş, 1998:183) When calculating target costs, target sale price and desired target profit margin, which are required for market share, have to be determined initially.

**Target sale price** is a sale price based upon the value assigned by the consumer perception towards the product. When determining target sale price, rival product prices, desire and ability to pay of target group have to be taken into consideration. **Target profit margin** is a profit margin determined by long-run profit analysis. Herein, target cost is calculated by the balance between sale price and profit margin. (Bahşi and Can, 2001:51) Business determines target price that customer is available to pay and after that backs from that point to determine the product cost which provides a satisfactory profit margin.

$$\boxed{\text{TARGET COST} = \text{TARGET PRICE} - \text{TARGET PROFIT}}$$

Target costing approach has a simple substance: (Şakrak and Hacırüstemoğlu, 2002:118)

- ✓ Sale prices of the future products are determined in target market.
- ✓ Profit margin which is aimed to be realized is subtracted from said sale price.
- ✓ Remaining value represents the level of target cost that the product has to be manufactured in.

Another important matter is that the success of TC management depends on support and collaboration of other methods when it is realized. Particularly, cost reduction method called value engineering has become crucial in this aspect. Value engineering is a method used to find ways to product cost reduction, by making no concessions to product features and quality expected by the customer. (Erol, 2002:83).

### **Basic Principles of Target Costing Method**

Conceptual basis of TC process consists of six basic principles. Said principles represents an extensive approach in the scope of cost management and they also present an approach totally different from the conventional approach to profit planning. (Swenson et al., 2003: 12)

- ✓ Costing in accordance with the price,
- ✓ Concentrating on customer,
- ✓ Concentrating on product design,

- ✓ Extensive involvement,
- ✓ Cost reduction during whole product life cycle,
- ✓ Paying attention to value chain.

“Determining competitive market price has to be mentioned initially in the target costing method. Target cost is calculated by subtracting expected profit margin of the business from the said price. While it can be varied based upon the market and customer conditions, **price** is under the control of the target profit, the general structure of the industry and the financial conditions of the business.

The feature of price-oriented costing can be divided into two sub-principles; (Aksoylu and Dursun, 2001:363)

- ✓ Market prices determine the planning of the product and the profit. These plans have to be reviewed frequently to ensure assigning resources to products that have sufficient and secure profit margin.
- ✓ Target costing method is supported with the analyses and information of active competition environment. Understanding how market prices are determined has importance to be on the alert for the difficulties and risks of the competition environment.

There are many factors that have to be taken into consideration in the target costing process. One of them is the needs and thoughts of the customer. (Kutay and Akkaya, 2000:3) Target costing is market-oriented thus customer thoughts have great importance in this process and they have to be taken into consideration by the business all the time. Consumers would not pay for the features they don't value. Because of that, decreasing and elimination of the features that do not offer value to the consumer but charge cost to the product, are required to be taken in the consideration in the product designing process.

Another important factor is **product design**. Target costing method is based on the principle of managing the costs before they emerge. Approximately 80-85% of product costs are determined by the decisions that have been made during the designing stage. For this reason, designing stage is crucial in the process of target costing. (Hacıüstemoğlu and Şakrak, 2002: 121-122) Design and manufacturing engineering, production, marketing, purchasing, cost accounting and other teams that consist of supportive services, have been made use of while applying the TC method. In addition to that, individuals and teams outside of the business such as sellers, distributors and consumers, join the team. Every unit in this team have to work towards to achieve their common goal, target costing, and they have to do their part on time and at their best level. TC process aims to reduce the costs to the minimum during the whole life cycle of the product. For this purpose, applying the method more effectively by using it from beginning to end of the product process can be mentioned. TC operations is a work that extends on the whole life cycle of the product, and interfunctional in the business, and based on value chain perspective which covers the all aspects related to the business. (Bahşi and Can, 2001:55). TC includes all members of value chain such as suppliers, sellers, distributors, service providers and consumers, in the process of target costing. In this way, target costing expands the effort of cost reduction throughout value chain, by creating a long-term collaborative link between business and other members of the value chain, based on their common interest.

### **Target Costing Process**

Target costing process is accepted as an interactive process. Most of the process activities actualize concurrently or correspondingly.

Target costing process has to be examined at 3 levels.

- At market level,
- At product level

-At unit level

Target costing discipline starts with the adjustments in the market and it requires the gathering of the information related to customer drives and the price they are available to pay. (Cooper - Slagmulder, 1999: 24) As conventional inside-out (business to market) approach is considered, product development activities were remote to market requirements and consequently products that are sufficiently designed and effectively labeled, were produced. However, with an out-inside (market to business) approach, instead of developing the products in a technologically possible way, they are being developed in accordance with the market requirements and according to the maximum price acceptable by the market. (Butscher and Laker, 2000:49) At this point, market analyses help to locate the place of the new products in the market, also they take a crucial role to form the cost portion of the target costing at market level by determining acceptable costs.

Target costing is used to relay these acceptable costs and the competitive cost pressure the business encountered to product designers. Product designers have to ensure that the products are in appropriate life cycle when they are manufactured. Target costing at product level, disciplines the costs and concentrates on the product designer creativity related to their success on the cost portion of this purpose. After target costing is determined at product level, it is divided to components at unit level, thus cost pressure the business encountered is relayed to the suppliers. Thereby, suppliers start to look for a way to design and produce the units the business provided from the outside. In this way, target costing at unit level helps to discipline the suppliers and make them concentrate on their creativity which is going to be beneficial to the business. (Acar, 2005: 44-45)

### **Activity-based costing and activity-based budgeting**

In today's production environment, share of general production costs that are within the product cost independent from the activity volume and mostly consisted of invariable indirect costs, is reaching considerable amounts. That situation leads to reaching misinformation related to the product costs incase of using value-based allocation keys while assigning indirect costs to the products. On the other hand, product costs have to be improved consistently. This is only possible with the elimination of the activities that do not add value in the production process and with the improvement on the activity performances. (Parlakkaya:229-230) All these developments have directed the businesses to new methods which can provide more accurate cost information. In this study, activity-based costing and activity-based budgeting that emerges with the operation of activity-based costing in business budgets, are going to be examined.

These activity-based methods will make themselves functional by providing more accurate cost information for dynamizing the target costing method that underlies this study.

### **Activity-based Costing – Conceptual Framework**

In recent years, failure of the conventional costing methods on monitoring the activities during the processes of service and production thus providing accurate data related to product and service costs, has been the starting point to the development of the activity-based costing. (Özcan et al., 2003). Today, ABC has become an effective management tool with the information it provided and as a result of their use in many managerial decisions such as pricing, enhancing the profit, product diversification, cost reducing, quality control and management, product development and designing. (Karaca, 2008:11).

ABC method aims to build an information infrastructure which enables to form a well-balanced relation between indirect costs and the cost units that the costs will be assigned on. ABC is a method that assigns resource costs to activities with the basis of the resource usage of the business activities; and it is also a method that assigns activity costs to cost objects

with the basis of the activities that the cost objects required. (Bengü 2005:188). Also the method is used for ensuring the managers to make the correct decisions regarding the product diversification and competition strategies, by directly linking general production costs to cost units such as processes, services, products or customers. (Cooper 1988:46).

The most important assumption in the ABC is that the resources of the business is consumed by the activities after the costs are determined and the activities are consumed by the manufactured products or services. (Gupta and Galloways, 2003: 132.) Objective of ABC method is to reduce wrong decisions by providing accurate cost information. In this method, planned, controlled and economic general production cost allocation data is acquired with reference to the assumption that the products consumes activities and activities consume the resources. For achieving the said objectives, in ABC operations, a cost pool is created for every activity, and all of the indirect costs pooled in it, and a cost allocation key for every cost pool is determined. (Cooper, 1988: 45). The crucial part is calculating the product costs after the calculation of activity costs. (Erdoğan, 1995: p.89).

### **Separation of Conventional Costing and Activity-based Costing**

Due to changes in production environment, businesses now need cost information more than ever. However, calculation methods based on conventional cost accounting fail to satisfy the business needs related to this subject. (Bruns, 1999: 15). And consequently, a method (ABC) that provides more accurate calculations of product and service costs and profitability, and a better guide to managers for taking their strategic decisions, has been developed. (Cooper and Kaplan, 1991: 130).

Conventional costing method regards production volume as the only factor that effects the resources. But ABC states that there is too many factors regarding the resource use and the production volume is only one of them. Conventional costing calculates product cost by using only one cost allocation key while ABC is using different cost allocation keys for every cost pool when determining the product costs. (Karcioğlu, 2000:156).

Substantially, the most important difference between ABC method and conventional costing method appears at *resource and activity costs* which are calculated in standard product cost. *In ABC method, not only production activity costs are covered as it is done in conventional methods, instead all of the business activities are covered in the standard cost of the product.* (Pazarçeviren, 2000:98). In conventional cost accounting, only the production costs are included in the product costs. R&D, Sales, Distribution, Marketing, General Administrative Expenses are recognized as running expenses and they are not charged to the products. Still, too many running expenses demonstrates features to include themselves into product cost. ABC assigns any cost that the method determined it is originated from the product and either it is a running expense or a production cost, to the product cost. (Balci, 2007, 52)

With ABC, activities that are causing a cost are determined effectively, and the cost is allocated to individual products. **Basic principle of ABC is costing the activities instead of products.** Costs are allocated in accordance with the activity requirements of the individual products. Allocation principles –cost drivers- are digitizing the activities. (Cengiz, 2010:163) The success of ABC widely depends on the estimation accuracy of activity costs. Therefore, ABC is preferred by the companies instead of conventional, simple, volume-based product costing methods. (Lockamy and Smith, 2000).

### **Importance of Activity-based Costing**

For calculating the total cost of the manufactured products in ABC system, it is required to know the activity costs, how much time product has stayed in this activity field, how many times the product entered this activity field and it is required the calculation of

how much activity resource is consumed by the product. Activity-based costing method is a system that reveals profit structure of the manufactured products or services provided by a business, and is used in analyses which are designed to improve that information constantly. (Güzeldere, 2007:44-45)

Because the ABC is providing more accurate cost information, it eliminates the activities that do not add value, and it supports the production decisions and pricing policies of the managers by detecting the unprofitable products. (Cokins, 1999: 38) This method has two major objectives. These are;

a) Determining and providing elaborate information related to the activity consumption, cost and interest in production business as a whole.

b) Providing accurate cost information that is going to be used in managerial decisions.

(Karcıoğlu, 2000:153).

The crucial part is eliminating the inaccuracies emerged from the use of volume-based keys which are used for charging costs to the products in conventional costing methods. (Rüstemoğlu and Şakrak, 2002: 30).

Activity-based costing provides support to potential profit measurement of the business, to make volume-profit analyses in the basis of sale objects and lines, and to develop sales and marketing policies. This approach also enables the creation of price simulations and pre-unit costs of the sale objects and therefore supports competitive price strategy implementations. (Pazarçeviren 2006:52-53).

### **Application of ABC Method**

In ABC method, linking the products with the costs is based on two basic stages. At the initial stage, resources such as energy, placing, unit stock keeping are divided in specific parts and every activity is assigned to the cost pool of its part. At the second stage, consumed resources are measured and these are charged to the products from the related cost pools. At this stage, used cost drivers reflects the factors that direct the product volume-based or non-based cost varieties. These keys are used to charge the cost at the product level or at other levels. These levels represents varied activity levels where the costs are also varied. (Şakrak, 1997: 185) Resource costs are allocated to the activities that are determined by **activity analyses** which are realized at the first stage of the installation. The accumulation in the activity cost pool is allocated to cost objects (product, service, customer etc.) determined by the business management and allocated at the rate in accordance with the consumed activity factor. Designing of the ABC method usually consist 5 steps even though it varies from business to business. These steps are; (Öker, 2003:37)

1- Identifying activities

2- Classifying activities

3- Costing activities

4- Selecting accurate cost factors for allocating costs to the products

5- Charging activity costs to products

The first stage of ABC application is the detailed analysing of the activities being conducted in the business. Completing this stage accurately is crucial because achieving the objectives of activity-based approaches, particularly the costing depends on it. These activities are those make difference in the scope of costs such as purchasing raw material and consumables, production planning, quality control, material movements, machine set up, product development, R&D, after sales support. (Öker, 2003: 37).

If the activities that are identified by the inspectional and statistical studies presents common features, path of classifying these activities or creating departments is going to be taken, because presenting too many activities will make the application of the method more difficult. Two points have to be taken into consideration while classifying the activities. The

first, activities that are going to be pooled have to be in the consumption for a common cost object. (Öker, 2003:39) The second point regarding the classifying the activities is that if the activities are using the same cost factor or not.

The stage after the identifying and classifying of the activities is determination of the activity costs. Ledger accounts are good data sources for ABC method designers. In a sense, entries in these ledgers sum all of the important financial data of the business. (Gündüz, 1997:131). Two methods are available when allocating costs to departments (activity costing). Resource costs can be allocated directly or with the cost drives to the departments. (Alkan, 2005: 47). There are two sorts of cost drivers. These are; resource cost driver and activity cost driver.

Cost driver reflects the cause and effect relation between an activity and a cost pool. Ultimately, resource cost driver (1<sup>st</sup> stage cost driver) is a mechanism to allocate the resources to departments (cost pools inside the departments). (Erdoğan, 1995: 72-73) The second stage cost drivers (activity cost driver) cover the charging of the costs from departments to the products. After the cost of resources consumed by activities in every department is monitored for activity cost pools, the second stage charging principles and cost drivers can be determined. (Erdoğan, 1995: 73)

The last stage of the ABC method is the charging activity costs to outputs. Here, "Output" concept represents cost objects such as manufactured products, services, projects etc. which are the purpose of the business. At the stage of charging the costs to the cost objects, after the appropriate cost drivers assigned to departments; the costs which are pooled in the activities, are allocated to product groups in accordance with the activity consumption of every cost object. (Öker, 2003:51) Activity-based budgeting is developed since the businesses that apply ABC method can not use conventional budgeting while planning the profits. Activity-costing model that is basically developed to allocate indirect costs accurately and therefore enables the gathering of more accurate information, is successfully implemented to the budgeting method.

### **Activity-based Budgeting**

Activity-based budgeting (ABB) can be described generally as the budgeting of cost and amount of the resources required for the activities and the activities that has to be realized to achieve the output which is planned for the next operating cycle. (Özer, 2001, 81) ABB is a method *based on activity management instead of resource management*. This new budgeting method has made a business enable to concentrate on which activities it realized, cost amount of the realized activities, realized physical values, performance level of the realized work and cycle time of the activity. (Balci 2007, 3)

ABB uses continuous development as basis and aims to establish a dynamic relation between final outputs and activities via use rate between activities and resources. In this way, controlling the expenses with the resource and activity usage approach, is aimed. In the process, the kind of activities required are determined by analysing the manufactured products or services, and budgeting of these resources that are required for these activities, is realized. (Karaca and Yıldız, 2010)

ABB is the planning and control process of the expected activities in the organization. ABB concentrates on activities and correlates **cost, time and quality** which are strategic objectives of the organization. (Cecily, 1999:288) ABB is emerged after the expansion of activity-based costing towards activity-based management. ABB is able to easily establish the cause and effect relation between activities, products or services.

Purpose of the ABB is achieving the strategic goal by creating a link between operational and financial transactions and by basing it on work load estimations; and setting an accurate plan and a budget by the combination of the planning and the budgeting with

activity-based methods, that are reflecting financial and non-financial requirements for realizing the transformations which are planned to improve present performance. (Kaygusuz, 2002: 5; Özer, 2001: 81).

An effective and accurate target costing process requires an activity-based costing/budgeting method. ABC and ABB which can be identified as an extension to activity based costing, are going to provide key cost data that is essential to achieve the goal of target costing.

### **Relation Between Target Costing and Activity-based Costing**

ABC is underlined widely in the literature as a supportive tool for target costing. (Cengiz, 2010: 167-168). Lee (Lee, 1994: 70) stated that target costing is compatible with ABC, and target costing provides cost information required for the realization of target costing. Koons (Koons F. J., 1994:70) underlined the fact that the strategic plans in target costing have to be on the basis of the identification, measurement and controlling of the exact sources of the costs. He also underlines that the best way to realize this is setting the strategic plans on the basis of target costs which are calculated with activity-based costing and budgeting. In this way, the company will not be subjected to limited measurements and cost allocations in conventional approach based on a single parameter such as labor force, and the company will have an elaborate cost information instead. (Koons, 1994: 70).

In the TC process, *ABC* is a method that provides very beneficial key cost information and assist to target costing to be successful. While TC ensures market-oriented goals, ABC presents the improvement processes by making the costs more transparent. (Horvath et al., 1998: 23-24) In the flexible production system that cope with the market demands in a short time, production expenses of the complex products are high. And this means more indirect costs are going to be appeared. For this reason, activity-based costing method which is a tool of general production cost management, is being utilized. (Ertaş, 1998: 190)

Target costing is related to the activity-based costing on three points. (Horvath,1993, s.12-13) The first one is determining the estimated cost. Activities that are used on the indirect areas depending on the product, can be analyzed by original activity costs. The second, activity-based costing can determine the cost drive of the product planning and the design offer. Subjects such as product diversification, usage of standard parts, chain of distribution, purchasing and production, has to be compatible with market requirements. While target costing provides information for market requirements and cost goals, activity-based costing can present cost structures of design alternatives. The third, activity-based costing can be used as a tool for achieving target cost. Activity-based costing which identifies the activities required to realize specific product functions and related to this, determines the cost allocation keys, assists to determine the optimal value area by transferring activity costs to product functions. In addition to that, cost allocation key information can present the conditions of the activities required to be reorganized for cost reduction operation.

ABC shall be more beneficial when it is applied with cost management tools that have strong customer-orientation such as TC. Because, ABC is a cost effectiveness tool that concentrates more on intrinsic subjects without creating an automated link with customers. If the executives focus only on intrinsic activities and effectiveness, they may forget factors such as time and quality which are important for the customers. (Arzova, 2002:83).

ABC method applied with the target costing, has enabled designers to reach the information related to every activity and operation by enabling designers to allocate direct-indirect costs. Knowing the costs of activities and operations enables designers to create product designs at the desired cost without sacrificing quality and functionality.(Öker, 2003: 77)

In target costing, it is aimed that sale prices are assigned after the product features are determined and product costs are calculated in accordance with the assigned cost. Intersection point of target costing and ABC regarding their relation is at determining the target price accurately by accurately calculating the costs. By this way, lower or higher price-fixing can be prevented. (Özer, 2004:133).

Beside this, target costs are used to determine the limits of the product design decisions. Data acquired from the ABC is used by designers for better understanding of general production costs, cost drivers and factors that form the cost; and it is used to develop more accurate cost estimations in product design. (Aksoylu, 2001:138). By this way, particularly in the early stages of the product design process and in accordance with the TC method, ABC enables the inclusion of common cost areas into the processes of planning and allocation of the target costs. (Can, 2002: 174).

### **Model proposition for determining target cost, based on activity-based costing and budgeting**

An effective and accurate TC process requires an ABC model. Thus, value received from the new model will be more. Thomson and Gurowka (Thomson J., Gurowka, 2005: 30) stated that the main purpose of target costing is transforming admissible target cost to achievable target cost by cost analyses and estimations, value engineering and continuous development; and also stated that ABC will assist to this purpose. As literature widely presented, ABC application is a requirement for target costing. (Cengiz, 2010: 167-168)

Starting from this point of view, a model is developed in the study for determining the target cost, and the information needed for target cost elements are acquired from activity-based budgets. As it is known, activity-based budgets are based on activity-based costing. The high point of the developed model is that the information which is going to be used in the determination of the target cost is determined on the basis of ABC.

In TC model, ABC application is going to provide more accurate data. Furthermore, it will enable businesses to compare the product features with the cost to develop these features by directly determining the resources and costs of the production processes; and it is going to enable businesses to monitor operation times and quality costs in every stage of the production process. (Cengiz, 2010: 167-168)

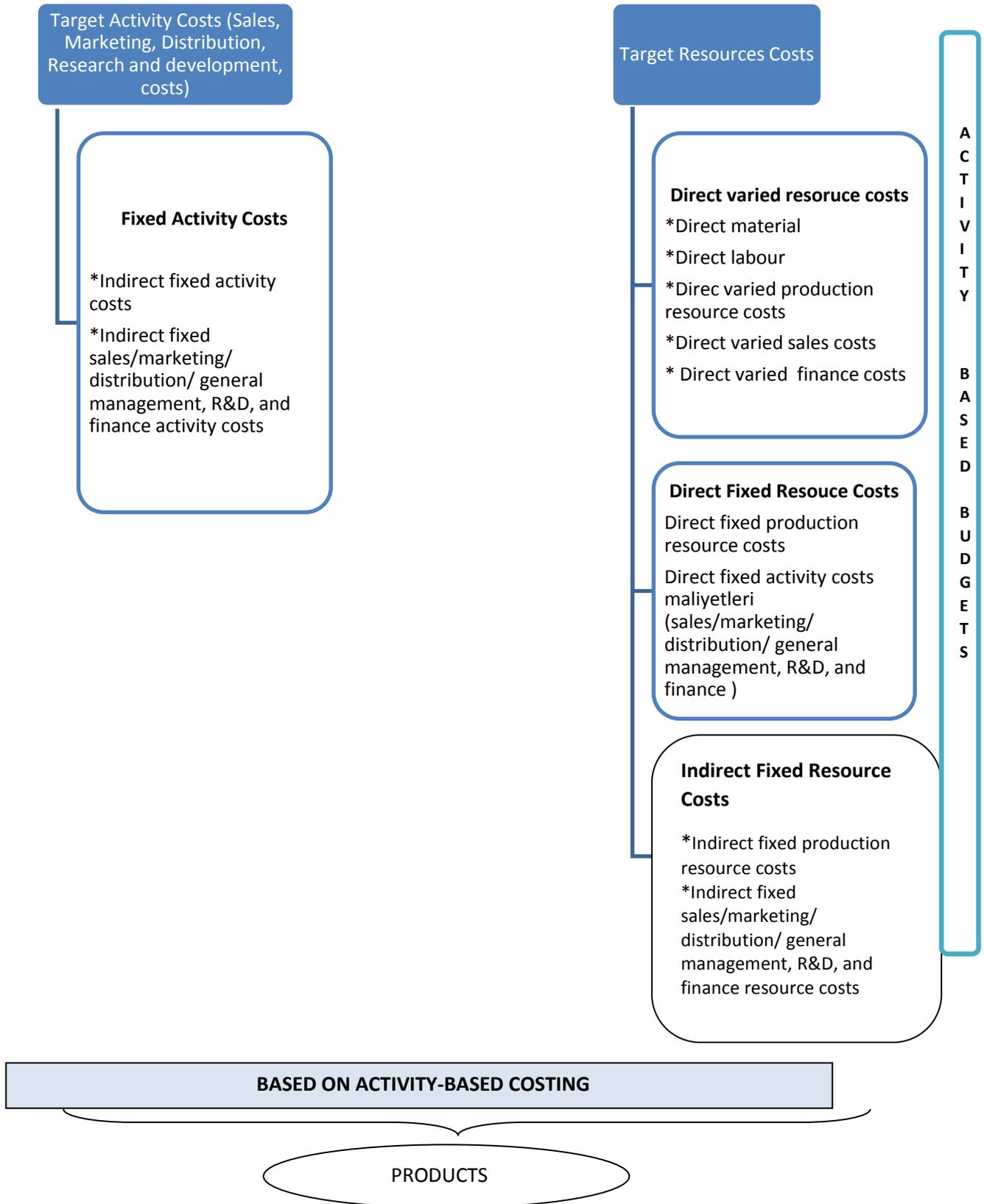
In ABC method, not only production costs are covered as it is done in the conventional methods, instead all of the business activity costs are covered in the cost of the product. Production costs are divided in two as direct and indirect production costs. Direct costs consist of the costs of direct labor and the direct material which is directly linked to the product. As for indirect costs, they are indirectly charged to the products since they have no direct link with the product. As a matter of fact, use of ABC method becomes prominent when charging the indirect costs to the products. Additionally, more accurate allocation of variable and fixed costs can be made since ABC considers all the business activities when allocating the costs, in other words, ABC also covers the costs of R&D, sales, marketing, distribution and general management.

In a business, resources contain the following: (Erdoğan, 1995:40);

- Direct material
- Direct labor
- Indirect costs related to the production
- Non-production costs (marketing, sales, distribution, R&D...)

At this place, the most important components are indirect costs. With the application of ABC method, product costs can be calculated more accurately after the indirect costs are transformed to production costs. Cost behavior has to be monitored closely and allocated when allocating the costs.

Figure :1



Activity based costing has satisfied a need at this point and enabled more accurate determination of the costs. As seen in the **Figure 1**, ABC is used to acquire the data for determining or identifying the target cost of the product. Costs are allocated at their usage ratio to the product cost from the production costs and from the non-production supportive activity costs such as marketing, sales, distribution, finance, general management and R&D. While this is realized, also the varied and the fixed allocation to the costs are realized and therefore acquiring a more systematic cost information is enabled. Because, allocating all costs **in accordance with the cost behavior (fixed, varied)** is crucial for determining how varied factors are effecting the cost. Effectiveness is realized by charging these costs to products with the assistance of varied cost drivers.

It has to be stated that; resources are basically divided in two according to their behavior in front of the operation volume. The first one of them is flexible/varied resources and the second is fixed resources. Flexible resources are provided from external suppliers for short-term demands. Material, energy, casual employees, piece workers, overtimes are examples for flexible resources. The cost of acquiring these resources are equal to the cost of using these resources. Cost of these resources is identified as varied cost since it is going to show variations depending on the use of these resources. Expenses for dependent resources, in other words fixed resources, is identified as fixed cost since activities do not depend on the use of these resources. Feature of the fixed resources is they are provided before the activity is started. (Karaca, 2008:33). *This allocation is also elaborately realized with ABC.* Many production factor cost that is not charged directly to the products in conventional methods, are charged directly to the products in ABC method, based on standard resource consumption amounts determined with engineering methods and calculations. Determining the production and activity costs, based on standart resource consumptions determined with objective measures, enables calculating accurate production and activity costs, and enables preventing the wastes during resource allocation and consumption. (Pazarçeviren, 2000:17)

**ABC** enables more accurate and precise calculations in situations such as indirect costs that are not directly charged to the product cost. Because, allocating indirect costs in volume-based methods is not easy. The most of these resources are being shared by many products, so, setting a system to monitor their consumption is not rational. The real costs of cost objects and activities that are emerged in organization processes, are determined due to the information **related** to activity costs provided by ABC.

Broader information related how target cost (as it's presented in **Figure 1**) is reached in cost allocation, is presented in **Table:1**.

**Table 1: TARGET COSTING MODEL BASED ON ACTIVITY-BASED COSTING**

<b>PRODUCT COST ELEMENTS</b>	<b>BASIC COST ACCOUNTS</b>	<b>DATA SOURCE</b>
<b>DIRECT MATERIAL EXPENSES</b>	PRODUCT DIRECT MATERIAL COST	STANDARD MATERIAL QUANTITY AND PRICE SETS OF THE PRODUCTS BASED ON PRODUCT TREE)
<b>DIRECT LABOUR EXPENSES</b>	PRODUCT DIRECT LABOR COST	DIRECT LABOR TIME AND PAY SETS OF THE PRODUCTS BASED ON DIRECT LABOR OPERATION LIST)
<b>ENERGY EXPENSES (ELECTRICITY, STEAM)</b>	PRODUCT DIRECT VARIED PRODUCTION RESOURCE COSTS	RESOURCE CONSUMPTION AMOUNT AND PRICE SETS OF THE PRODUCTS)
<b>OTHER DIRECT VARIED EXPENSES</b>	PRODUCT DIRECT VARIED PRODUCTION RESOURCE COSTS	RESOURCE CONSUMPTION AMOUNT AND SETS OF THE PRODUCTS)
<b>(1) <u>PRODUCT VARIED PRODUCTION COST</u></b>		
<b>DIRECT FIXED PRODUCTION RESOURCE COSTS OF THE PRODUCTS IN DEPARTMENTS</b>	BUDGETED DIRECT FIXED PRODUCTION RESOURCE COST	ACTIVITY COST BUDGET SYSTEM OF THE BUSINESS
<b>INDIRECT FIXED PRODUCTION RESOURCE COSTS OF THE PRODUCTS IN DEPARTMENTS</b>	BUDGETED INDIRECT FIXED PRODUCTION RESOURCE COST	ACTIVITY COST BUDGET SYSTEM OF THE BUSINESS
<b>PRODUCT DEPARTMENTS BUDGETED ACTIVITY COSTS</b>	<i>BUDGETED INDIRECT FIXED PRODUCTION ACTIVITY COSTS</i>	ACTIVITY COST BUDGET SYSTEM OF THE BUSINESS
<b>(2) <u>PRODUCT FIXED PRODUCTION COST</u></b>		
<b>(1+2) <u>PRODUCT (FULL) PRODUCTION COST</u></b>		
<b>DIRECT VARIED SALES RESOURCE COSTS OF THE PRODUCTS IN SALES DISTRIBUTION MARKETING DEPARTMENTS</b>	BUDGETED DIRECT VARIED SDM RESOURCE COST	ACTIVITY COST BUDGET SYSTEM OF THE BUSINESS
<b>DIRECT FIXED SDM RESOURCE COSTS OF THE PRODUCTS IN SDM DEPARTMENTS</b>	BUDGETED DIRECT FIXED SDM RESOURCE COST	ACTIVITY COST BUDGET SYSTEM OF THE BUSINESS
<b>INDIRECT FIXED SDM RESOURCE COSTS OF THE PRODUCTS IN SDMF DEPARTMENTS</b>	BUDGETED INDIRECT FIXED SDM RESOURCE COST	ACTIVITY COST BUDGET SYSTEM OF THE BUSINESS
<b>SDM DEPARTMENTS BUDGETED ACTIVITY COSTS</b>	BUDGETED INDIRECT FIXED SDM ACTIVITY COSTS	ACTIVITY COST BUDGET SYSTEM OF THE BUSINESS
<b>BUDGETED FIXED SALES DISTRIBUTION MARKETING COST</b>		
<b>DIRECT FIXED GM RESOURCE COST OF THE PRODUCTS IN GENERAL MANAGEMENT DEPARTMENTS</b>	BUDGETED DIRECT FIXED GMA RESOURCE COST	ACTIVITY COST BUDGET SYSTEM OF THE BUSINESS

<b>INDIRECT FIXED GM RESOURCE COSTS OF THE PRODUCTS IN GM DEPARTMENTS</b>	PRODUCT BUDGETED INDIRECT FIXED GMA RESOURCE COST	ACTIVITY COST BUDGET SYSTEM OF THE BUSINESS
<b>GM DEPARTMENTS BUDGETED ACTIVITY COSTS</b>	PRODUCTS BUDGETED INDIRECT FIXED GM ACTIVITY COSTS	ACTIVITY COST BUDGET SYSTEM OF THE BUSINESS
<b>BUDGETED FIXED GM COST</b>		
<b>DIRECT VARIED FINANCE RESOURCE COSTS OF THE PRODUCTS IN FINANCE DEPARTMENTS</b>	PRODUCT BUDGETED DIRECT VARIED FINANCE RESOURCE COST	ACTIVITY COST BUDGET SYSTEM OF THE BUSINESS
<b>DIRECT FIXED FINANCE RESOURCE COSTS OF THE PRODUCTS IN FINANCE DEPARTMENTS</b>	PRODUCT BUDGETED DIRECT FIXED FINANCE RESOURCE COST	ACTIVITY COST BUDGET SYSTEM OF THE BUSINESS
<b>INDIRECT FIXED FINANCE RESOURCE COSTS OF THE PRODUCTS IN FINANCE DEPARTMENTS</b>	PRODUCT BUDGETED INDIRECT FIXED FINANCE RESOURCE COST	ACTIVITY COST BUDGET SYSTEM OF THE BUSINESS
<b>FINANCE DEPARTMENTS BUDGETED ACTIVITY COSTS</b>	PRODUCT BUDGETED INDIRECT FIXED FINANCE ACTIVITY COSTS	ACTIVITY COST BUDGET SYSTEM OF THE BUSINESS
<b>PRODUCT BUDGETED FIXED FINANCE COST</b>		
<b>DIRECT FIXED R&amp;D RESOURCE COSTS OF THE PRODUCTS IN R&amp;D DEPARTMENTS</b>	PRODUCT DIRECT FIXED R&D RESOURCE COST	ACTIVITY COST BUDGET SYSTEM OF THE BUSINESS
<b>INDIRECT FIXED R&amp;D RESOURCE COSTS OF THE PRODUCTS IN R&amp;D DEPARTMENTS</b>	PRODUCT INDIRECT FIXED R&D RESOURCE COST	ACTIVITY COST BUDGET SYSTEM OF THE BUSINESS
<b>R&amp;D DEPARTMENTS BUDGETED ACTIVITY COSTS</b>	INDIRECT FIXED R&D ACTIVITY COSTS OF THE PRODUCTS	ACTIVITY COST BUDGET SYSTEM OF THE BUSINESS
<b>PRODUCT BUDGETED FIXED R&amp;D COST</b>		
<b>PRODUCT -(FULL) COMMERCIAL COST</b>		

In the table, how the target cost or commercial target cost of the product is determined, is presented in detail by handling fixed and varied costs of production and other activities individually.

In the model, target cost of the product which is going to be produced is determined in 2 steps. In fact, what is going to be reached is the full/commercial cost of the product. For this purpose, these are required;

- 1- ***Calculating production (industrial) cost of the product***
- 2- ***Calculating non-production costs of the product***

Production (industrial) cost consists of direct material cost, direct labor cost and fixed and varied general production costs which are budgeted at ordinary capacity level. Full commercial cost is determined by adding budgeted varied and fixed sale, marketing, distribution and management expenses to full industrial cost. For determining target commercial cost of the product, allocating indirect costs to products with activity-based costing method will provide more accurate informations. ABC will follow a more systematic method on cost behaviors when allocating varied and fixed. In this method where ABC method is used for allocating indirect costs, target commercial cost of the product is determined by acquiring required cost data from activity-based budgets. Therefore, the most crucial part of target costing is that determining the target cost will be realized with more accurate informations. Also, operating ***full cost method*** in ABC is compatible with target costing.

ABC has a guiding function on reaching target costs by determining cost objects related to every process in indirect area, and ABC also enables cost management to be

compatible with the Market demands. Particularly in the early stages of product development stage and in accordance with the target costing method, ABC enables the inclusion of common cost areas into the processes of planning and allocation of the target costs. ABC enables the determination of cost objects in the common cost areas, and enables extensive monitoring of the costs caused by an activity or a process. (Can, 2002:174-175) It can be stated that the information required for the target costing is provided by activity-based costing method. After charging the indirect costs to products with activity-based costing, target costs are being determined, and information related to the required alterations to product parts and activities for achieving the target cost can be acquired. (Aksoylu, 2001:142). By this way, in product design phase, businesses will be able to reduce the future costs by designing products that use less parts but with same functions. (Karcioğlu, 2000:191)

### We can explain with the help of an example of the above model

In the example, the unit target cost is calculated over the years. As a basis for 5 years. Total costs as well as target costs per unit can be seen over the years. Thus, we can reach the target cost with a more healthy way. Unit costs are calculated from the structure of the direct variable resource costs, and direct/ indirect fixed resource and activity costs. Also, Life cycle costs are calculated separately because these costs do not show periodicity

The most important advantage of activity based costing method is calculated product target costs considering resource costs as well as activity costs.

**Table:2**

<b>Direct Varied Resource Costs</b>	<b>1.year TL/unit</b>	<b>2.year TL/un.</b>	<b>3.year TL/un.</b>	<b>4.year TL/un.</b>	<b>5.year TL/un.</b>	<b>Average</b>
Direct Material	0,7	0,8	0,9	1,02	1,04	0,9168
Direct Labour	0,82	0,8	0,76	0,72	0,7	0,7512
Direct Varied Production Resource Costs	0,5	0,52	0,54	0,6	0,62	0,5648
Direct Varied Finance Costs						
Direct Varied Sales Costs	0,4	0,42	0,46	0,48	0,54	0,4696
<b>Total</b>	<b>2,42</b>	<b>2,54</b>	<b>2,66</b>	<b>2,82</b>	<b>2,9</b>	<b>2,7024</b>

**TL: Turkish Liras**

**Un: Unit**

**Table 3: The Determining**

Average of Direct Varied Resource Costs

<b>Direct Varied Resource Cost</b>	<b>1.year</b>	<b>2.year</b>	<b>3.year</b>	<b>4.year</b>	<b>5.year</b>	<b>Total</b>
Direct Material	0,098	0,144	0,18	0,2244	0,2704	0,9168
Direct Labour	0,1148	0,144	0,152	0,1584	0,182	0,7512
Direct Varied production Resource Costs	0,07	0,0936	0,108	0,132	0,1612	0,5648
Direct Varied Finance Costs						
Direct Varied Sales Costs	0,056	0,0756	0,092	0,1056	0,1404	0,4696
<b>Total</b>	<b>0,3388</b>	<b>0,4572</b>	<b>0,532</b>	<b>0,6204</b>	<b>0,754</b>	<b>2,7024</b>
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<b>Budgeted Sales Amount</b>	<b>7.000</b>	<b>9.000</b>	<b>10.000</b>	<b>11.000</b>	<b>13.000</b>	<b>50.000</b>

Table 2 shows that direct varied resource costs. Direct varied resource costs include direct material, direct labour, direct varied other production costs, direct varied sales costs and direct varied finance costs. Direct variable costs are loaded directly to the products as it is

known . In this table, unit direct varied resource costs are calculated over the years . Also, We calculated the average in this table. We consider budgeted sales for calculating the average.(Table 3)

**Table 4: Fixed Costs**

<b>Direct Fixed Resource Costs</b>	<b>Example</b>	<b>1 (tl/year)</b>	<b>2 (tl/year)</b>	<b>3 (tl/year)</b>	<b>4 (tl/year)</b>	<b>5 (tl/year)</b>	<b>Total</b>
Direct Fixed Production Resource Costs	Used machine amortization for only A product	24.000	24.000	24.000	24.000	24.000	120.000
Direct fixed Marketing Resource costs		40.000	42.000	43.000	44.000	46.000	215.000
Direct Fixed Sales Resource Costs	Sales manager	36.000	36.000	36.000	36.000	36.000	180.000
Direct Fixed Distribution Resource Costs							
Direct fixed finance Resource Costs							
Direct fixed general management resource cost							
<b>TOTAL</b>		100.000	102.000	103.000	104.000	106.000	515.000
<b>Indirect Fixed Resource Costs</b>							
Indirect Fixed Production Resource Costs		18.000	18.000	18.000	18.000	18.000	90.000
Indirect Fixed Marketing Resource Costs							
Indirect Fixed Sale Resource Costs							
Indirect Fixed Distribution Resource Costs							
Indirect Fixed Finance Resource Costs							
Indirect Fixed GM Resource Costs							
<b>TOTAL</b>		18.000	18.000	18.000	18.000	18.000	90.000
<b>Indirect Fixed Activity Costs</b>							
Indirect Fixed Production Activity Costs		17.000	18.000	20.000	21.000	22.000	98.000
Indirect Fixed Marketing Activity Costs							
Indirect Fixed sales Activity Costs		10.000	11.000	12.000	14.000	15.000	62.000
Indirect Fixed Distribution Activity Costs							
Indirect Fixed Finance Activity Costs		8.000	10.000	11.000	12.000	13.000	54.000
Indirect Fixed GM Activity Costs		11.000	13.000	14.000	15.000	17.000	70.000
<b>TOTAL</b>		36.000	41.000	45.000	48.000	52.000	222.000
<b>Direct/Indirect Fixed Resource-Activity Costs – Total</b>		154.000	161.000	166.000	170.000	176.000	827.000
Budgeted sales amount		7.000	9.000	10.000	11.000	13.000	50.000
<b>Unit Direct/Indirect Fixed Resource-Activity Costs</b>		22	17,88889	16,6	15,45455	13,53846	16,54

Table 4 lists fixed costs for 5 years . Fixed costs contain direct fixed resource costs, indirect fixed resource costs and indirect fixed activity costs. Sub- classification of these costs in detail to provide a new approach to the target cost .In this table, we calculate both total direct/indirect fixed resource – activity costs and unit costs.

**Table 5:**

<b>Product life cycle costs</b>	<b>Example</b>	<b>Total (5 year)</b>
Direct fixed R&D resource costs	Prorotip material product costs	15.000
Indirect fixed R&D resource costs	pattern costs for x and y products	10.000
Indirect fixed R&D activity costs	Design costs, engineering costs	30.000
<b>TOTAL</b>		<b>55.000</b>
Budgeted total sales		50.000
Unit life cycle costs		1,1 TL/un

**R&D costs are product life cycle costs. These costs do not show** periodic separation, Thus, they are calculated for product entire life.(Table:5)

**Table 6: The calculation of unit target cost**

	1st year	2nd year	3rd year	4th year	5th year	<b>Average</b>
Unit Direct Varied Resource Costs	2,42	2,54	2,66	2,82	2,9	2,7024
Unit Direct/Indirect Fixed Resource and Activity Costs Direkt /Endirekt Sabit Kaynak ve Faaliyet Mal.	22	17,8889	16,6	15,45455	16,53846	16,54
Unit life cycle costs	1,1	1,1	1,1	1,1	1,1	1,1
<b>Unit target Costs (Total)</b>	<b>25,52</b>	<b>21,5289</b>	<b>20,36</b>	<b>19,37455</b>	<b>20,53846</b>	<b>20,3424</b>

Unit target costs are calculated over the years in Table 6. the unit was the target cost . Also, these costs' average is calculated in this table. Thus, activity based costing has allowed the effective target cost calculation and target cost model.

Our model provides more accurate and transparent cost information than the conventional approach in determining product target cost. It helps management greatly to focus on the right resources in order to improve the performance of the whole system.

## Conclusion

With the globalization, the conditions of competition have changed and the consumer awareness has risen. Now, the businesses are competitive as much as their ability to cope with providing new consumer demands and needs at the quality, price and time the consumer desires. These changes have led the development of new strategic approaches in the scope of cost and management accounting. And, one of these approaches is target costing.

With the target costing, future costs are planned and controlled before they emerge and this accompanies significant cost savings. Purpose of the method is to establish a production process that achieves the desired profit. In this way, the method is used in the new product development process for counterbalancing the profitability and the cost planning, with taking customer satisfaction into consideration.

However, operating target costing method with the information provided by conventional value-based costing method will decrease the benefits of the target costing method.

Because, with the transition to advanced production environments that operates advanced production technologies, the production is enabled to be realized in a broad product range, thus the importance of the direct labor costs in the total cost are declined, on the other

hand indirect costs/general production costs are greatly increased in importance. In addition to this, conventional volume-based costing caused the reporting of inaccurate cost informations. Activity-based Costing method based on Activity-based information is developed to fill this deficiency.

ABC can be described as a cost and management approach that operates with the activity-based allocation of the indirect costs due to the fact that the products consumes the resources of the business based on the activity; and can be described as an approach that establishes a direct link between the product and indirect costs, without depending solely on product volume and at varied levels. ABC which is presented against conventional costing methods, is a modern cost allocation method that presents a new alternative to allocation of the general production costs.

In the study, activity-based costing method is used for determining the target cost in target costing model. It is clear that the method provides more accurate cost information particularly about the allocation of the indirect costs. Activity-based costing forms a highly compatible model with target costing. While the area of target costing expands to include customer, distribution, supplier relationship; on the other hand, the information required to properly manage these relationships is going to be provided from activity-based costing method. Again, while taking customer satisfaction into consideration, changes will be made in product design and development. At this point, reflecting these changes to the costs can be realized with activity-based costing method.

For providing more accurate and extensive information in cost management, it's beneficial to operate target costing with the activity-based costing which is presented as an alternative to conventional method. Particularly common cost areas pose a problem in the businesses. In target costing, the costs start at the market level and branches to the level of every subsection. At this point, when allocating common costs, ABC is going to be able to provide more accurate informations for target costing.

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# DIFFERENCES BETWEEN B2B AND B2C CUSTOMER RELATIONSHIP MANAGEMENT. FINDINGS FROM THE CZECH REPUBLIC<sup>1</sup>

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## Abstract

The purpose of this article is a comparison between Customer relationship management (CRM) in the B2B environment and B2C Environment. Literature shows significant differences; therefore the motivation of the research and hence the article was the verification of theoretical statements. Based on the literature review of CRM, an online questionnaire was sent. This research used 6 questions from the questionnaire. On a large number of respondents the differential analysis was made. Results prove the theoretical expectations: CRM in B2B and B2B environment are partially similar, but the mostly differs.

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**Keywords:** B2B, B2C, CRM, difference

## Introduction

Customer relationship management (CRM) is well-known term during past decade. Brought by academics and implemented into the business by practitioners, it is nowadays well-used in many companies from different industries.

The purpose of this article is to compare the CRM approach between Business-to-business (B2B) and Business-to-consumer (B2C) relationships. The study was made on small and medium companies in service industry in the Czech Republic.

## Literature review

Relationships between the company and customer are usually categorized by types of subjects on the customer side of the relationship<sup>2</sup>. Therefore the categories could be distinguished into Business-to-business (B2B), Business-to-customer (B2C), or Business-to-government (B2G). (Payne & Frow 2013, s.56) This article will mainly focus on differences between the B2B and B2C environment.

## *B2B and B2C*

B2B is described as the form of relationship with the company on the side of supplier and another business company on the customer side. This business company could be represented by sole trader, company, or institution<sup>3</sup>. (Kumar & Reinartz 2012, s.261)

B2B market includes big number of transactions, and is usually more complex (Davis et al. 2012; Saini et al. 2010; Hutt & Speh 2012, s.38). The complexity leans on number of

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<sup>2</sup> For the purpose of this study we will omit the cases where the supplier is not a business company, but individual as the consumer.

<sup>3</sup> According to some sources the B2B environment includes government institution (Kotler & Armstrong 2009)

people responsible for the transaction and number of steps in these transactions. (Payne & Frow 2013, s.56)

Johnston and Bonoma (1981) define the group of people responsible for the transaction on customer side in B2B market as buying center. The complexity is higher also because of number of people involved – seller has to identify and understand their needs and motivation. According to Davis, Golicic and Marquardt (2012, s.200) the number of people in the buying center varies depending on the importance of the transaction, its stage and character. The process is called decision making (Webster & Wind 1972, s.2).

The trend in last decades in B2B environment according to Ulaga and Eggert (2006) are closer relationships and also decreasing number of relationships overall. Business-to-consumer (B2C) relationships could be described as a relationship with businesses on the side of supplier and consumers on the other side. The differences to B2B are described in following part.

## CRM

Building a relationship with customers is an important issue both for B2B and B2C. Mousavy et al. defines CRM as a *“wealthy popular strategy having hypotheses on the belief that collecting data and expanding the relationship with customers can be the best way to serve customer’s loyalty and subsequent profits”* (Mousavy et al. 2012)

Campbell et al. (2009, s.109) see customer relationship consisting from two perspectives: relationship breadth and relationship depths. Breadth represents phases or evolution of the relationship. *“Organizations develop strategies for moving relationships to a desired phase”*. By strategies Campbell et al. mean for example loyalty programs, etc. Reichheld presents CRM as a process of developing a relationship with customers which makes them more loyal. He also states that loyal customers are more profitable than non-loyal. (Reichheld 1996)

Customer relationship depth *“focuses on the factors that strengthen or weaken a relationship within a particular stage – e.g. trust, satisfaction, etc”* (Campbell et al. 2009, s.109).

Javalgi et al. (2006) describe the four main components of service CRM: customer satisfaction, customer loyalty programs, customer retention programs and customer lifetime profitability. According to Reinartz et al. (2004), major CRM activities are customer interaction management (customer identification, acquisition, retention), customer relationship upgrading (cross-selling and up-selling) and customer relationship win-back.

Customer relationship management is often seen as technology-only approach. Many studies confirmed this assumption is based on false expectations and CRM cannot serve without other components (Kale 2004). Woodburn (2002, s.19) confirms this statement by warning that relying on the technology only could inhibit or destroy the relationships with customers.

Chen and Popvitch (2003), supported by other authors (Coltman et al. 2011) include technology among the two other main CRM components – people and processes.

## Differences between B2B and B2C environment

According to Kumar and Reinartz (2012, s.261), the transaction volume on B2B market is much greater than on B2C market. Several sources (Saini et al. 2010; Kumar & Reinartz 2012) state there are fewer subjects on B2B market, therefore the value of each transaction and amount in purchase is much bigger. Gummesson (2008, s.174) sees the biggest difference in B2B and B2C in *“the greater degree of independence between buyers and sellers in the former”*. Saini et al. (2010, s.366) show the evidence that the CRM technology leads to higher performance in B2B than in B2C relationships.

Saini, Grewal and Johnson (2010) add another differences: in B2C relationship customers are less loyal and therefore more likely to switch. Davis et al. explain the bigger loyalty in B2B relationships by need of bigger reliability among trading partners (Davis et al. 2012, s.200). Because pure and discrete transactions are rare in B2B (Day 2000), the importance in B2B is not only about the product or service, but also in the customer relationship (Davis et al. 2012, s.200).

### The study and methodology

The main aim of the study is to discover differences between B2B and B2C relationships. The research was based on online questionnaire sent to random small and medium companies in the service industry in Czech Republic. Company samples were selected from Albertina database. The questionnaire contained 20 questions, but for purpose of this study, only 6 were used. An e-mail containing link to the questionnaire was sent to 30 674 randomly chosen SMEs. 2 462 replies were collected, and 1 701 were possible to link with additional information from the Albertina database.

From this amount were 1 091 samples from B2B relationship and 610 from B2C. Since the main aim of this study was finding differences between the two types of relationships, all the answers were analyzed for maximal differences between the two groups. The table shows ten most interesting results.

Code	Question with a specific answer	B2B	B2C
QA1	The customer satisfaction with your services are inquired by: [Social media and internet monitoring]	10%	27%
QA2	The key customers are determined by: [financial contribution to the company]	55%	29%
QA3	The key customers are determined by: [We do not differentiate customers, everyone is equal]	43%	67%
QA4	How do you select which customers have the right to better customer service? [Those who spend more money]	25%	15%
QA5	How do you select which customers have the right to better customer service? [Those who are prestigious, e.g. for the reference]	22%	11%
QA6	How do you select which customers have the right to better customer service? [We do not differentiate customers, everyone is equal]	43%	56%
QA7	The most common customer faults are in your opinion: [They do last minute orders]	45%	28%
QA8	The most common customer faults are in your opinion: [They ask about information that can be easily found]	12%	24%
QA9	The most common customer faults are in your opinion: [They pay after maturity]	65%	36%
QA10	What kind of the loyalty program does your company have? [None]	54%	47%

Tab. 1: Selected questions with selected answers

The differences between B2B and B2C group could be measured separately (as shown above) or together as two groups. Coordinates of the centers and distance of the centers  $m(B2B)$  and  $n(B2C)$  were calculated.

$m(B2B) = [0,0999; 0,5509; 0,4326; 0,2539; 0,2181; 0,429; 0,4464; 0,1247; 0,6508; 0,5371]$

$n(B2C) = [0,2721; 0,2869; 0,6672; 0,1492; 0,1131; 0,5574; 0,2754; 0,2426; 0,3639; 0,4656]$

In general:

$m(B2B) = [m_1; m_2; m_3; m_4; m_5; m_6; m_7; m_8; m_9; m_{10}]$

$n(B2C) = [n_1; n_2; n_3; n_4; n_5; n_6; n_7; n_8; n_9; n_{10}]$

Afterwards the distances between all items and centers of **their** clusters using the equation of Euclidean distance were calculated:

- $L(x_i - m(B2B)) = \sqrt{(x_1 - m_1)^2 + (x_2 - m_2)^2 + \dots + (x_{10} - m_{10})^2}$
- $L(y_i - m(B2C)) = \sqrt{(y_1 - n_1)^2 + (y_2 - n_2)^2 + \dots + (y_{10} - n_{10})^2}$

Using the same principle the distances between all items and the centers of the **other** clusters:

- $L(x_i - n_{B2C}) = \sqrt{(x_1 - n_1)^2 + (x_2 - n_2)^2 + \dots + (x_{10} - n_{10})^2}$
- $L(y_i - m_{B2B}) = \sqrt{(y_1 - m_1)^2 + (y_2 - m_2)^2 + \dots + (y_{10} - m_{10})^2}$

For the confirmation of affiliation of the item (company) to its group (B2B or B2C) the test was made: if the distance between this item and the center of its cluster is smaller, then add 1 to the group counter. Therefore:

- If  $L(x_i - m_{B2B}) > L(x_i - n_{B2C})$  then count +1 to B2B cluster
- If  $L(y_i - n_{B2C}) > L(y_i - m_{B2B})$  then count +1 to B2C cluster

This test showed 705 from 1091 B2B and 421 from 610 B2C are affiliated with their groups<sup>4</sup>. The conformity is not absolute; therefore the groups are partly overlapped. This result shows the B2B and B2C relationships are not completely different entities but they have something in common.

For a better quantification of the overlap was used distance from the clusters' centers and standard deviation for both clusters.

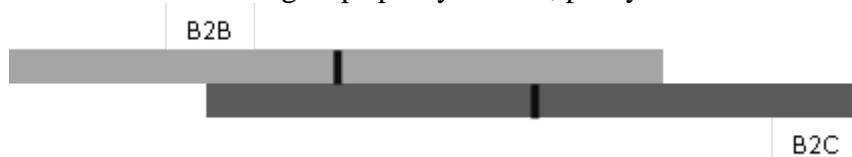
$$L(m_{B2B} - n_{B2C}) = \sqrt{\sum_{i=1}^{i=10} (m_i - n_i)^2} = 0,57$$

$$\sigma_{B2B} = \sqrt{\frac{1}{N} \times \sum_{i=1}^{i=10} (x_i - m_i)^2} = 1,42$$

$$\sigma_{B2C} = \sqrt{\frac{1}{N} \times \sum_{i=1}^{i=10} (y_i - n_i)^2} = 1,40$$

The results can be visualized (see

**Fig. 1**). The width of B2B rectangle is  $2 \times 1,42$  and the width of B2C rectangle is  $2 \times 1,40$ . The distance between clusters' centers is 0,57. As mentioned above, the visualization shows B2B and B2C groups partly similar, partly different.



**Fig. 1: The distance of the B2B and B2C clusters**

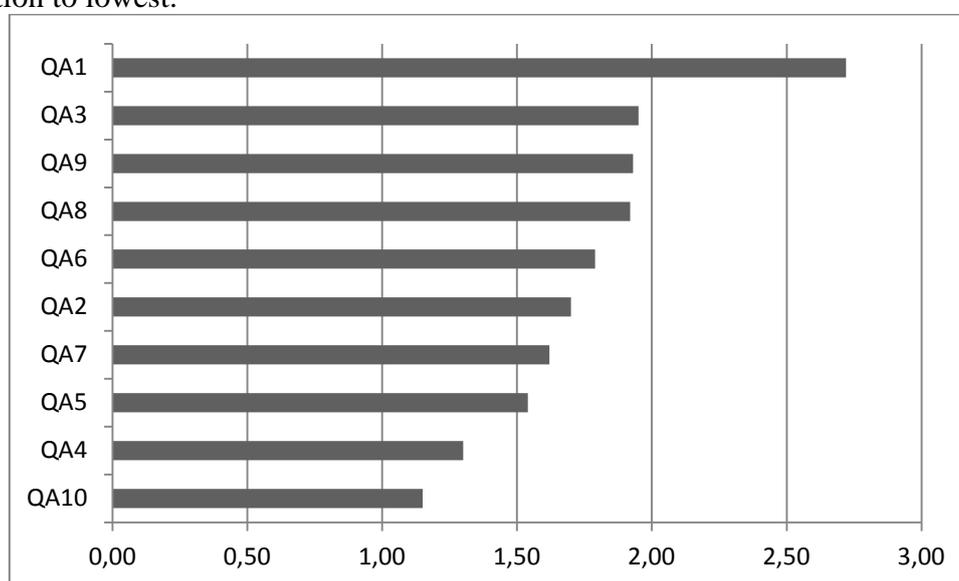
Next step was to find out which answers differentiate clusters the most. Therefore the ratio between the answers was developed.

<sup>4</sup> Which means with the type of the relationship they claimed in the questionnaire to use the most

	QA1	QA2	QA3	QA4	QA5	QA6	QA7	QA8	QA9	QA10
<b>B2B</b>	0,0999	0,5509	0,4326	0,2539	0,2181	0,429	0,4464	0,1247	0,6508	0,5371
<b>B2C</b>	0,2721	0,2869	0,6672	0,1492	0,1131	0,5574	0,2754	0,2426	0,3639	0,4656
<b>ratio</b>	2,72	0,52	1,54	0,59	0,52	1,3	0,62	1,95	0,56	0,87
<b>inverted ratio</b>	0,37	1,92	0,65	1,7	1,93	0,77	1,62	0,51	1,79	1,15
<b>how many times more important</b>	2,72	1,92	1,54	1,7	1,93	1,3	1,62	1,95	1,79	1,15
<b>rank</b>	1	4	8	6	3	9	7	2	5	10

**Tab. 2: Ratio and comparison of the answers**

In the Graph 1 the results are visualized. The bigger value the more this answer contributes to the difference of the clusters. In the graph the answers are sorted from highest contribution to lowest.



**Graph 1: Comparison of the answers**

## Conclusion

From the literature review are visible the similarities differences between B2B and B2C customer relationship management. Although the topic of CRM is popular, not many researchers compared these types of relations.

This research paper showed the evidence of different customer relationship management approach in B2B and B2C relationship types. On the large number of respondents from small and medium companies in Czech Republic was shown the approach is partly similar, but more less different. The topics which differentiate the two groups the most are QA1, QA3 and QA8+9.

The further research should be directed into deeper description of the differences and comparison in different industries and countries. Deeper description could be fulfilled by qualitative research – especially interviews.

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## **CARBON DYNAMICS: EVER GOING TO STOP INCREASING?**

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### **Abstract**

The purpose of the study was to mimic carbon dynamics in the atmosphere and to simulate the change of carbon under different versions of the base model. The simulation contains namely three stocks the CO<sub>2</sub> in atmosphere, - in biosphere and - emission from fossil fuels. The assumption is that ocean carbon uptake and outflow cannot be directly influenced by policy makers. There are factors influencing carbon in- and outflow which are the rate of respiration, the decomposition, the area of forests, the net primary production, the deforestation, the assumed growth rate of fossil fuel demand and the saturation of consumption. The study unveils the dynamic of this process by applying system thinking and uses AnyLogic 6.9.0 version software for modeling system dynamics. The model originally elaborated by Hartmut (1994). The software facilitates to forecast the change of carbon if fossil fuel consumption will saturate and if deforestation will be stopped. The overall aim was to create a simulation to see the sensitivity of the ecosystem and try to eliminate climate change due to the escalation of carbon. The results of this analysis can be used to identify the necessary changes to stop carbon growth in the atmosphere. The anticipated outcome of this simulation is to set up the original model and to create three versions of the base model. The findings may be useful for decision makers in the field of sustainability, biomass power plants operators or for energy and environment strategy managers.

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**Keywords:** Carbon dynamic, system thinking, atmosphere, biosphere, fossil fuel, model ecosystem, deforestation

### **Introduction**

Carbon dioxide is considered to be the most relevant influential factor for global warming and climate change which resulted from human activities. The concentration of carbon dioxide in the atmosphere is rapidly increasing year by year, past year average increase was 2 ppm/yr (parts per million per year). Currently the CO<sub>2</sub> level was 395.15 ppm in august 2013 (NOAA, 2013; Scripps Institution of Oceanography, 2013). If the growth dynamic do not change or develop more dynamically, the world is going to face serious consequences as 50 million years back when the earth was ice-free until the CO<sub>2</sub> level dropped below 450 ppm. The safety limit of the carbon concentration in the atmosphere is 350 ppm. If we exceed the level 450-500 ppm that would induce significant stress on our biodiversity, lead to the extinction of several species, global warming, change the global ecosystem and increase the number of natural hazards. Unfortunately 350 ppm was already exceeded in the year of 1988 (Hansen et al. 2008, Pacauri, Reisinger, 2007). The process is only reversible by prompt policy changes.

It has been proved that the increase of carbon dioxide in the atmosphere was in the same speed with the combustion and use of fossil fuel energies starting from the industrialization. Also the beginning of the industrial sized deforestation in 1970 has

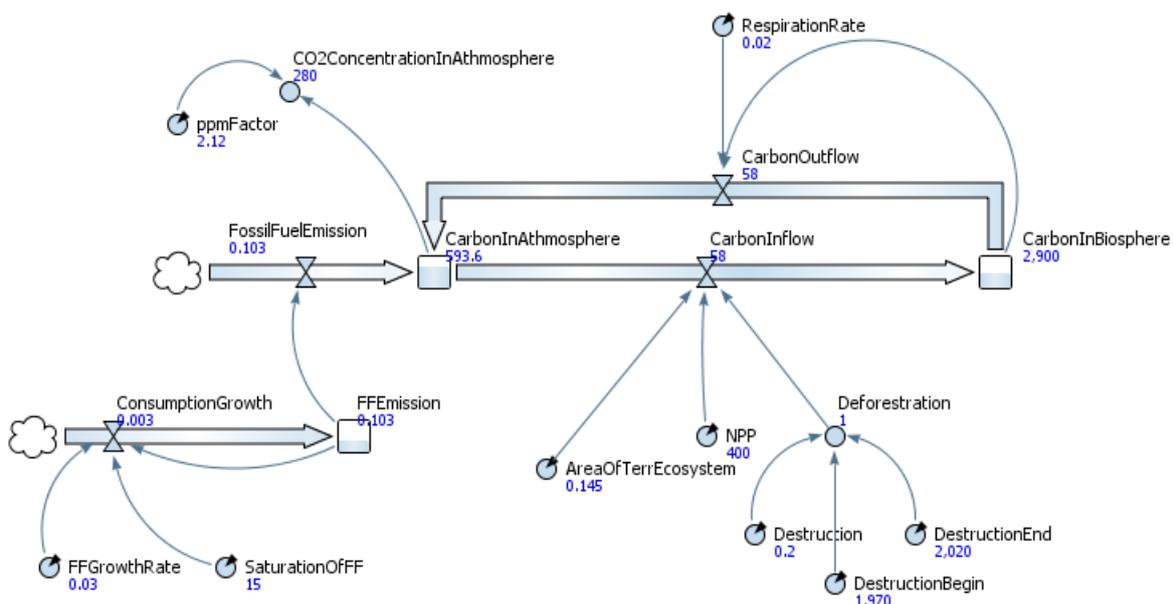
triggered the increased carbon dioxide concentration in the air. Forest is one of the largest carbon sink, along with the atmosphere and ocean. Any change or disruption in the system will reduce the size of the carbon sinks. Consequently if the use of traditional source of energies and deforestation is not going to be eliminated, then the options for mitigating probable climate change is limited (Hartmut, 2007, le Quéré et al, 2009; Canadell, 2007).

Before policy making one should understand that ecosystem is a highly complex system where each individual part is in relation with the whole complexity. It is not possible to change an element without measuring its impact and observe its consequences. A system is defined by Meadows (2008, p188) as “an interconnected set of elements that is coherently organized in a way that achieves something (function or purpose)”. A behavior of a system can be predicted by knowing the elements of the system. Interconnection between each element is responsible to supply the necessary information which is determined by the general function of the system. Function is a higher level state which has a dramatic affect when being modified. Therefore model creation facilitates the process to observe system behavior over time with the help of graphs. Modeling system behavior will help us understand whether the system is approaching a goal or a limit, and see the dynamic of the process (Meadows, 2008).

The first section is going to guide the reader through the verbal model that is going to explain the details and content of the base model including parameters and applied data. The second section is introducing three different versions of the base model and interpreting the findings. The third section will follow with recommendations from an economic prospective and see the financial consequences of the current.

### Description of the model

Hartmut (1994 p346, 2007) findings have provided the basis for our simulation. In the original model the author was trying to model the CO<sub>2</sub> dynamics in the atmosphere after 1850 when the equilibrium state was being disturbed. The added value beyond regenerating Hartmut model is to extend it with different versions assuming optimistic and pessimistic situations by modifying or adding new parameters and find an ideal path to stabilize carbon dioxide concentration. During model development AnyLogic software was used which required the exact definition of equations and data. Hence a thorough and critical review of the base model had to be conducted.



1. Figure Base model interpreting carbon dynamics at the first stage of model development (the figure is made by the author)

The model contains two main carbon stocks. Namely one stock represents carbon level in the atmosphere and the other stock represents the carbon in biosphere (See Figure 1). These two stocks are interrelated, both are influencing one another. There will be parameters effecting and determining this relation, so called the flow of carbon uptake and intake. It is known that humanity's carbon dioxide is being sequestered by three sinks: the atmosphere (50%), the biosphere (26%) and the ocean (24%) (le Quéré, 2009, Hall, 1988). The original model made by Hartmut (1994) has neglected carbon intake by the ocean to simplify the model and he assumed it is a relatively small amount. The model will disregard ocean as a carbon sink at this stage of the model development. The assumption is that ocean carbon uptake and outflow cannot be directly influenced by policy makers, therefore a simplified model will be used now since at other carbon sinks there are more tools to influence carbon sequestration. Furthermore the next research question of the author will be to model the change in carbon uptake particularly of forest and crop land under different agro-strategies proving that biomass plants are not carbon neutral. Le Quéré (2009) and Canadell (2007) have found that the carbon sinks sequestration capacity is deteriorating due to the negative response to climate change and variability. Between 1959 and 2008 there were 43% more carbon remaining in the air than before (le Quéré, 2007). The ocean pH content before the industrialization was 8.179 and currently it is 8.104. It has decreased by 0.075 which results in the acidification of oceans and if pH level reaches 7.824 as a prognosis said by 2100, it will danger the existence of coral reefs and alters the ecosystem of the ocean (Caldeira, Wickett, 2003; Raven et al, 2005). If the acceleration of carbon in atmosphere would stop, that would consequently solve the acidification of the ocean. The carbon in biosphere at the equilibrium state (before industrialization) was 2,900 ppm which is being determined by the total terrestrial area of the ecosystem, 0.145 Gkm<sup>2</sup> (giga km<sup>2</sup>) and the net primary production which is 400 Gt C (gigaton of carbon) showing the amount of net carbon dioxide taken in by plants minus the respiration (McGraw-Hill, 1982). This equation was disturbed by deforestation starting in 1970 and the assumption of the base model is that it will be stopped in 2020. It is changing with a rate of 0.02% per year. This parameter has a negative feedback loop for the system. It has explained the carbon tied in the biosphere through photosynthesis. The carbon outflow from biosphere occurs during the respiration of the ecosystem (plants, animals), and the decomposition of organic matters. It is estimated on a rate of 0.02 per year. It is depending on the rate of carbon in the biosphere, consequently there is a link between the flow and the stock. The following equation expresses the carbon in biosphere in relation of time.

*Carbon in Biosphere/dt*

$$= \text{Area of Ecosystem} * \text{NPP} * \text{Deforestation} - \text{Respiration rate} * \text{Carbon in Biosphere}$$

The other large stock is carbon in atmosphere. There is one carbon outflow, the sequestration of biosphere and there are two carbon inflows: carbon from respiration, decomposition and carbon from the combustion of fossil fuels. The historical CO<sub>2</sub> equilibrium was 280 ppm in the atmosphere until 1850, when burning fossil fuel overbalanced the equilibrium state (Hydrogen, 2002). If rate of burning coal, oil, and natural gas would be less intensive; the CO<sub>2</sub> concentration may not change so dramatically in the air. The following equation expresses the carbon in atmosphere in relation of time.

*Carbon in Atmosphere/dt*

$$= \text{Fossil fuel emission} + \text{Respiration rate} * \text{Carbon in Biosphere} - \text{Area of Ecosystem} * \text{NPP} * \text{Deforestation}$$

There is an auxiliary, so called CO<sub>2</sub> concentration in atmosphere, which is starting from the carbon in atmosphere stock with the purpose merely to express carbon in the air in ppm. It is calculated so that the carbon in the atmosphere is divided by 2.12 Gt C/CO<sub>2</sub>ppm.

The last complex dynamic subsystem describes the carbon emission of fossil fuel during combustion. It assumes a 0.1 Gt carbon emission per year and calculates with a 0.03% growth per year. The model hypothetically defines saturation in fossil fuel consumption at a rate of 15 Gt C per year. The expectation is that it will result in a logistic curve at the fossil fuel emission stock, where the function starts at a given rate, while growing up until a certain rate and will stay unchanged. This dynamic system is going to influence the atmosphere. The following equation expresses the carbon in atmosphere in relation of time.

$$\begin{aligned}
 & \text{Carbon emission of FossilFuel}/dt \\
 &= \text{Fossil Fuel growth rate} * \text{Fossil fuel emission} * \left(1 - \frac{\text{Fossil fuel emission}}{\text{saturation in consumption}}\right)
 \end{aligned}$$

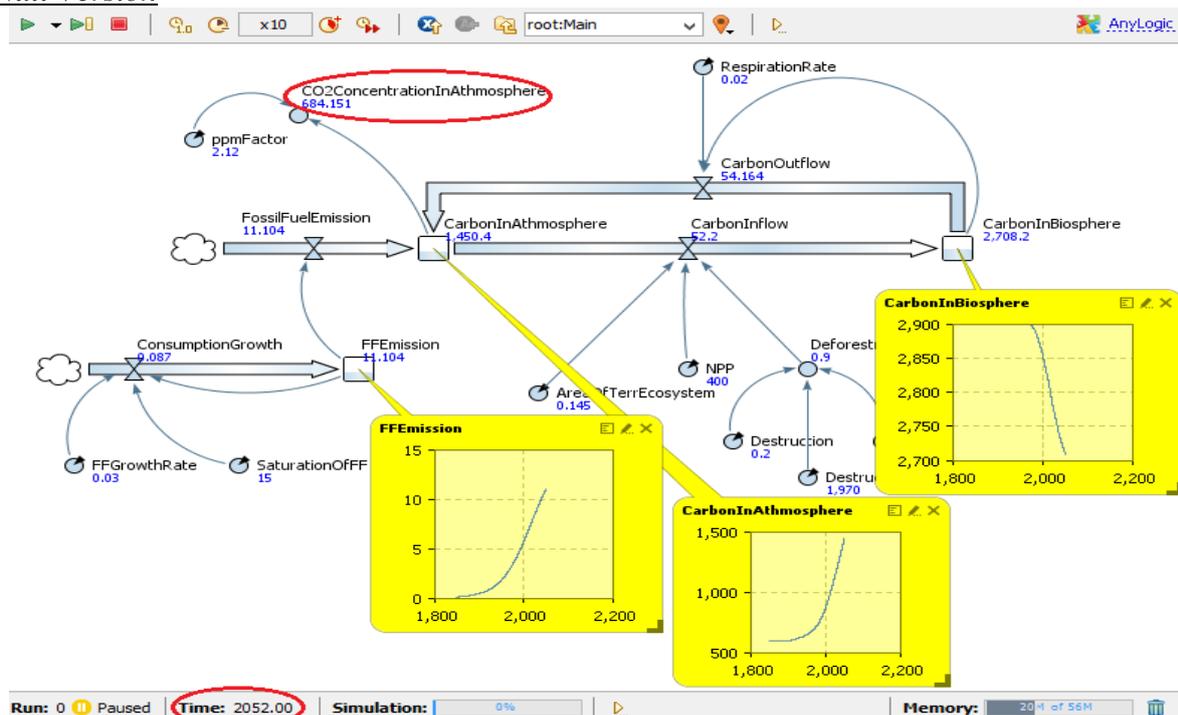
According to Le Quéré (2009) and Canadell (2007) 91% of CO<sub>2</sub> is originated from burning fossil fuels and cement and 9% comes from the different land use strategies. The model is calculating with both of the large emitting factor. In order to mitigate possible impact the model is going to help us to foreseen the future changes under different versions of the base model.

For the sake of simplicity minor events are going to be neglected in the model. For instance the emissions resulting from human activities are not considered as a carbon flow, as it represents only a few percent.

### Versions of the base model and results

This section's purpose is to run the base model in Anylogic software, then execute several alterations on parameters and interpret the results. There is going to be one plus three versions. The null version will be the base model created by Hartmut (1994, 2007). The first version is going to modify the future consumption of fossil fuel parameters. The second version will examine different deforestation and afforestation strategies. The third version develops suggestions for energy and forest policies that stabilize CO<sub>2</sub> concentration in the atmosphere.

#### Null Version



2. Figure Null version output table (the figure is made by the author)

Looking at the base model output table (see Figure 2) it corresponds with the historical trends of carbon increase. The model was run between the period of 1850 and 2052. The atmospheric carbon has increased from 280 ppm to 684 ppm. It is observable on the yellow diagrams (Figure 2) that starting from the equilibrium state carbon begins to increase heavily in the atmosphere due to the logistic curve of fossil fuel carbon emission. The carbon uptake of the biosphere is being negatively affected by the deforestation and net primary production rate relative to the forest area. It results in a negative slope. The rate of respiration is depending on the area of the terrestrial ecosystem. Therefore the respiration rate is going to decrease hence more carbon remains in the atmosphere.

If the model is running until the consumption of fossil fuel saturate at a rate of 15 Gt C, it is going to happen in year 2365. By that time the Carbon in biosphere will settle down at a new equilibrium point. However in contrast the carbon concentration in the air is steadily increasing.

### First Version

The first version illustrates the possible outcomes if the decision makers are going to realize the harmful effect of fossil fuels and willing to act towards sustainability. In the model input parameters will be changed around the base model which serves as a reference point to see the change effect on the outcome.

First of all the model parameter, the saturation of fossil fuel consumption, is going to be modified to 5, 10, 15, and 20 GtC/yr at ceteris paribus. According to my expectations, the atmosphere carbon content was increasing with a slower rate (see Table 1).

Year	Saturation level (GtC)	Carbon content (ppm)
2052	5	544
2052	10	632
2052	15 base scen.	684
2052	20	726

**1. Table** Showing carbon content at different saturation levels

If another parameter, growth of fossil fuel consumption will be altered to 0.02, 0.03 and 0.04 % per year at ceteris paribus. The comparison table shows the accumulation of carbon concentration in the air, but the growth rate is a stronger influential on carbon emission than saturation in consumption (see Table 2)

Year	Growth rate of FF (pct/yr)	Carbon content (ppm)
2052	0.02	479
2052	0.03 base scen.	632
2052	0.04	913

**2. Table** Showing carbon content at different growth levels

The best strategy would be if fossil fuels are saturating at a rate of 5 Gt C and there would be a 0.02 growth rate. If it happens, it would result in 455 ppm in 2052 which is still high, but would induce lower emission than currently.

### Second Version

The following version is looking at several deforestation strategies. Hypothetically the rate of deforestation will be modified to a better and worse version while the base model will

function as a control output. The rates of cutting trees are going to be 0.15, 0.2 and 0.25 % per year. If the rate of deforestation will be lowered, a slight reduction would be experienced in carbon content (see Table 3)

Year	Rate of deforestation (pct/yr)	Carbon content (ppm)
2052	0.15	661
2052	0.2 base scen.	686
2052	0.25	708

**3. Table** Showing carbon content at different rate of deforestation

compared to the base model. Cutting more trees out is not an option to consider, but as a worst case version we can see that the carbon content will increase to 708 ppm.

The next step was to alter the end date of deforestation. If decision makers and politicians fail to change their forestry strategy on time and continue with the current rate of environment degradation, it is necessary to understand how much burden it means for the environment. If deforestation stops in 2025, it increases the level of carbon to 691 ppm, which is increasing slowly and constantly as the time is being postponed (see Table 4).

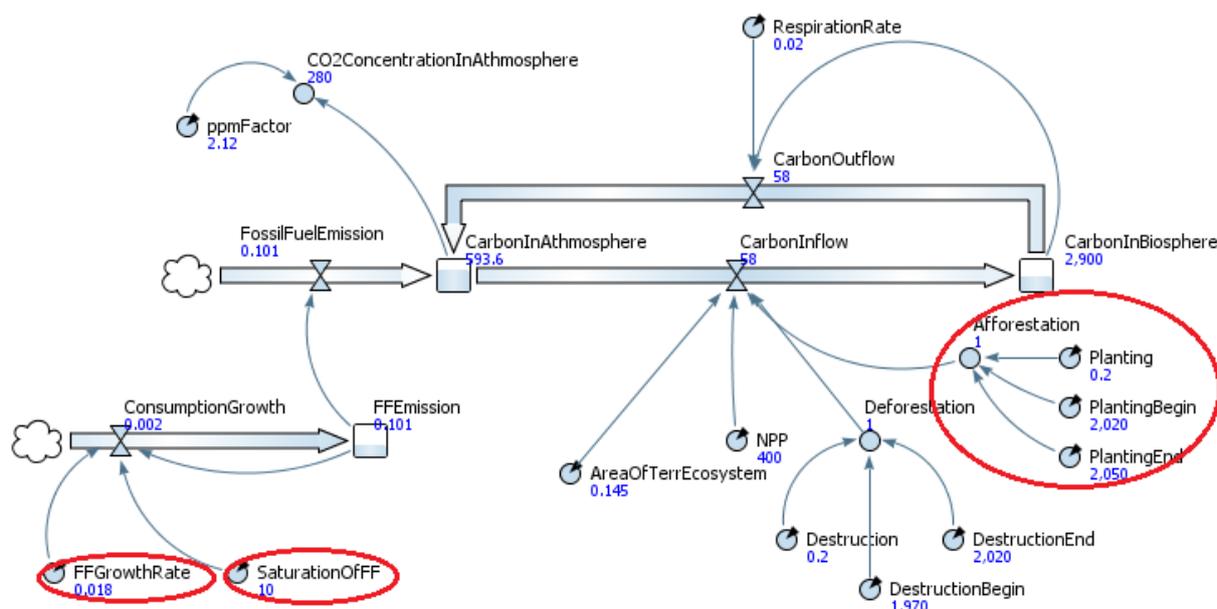
Year	End of deforestation (yr)	Carbon content (ppm)
2052	2020 base scen.	686
2052	2025	691
2052	2030	696

**4. Table** Showing carbon content at different end of deforestation

It is easy to realize that reducing the volume is more influential, then the end of deforestation. It is also necessary, but results only in a relatively small carbon increase in the atmosphere. Policy makers should go beyond and develop alternative strategies at the meantime to reduce carbon content.

### Third Version

The last version is the combination of best practices. A hypothetical energy and forestry strategy is going to be investigated that aims to stabilize carbon dioxide in the atmosphere. First the strategies will be introduced then the outcome will be investigated. The first step would be to regenerate the lost biosphere and start to plant trees. Therefore the afforestation auxiliary was added to the model similar to the deforestation equation (see red circle in Figure 3). It is determined by the level of afforestation (parameter named as 'Planting'), by the beginning and end date of planting trees. As the decision makers will realize the negative effect of destroying forest, will stop cutting out further trees and will start regenerating the lost forest lands. Therefore the model takes 2020 as the year when afforestation starts and 2050 as the end of planting. The rate of afforestation is assumed to be twice as much than the rate of deforestation in order to increase the absorption capacity of the biosphere. It is 0.2% per year.



3. Figure Third version output table (the figure is made by the author)

The other option is to realize a more sustainable energy strategy. It is high time for decision makers to understand the harmful effect of fossil energies on one hand and to believe the finite availability of fossil energies. Energy consumption should be sourced from renewable energy rather than non-renewables. There are numerous alternatives to cover energy needs which are less or non-polluting. For example wind-, solar energy, hydro power plants, bioenergy and geothermal energy are all applicable and developed technologies available on the market. Therefore the growth rate of fossil fuels will be reduced to 0.018% per year, assuming that other non-emitting energy resources will replace the fossil energies. The saturation of consumption in fossil fuel therefore will happen earlier than the base model suggested. Now it is set to 10 Gt C (see red circle in Figure 3).

After running the model several times following different strategies, it was observed that the most effective way to reduce atmospheric carbon is the slower growth rate of fossil fuels. With the above written parameters by 2050 there would be 456 ppm carbon dioxide in the air. The rate of carbon accumulation would be significantly reduced by proper policy making.

### Recommendation

The earth has passed in 1988 the safety level of carbon content in the atmosphere neglecting the unforeseen negative consequences. As the human kind severely experiencing global warming, the acidification of ocean, the melting of ice-cap, extinction of species and the frequently occurring natural hazards, they tend to believe it is time to execute changes. These phenomena have impact not just on our natural environment, but also on our economy and society. The economy is spending millions of dollars to correct and revise the traditional way of business models and old polluting technologies. The government is also responsible to insure the society and cover their losses in case of natural hazard and extreme climate events. Huge amount of money is spent on this respect. It is a common interest to warn off fossil fuel resource usage and carbon emission as much as possible. It seems to be plausible, but only with strict policy making. Otherwise if we reduce only a bit of the carbon emission it would still continue heating up (Matthew&Caldeira, 2008, Hansen et al., 2008, Pacauri, Reisinger, 2007).

My recommendation is to act now, as the different versions have illustrated there is a lack of time and increasing carbon dioxide in the atmosphere. The target 450 ppm will be

reached by 2050 in the third version as well, therefore forestry and energy strategy is not remedy for this problem. What has been accumulating since 1850 could not be removed from one day to another from the air. Recommendation is to replace fossil fuel resources with other non-renewable sources at the first place, such as solar, wind, geothermal, hydro, bioenergy...etc. There are some advanced technologies such as the concentrated solar, wave and tidal energy. Try to avoid traditional cars and support electric cars. Proper forestry and agricultural strategy should be favored by decision makers (Matthew&Caldeira, 2008, Hansen et al., 2008, Pacauri, Reisinger, 2007).

Nowadays governments are heavily investing in research and development to find out the best and fastest technology to reduce carbon in the air. It is a highly researched area whether carbon can be artificially drawn from the air. The technology is not there yet to offer a large scale option, but may in the future. There are pilot projects existing at a cost of \$200/tC. To artificially remove 50 ppm carbon from the air would cost around \$20 trillion (Lackner, 2003; Keith, 2006, Hansen et al., 2008). It is a rather capital intensive solution. There is an early application of carbon dioxide capture and storage (CCS) system as well. However afforestation strategy could offer a cheaper and natural way of carbon elimination. As my model illustrated in the second and third versions, this process is able to reduce the carbon content in the atmosphere in a way that the positive effect of carbon sequestration of soil is also increasing. It is being researched that bio-char with another name charcoal would be a potential matter to store carbon for several decades. Bio-char basically is the residue after burning biomass. Usually it is spread on the topsoil as a fertilizer and it generates richer soil content while capturing CO<sub>2</sub>. This solution would probably reduce 8 ppm or more in half century (Lehman, 2007; Lehman at al., 2006, Hansen et al., 2008).

## Conclusion

The conclusion of the study is that carbon dioxide in the atmosphere is going to exceed the safety zone in the base scenario and go beyond 450 ppm which irreversibly change the ecosystem of the planet where the regeneration of forests for example are not feasible anymore. Trying several versions of the model by following different energy- and agro-strategies, the suitable parameters to reduce carbon are fossil fuel growth rate of 0.018%, saturation of fossil fuel consumption at 10 Gt C, and the afforestation starting at 2020 until 2050 with a rate of 0.2%.

The study covers an important issue of this era. The investigation of carbon dynamics in the atmosphere and the simulation of carbon under different versions attract attention from several researchers. Answering the question in the title – Carbon dynamics: Ever going to stop increasing? – seemingly carbon dioxide is going to accumulate further. However the rate of intensification can be changed by strict policies and with prompt, environmental conscious society the process might even reverse at a given point of time.

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## EVALUATION OF FOREIGN INVESTMENT USE IN OIL AND GAS COMPLEX OF KAZAKHSTAN

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### Abstract

In modern conditions of oil and gas functioning there is exigency in search of field reserves of development at the expense of rational use of investment resources and efficient realization of investment projects. In the present situation such tasks solution is possible only in the framework of strategy development of component parts of the complex, including efficient attraction of foreign investment and mechanisms formation of its use.

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**Keywords:** Foreign investment, hydrocarbon resources, oil and gas complex, oil and gas projects efficiency

### Introduction

**Problem formulation.** The Republic of Kazakhstan transition to the trajectory of stable development depends a lot on investment policy that should contribute to structural reconstruction of state economy, radical renovation of physically and morally old production assets. However in crisis condition of economy, acute shortage of inner finance sources to inculcate modern technologies and equipment. This strategically important task can not be solved without foreign investment.

**Latest research and publications analysis.** The most significant works, on which is based theoretical and practical aspects of the problem being researched are the works of the following scholars economists: V. Y. Alekperova [1, 2], R.Y. Apostolova [3], T.N. Valuiskova [5], V.Y. Dodonova [7], V.V. Chainikova [10].

**The basic goal** of the research is scientific grounding of the propositions of improving the mechanism of foreign investment attraction in oil and gas industry of the Republic.

**Basic outcomes of the research.** One of the most important strategic lines of the state on foreign investment is maximizing of invested capital efficiency. The economic sense of this policy is first of all in efficiency increase from investment reclamation in a specific project, field or economy sector.

### Main Text

According to designated purpose or functional character of the received effect investment projects at the enterprise can be divided into projects directed to products quality improvement and projects directed to manufacture quality improvement.

To the first ones can be referred projects carried out with the aim of improving single indexes of quality. In other words they are directed at improvement of the properties of the products manufactured or creating products with new properties. The second group of projects produces effect in the form of decreasing direct costs per production unit

manufacture (labor intensity, materials output ratio) and/or in the form of products output increase.

Investment costs of the first or second group are economically homogeneous as represent in all cases marginal costs of fixed and current assets. Economic differences can be defined only from actual data analysis. If, for example, it turns out that investment costs of the first group at a greater extent influence fixed assets increase and the second group influence current assets increase (or vice versa), then the connection between functional and economic costs composition can be determined more distinctly. Basically we can assume that second group costs are connected with manufacture process quality more and consequently production volume (i.e. turnover). That is why they can influence significantly current assets increase whereas first group investment costs can be connected at a greater extent with capital assets increase.

In reality the projects are directed as a rule at the same time at products quality improvement and productive capacity increase (costs cutout). Therefore there is a perception that products quality can be improved with simultaneous production costs cutout. It means that products quality and production capacity (production process quality) should be considered as two factors influencing the size, structure and character of production costs change. These two factors combined action complicates the evaluation of influencing character of each of them separately on the economic outcome and accordingly – investment projects efficiency. As a result products with better qualities do not always require current production costs increase and do not always entails price increase [4].

Products quality increase investment projects are characteristic of the following peculiarities:

1. Economic efficiency of products quality increase projects depends on the change of the form and elasticity of demand function. Demand or demand function represents a connection of products price (P) from the number of products at the market (Q) with all other things constant. When conditions are changed under the influence of different factors demand function is changed. Demand price elasticity is characterized with sensibility of the number of product purchases to price change and is measured with the help of elasticity index, which is determined according to the formula:

$$E = (Q_2 - Q_1) \cdot (P_2 + P_1) / (P_2 - P_1) \cdot (Q_2 + Q_1), \quad (1)$$

where  $P_1$  - initial (bigger) demand price,

$P_2$  - changed (less) demand price,

$Q_1, Q_2$  - the number of purchased products correspondingly with bigger and less price.

Products quality is one of the most essential factors, changing demand function and its price elasticity. For example, products quality increase of some company with all other things equal can significantly increase its sale (and consequently all demand function relative to this company) then advertising and sales promotion.

Quality influence character on demand function is complicated and complex. However, it is necessary to point out that quality increase can reduce elasticity and increase demand function. Such influence corresponds to accepted conception of products life cycle (including products with improved quality characteristics).

2. Products quality improvement in manufacture always requires current production costs and extra investment increase the amount of which will depend on the change of those properties of manufactured products.

Presented dependence is characterized by the fact that while costs (current and lump sum) increase, directed to quality increase the products quality increases to a definite extent K (extreme quality), after which any costs increase does not lead to its improvement.

As it is known project efficiency in many ways is determined by timely characteristics of costs and project outcomes. As for products quality time of reducing targeted costs for products quality has a great significance, on which the character and products life cycle size is dependent on. In this connection the term quality management has a wide distribution in world practice and it is coming closer to the meaning of monitoring which is used nowadays widely enough in a great activity spectrum.

The main reference point of quality management as a process is in our opinion the determined dependence of product life cycle length and its economic characteristics at each stage of product quality, supplied to the market. In this connection it is necessary to interpret the main points of this process:

- the earlier quality management is organized at a pre manufacture stage the more economical products manufacture will be, otherwise quality will not change but economic indexes can significantly decrease;

- quality management should be done at every stage of pre manufacture stage of life cycle and therefore be integrated, otherwise the company can come to the market with product having other properties that will determine a new life cycle [6].

Thus, quality management elements will be as follows: economic (quality and price costs), market (demand, competitors, life cycle length, depending on qualitative properties), finance money flow, determined by the time of quality management carry out). On the basis of elements interrelation a model can be designed giving the possibility to solve the tasks of creating acceptable product quality design for specific market situation.

Statements considered above allow to make a classification of effects for products quality increase investment products (Fig. 1).

Costs		Non costs
Economic	Finance	
According to products quality increase outcomes	Sources of finance	Social
According to costs for products quality increase	Current assets management	Ecologic
According to capital fund costs, improving products quality	Tax-depreciation policy change, capital fund evaluation	
According to time According to the amount of "consumption price"		

Fig. 1 - Classification of effects for products quality increase investment products

Effects can be costs and non costs. Costs effects are those that can be determined in the form of specific cost (money) unit. They can be divided into two groups: economic and finance, as they have different origin nature and are stipulated by different laws and at some moments can exist independently of each other.

Determinant effects for any investment project, including investment projects of products quality improvement, having economic nature and which are based on the principle of measuring costs and outcomes.

Four basic types of economic effects can be singled out for including investment projects of products quality improvement, which are determined on the basis of investment projects of products quality improvement peculiarities considered above:

- effects arising from demand function change for the goods of improved quality that determines the change of product quality improvement outcomes;
- effects, arising because of costs change for manufacture quality;
- effects, arising of quality management carrying out time;
- effects, determined by "consumption price".

Non costs effects are expressed in qualitative characteristics and can be determined only indirectly. For example, projects of increased level of ecologic security can influence people's life expectancy and labor efficiency increase, disease incidence decrease, etc. [8].

Striving for investment efficient use at microeconomic level it is possible to achieve high benefit also at the macro level. In this connection the author considers it reasonable to use those statements while analyzing finance-economic activity of a specific joint venture as a typical example of foreign investment use in the Republic. Besides, considered enterprise indexes on many points are identical to those of other joint ventures, thus, received outcomes and conclusions can become a practical recommendation in general for the whole sector of joint ventures in the Republic.

Enterprise activity is nearly always connected with investments. Company management while decision making directed for efficiency increase often faces different factors: investment type, investment project cost, available projects multiplicity, financial resources limit available for investment; risk, connected with making this or that decision, etc.

The basic sense of investment decision making is in the determination of the volume of assumed investment and future cash receipts. First of all, this principle is oriented for track of time analysis. Methods, used for investment activity analysis can be divided into two groups: a) based on discounted evaluations; b) based on accountable evaluations.

One of the basic methods of efficiency determination of investment use is calculation of net present value. This method is based on comparison of original investment volume size with general sum of discounted pure cash receipt, generated by it during projected lifetime.

As cash flow is distributed in time, it is discounted with the help of coefficient  $r$ , set up by the analyst himself on the basis of annual return rate that he would like to have or has for invested by him capital.

While investment solutions analysis and for objective outcomes receipt it is very important to apply such instrument of efficiency determination as a method of investment profitability index calculation. Profitability index or internal revenue rate (IRR) is discounting index value, where project NPV is equal to zero:

$$IRR=r, \text{ where } NPV = f(r) = 0 \quad (2)$$

The meaning of calculating this coefficient while analyzing planned investment efficiency is in the following: IRR shows maximum permissible relative level of expenses that can be associated with this project. For example, if the project is completely financed at the expense of commercial bank loan, IRR value shows the upper limit of acceptable level of bank interest rate, the increase of which makes the project unprofitable [9].

In practice any company finances its activity including investment one using different sources. In many cases the sources are advanced capital, for which it is necessary to pay a definite sum that compose company expenses. The index, characterizing relative level of those expenses can be called the price of advanced capital ( $P_{ca}$ ). This index reflects the minimum of return for invested capital, its rate of return and is calculated according to the formula of measured average.

This index economic sense is in the following: the company can make any decisions of investment character, the level of rate of return of which is not less than current value of  $P_{ca}$ .

IRR index is compared with it and is calculated for a specific project and the dependence between them is the following:

If  $IRR > 0$ , the project can be accepted;

$IRR < 0$ , the project should be rejected;

$IRR = 0$ , the project is neither profitable nor unprofitable.

It is necessary to point out that it is possible to meet in the economic literature different opinions concerning IRR determination. The most correct, in our opinion, is the definition that characterizes internal norm as that interest rate calculation when capitalization of regularly received profit provides the sum equal to investment and consequently capital investment is a paid off activity.

As a rule, IRR calculation is done on the basis of special tables, specific values choice is done by computers and special software. Hand technology is the following: money flow is put in tables. The expert (investor) using trial and error method, starting from arbitrary value chooses discounting coefficient when NPV of invested profit will not be equal to zero. Such rate will show maximum interest rate for loan for this very investment project, when the project still remains self-supporting.

The third index of capital expenses efficiency is the period or payback coefficient (Payback) is most often used and the simplest way to determine project rate of return. Reduced costs rate of return index is often used in practice and in this case, the denominator is the sum of reduced costs. As depreciation does not mean real funds spending, this sum is again added to cash flow after calculating chargeable taxes. The benchmark while analysis is any convenient time (for example, project start).

Project payback period index shows in what time after project exploitation start investment will be compensated (i.e. total profits will become equal to initial investment) and turnover will become positive. For this reason there is another name for payback period calculation in English literature – break even analysis, i.e. break even point analysis. Using pointed out methodical directions you can analyze the realization of a specific investment project.

## Conclusion

It is necessary to point out that economic efficiency evaluation of foreign investment use in oil and gas processing industry is directly connected with industry peculiarities in general and specific conditions of oil processing at specific companies of the Republic. These conditions are the following:

1. Due to a great capital intensity of destruction processes, inculcated with the aim of oil and gas products quality increase, investment amount, directed to those processes development, final economic outcomes of manufacture are accompanied with deterioration of general evaluation indexes of rate of return, capital and productivity. In this connection multiplication effect determination has a great significance as the most part of field effect from investment use as the most part of field effect is not taken into account in practice as it is formed while using high quality oil products by the customer. In such conditions assimilated investment can have low efficiency while simultaneous achievement of national economy significant efficiency.

2. Nowadays there is companies fundamental reconstruction in oil and gas industry of the Republic caused by the fact that technological base of oil and gas processing plants was not adapted for high-wax and sulphur crude oil processing, having high specific weight in the composition of initial resources processing, satisfying customers' needs. Herewith together with the objects of main manufacture purpose that directly increase industrial market products output, a great place was given to the construction of necessary objects on raw materials cleaning and non manufacture purpose buildings.

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# STRATEGIC OPPORTUNITIES TO INCREASE THE IMPACT OF SCIENCE AND TECHNOLOGY IN REGIONAL DEVELOPMENT: OPEN INNOVATION AND THE STRATEGIC VALUE OF HORIZONTAL SOCIAL NETWORKS

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## Abstract

This paper discusses the background to and theoretical grounding for the development of a collaborative project, initiated by the author with a local business-education foundation and two regional universities, to create a Web page based on the principles of open innovation to facilitate the transfer of science, technology and knowledge between disciplines and sectors to encourage innovation and development. It considers how open innovation can serve as a strategic device for overcoming organizational path dependence, vertical state and social hierarchies and embedded patron client relations, with the aim of achieving a greater role for science and technology in regional development in less favoured regions (LFR's).

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**Keywords:** Open innovation, knowledge transfer, horizontal networks, social capital, regional development

## Introduction

Funding intersectorial collaboration projects is one of the strategies the Mexican government has used to address the challenge to increase the social appropriation of science and technology to favour national and regional development. Businesses are encouraged to work with research institutes and departments to develop innovations in diverse fields. In the knowledge economy open innovation has become a more valued part of the economic landscape: Péñin et al describe the following different forms of open innovation: “co-conception; innovation with customers, markets for ideas, crowdsourcing, open source, co-development, etc.” They also observe that “opening the innovative boundaries of the firms also lead to changing regional innovative dynamics” (Péñin, Hussler y Burger-Helmchen 2011, 11,21). Manuel Castells has explored the role of new communication technologies in the creating a worldwide network of innovation systems (M. Castells 2001) (M. Castells 2002) (M. Castells 2002) A study, however, by the OECD on learning and innovation systems, whilst acknowledging the importance of regional innovation systems, also explored the barriers to the development of open innovation networks in certain regions. (OECD 2001)

To explore these barriers, they reflected upon the social aspect of institutions and organisations, concluding that “The interaction between the organisations comprising a network (or system) reflects not only market relationships but also the wider social and cultural context”. The policy implications of this social aspect are that “markets are always institutionally embedded... these institutions are in part the unpremeditated product of long-

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term processes of civil and economic development... and may result in path-dependency". When such long term processes are taken into account, the nature of the barriers to the development of regional innovation systems stands out: "In less-favoured regions (LFRs)"the culture of command, hierarchy, and dependency...has stifled the formation of a reflexive culture among the majority of its economic institutions". They conclude that "the crucial issue is not whether policy makers should intervene or not, but rather what forms of intervention are likely to be most effective in actually existing situations" and that "What is much more complex, of course, is to specify how such regional institutional change is to be achieved". (OECD 2001)

In this study of the challenges to increase the social appropriation of science and technology in the southeast of Mexico, a systemic approach is applied. The systemic approach seeks long term sustainable solutions through the exploration of the multiple dimensions of the problem space (such as Social, technical, economic, political, physical cultural, others...) and the design of an enabling environment to successfully navigate those problems. (MIDDLEGROUND; LSE COMPLEXITY 2012, 43). Findings from a recent regional research project on the Social Appropriation of Science, Technology and Innovation and also research undertaken by the author on the impact of reforms in Higher Education in Mexico were analysed through the heuristic framework of social capital to explore the problem space of this regional context.. The design of an enabling environment was based on the use of the open innovation model and innovations in Internet technology as an alternative strategy to challenge the structural challenges in the region.

### **Outline of the heuristic framework of Social Capital**

In The Well-being of Nations, the CERI project of the OECD defines social capital as "*networks together with shared norms, values and understandings that facilitate co-operation within or among groups.*" (OECD 2001, 41) Trust is considered to be both an outcome and source of social capital. Positive forms of social capital are based on strongly bonded groups which practice both inclusive *social bridging* and *linking*. The down-sides of social capital can emerge as the result of the negative effects of 'inward-seeking' strongly bonded groups and 'exclusive social bridging'.

### **Organisational "path dependence"**

Robert Putnam is well known for his work on the declining social capital in the United States which he attributes to the breakdown of relations of trust as people engage ever less in community activities such as bowling, choir groups, etc. His research in civic traditions in modern Italy sought to explain why national policies have not overcome the diverging social and economic realities of the northern and southern regions in Italy. He refers to the prevalence of 'tradition', in southern Italy and in Latin America, in terms of 'path dependence', which not only includes the idea of cultural resistance to external policy initiatives, but also the transformation of the intended outcomes of those policies: resulting from the fact that "informal norms and culture change more slowly than formal rules, and tend to remould those formal rules, so that the external imposition of a common set of formal rules will lead to widely divergent outcomes." (Putnam 1993)

Yet according to Putnam tradition is not merely the result of inertia, instead the informal rules which sustain tradition are themselves embedded in the hierarchically ordered organizations which reproduce traditions, concluding that "the Mafia or the institutional Catholic Church should be negatively associated with good government" as should patron-client relations and strong kinship ties. These reciprocal yet vertical and unequal relations "undermine the horizontal group organisation and solidarity of clients and patrons alike – but especially of the clients." (Putnam 1993)

Putnam recognises that such hierarchical structures do serve a purpose in the early stages of society by establishing stability, yet if not superseded in the appropriate moment of social development, they become themselves an obstacle. And so, it can be observed that in the north of Italy “civic equilibrium has shown remarkable stability ... although its effects have been disrupted from time to time by exogenous forces like pestilence, war, and world trade shifts. The contrasting Hobbesian equilibrium in the South has been even more stable, though less fruitful.” . Similarly kinship ties are important in the early stages of commercial revolution, but in later social development, such ‘strong ties’ are less important than weak ties which “encompass broad segments of society and thus undergird collaboration at the community level”, Thus “Social context and history profoundly condition the effectiveness of institutions.” (Putnam 1993)

When considering innovation and learning regions the OECD consider that “Such “path-dependency” may thus confine regions to development trajectories leading to low growth, decreasing employment, declining income levels and so forth”. Clearly in less favoured regions (LFRs) alternative strategies to facilitate knowledge transfer need to be designed to circumvent the organizational path dependence “which may produce “lock-in” within a regional innovation system” (OECD 2001)

### **Vertical and horizontal social structures**

Path dependence is a concept which can usefully be employed in explaining the resistance to public policies for institutional reform in Mexico (Adler Lomnitz 1994) During the seventies and eighties in Mexico, Larissa Adler Lomnitz, a Chilean anthropologist, identified a combination of vertical and horizontal relations as typifying the structure of urban relations in Mexico City, and the structure of Mexican society in general. Horizontal reciprocal relations develop at all levels of society and increases social mobility and the circulation of resources between equals. Unlike the vertical interchange of resources based on formal groups, horizontal interchange takes place between “informal groups, without permanent or clearly defined frontiers. These horizontal networks extend across sector divisions, so it is common practice to use family and social connections to resolve bureaucratic requirements or legal issues.

Adler argues that both the private and public sector have interests in maintaining these horizontal networks, and this can be shown by the proliferation of these networks. Horizontal networks by introducing flexibility into the system allow the system to work for “they lighten the pressure of hierarchical relations and provide flexibility” They also avoid the system transforming itself into a “cast society in perpetual rivalry. (Adler Lomnitz 1994)

### **Horizontal social networks and new social media**

Manuel Castells explains that horizontal networks whose strength “resides in their flexibility, adaptability and capacity for self-reconfiguration” have played an important social role since ancient times, yet have remained historically undocumented not only because vertical structures of power are more visible to historical record, but also because “when they exceed a certain size, complexity and volume of transactions, they become less efficient than the vertical structures of command and control, *in the existing conditions of pre-electronic communication*”. (M. Castells 2012)

This same fact explains why horizontal networks are becoming unexpectedly influential as developments in microelectronic forms of communication remove the material impediments to the flourishing of an integral form of social organization. Whilst the first forms of electronic communication such as the telegraph “had insufficient capacity to proportion autonomy to all the nodes of the network”, it was the new communications

technologies which “liberated all the potentialities of the networks”, namely flexibility, adaptability and survival capacity”. (M. Castells 2012)

Castells suggests that another important aspect of new microelectronic forms of communication is the autonomy from social institutions which they facilitate, an important factor in the survival of networks and the confidence individuals have in their use: “*there is a more profound fundamental connection between the Internet and the social network movements; they share a specific culture, the culture of autonomy, the fundamental cultural matrix of contemporary societies*”. (M. Castells 2012)

It may be asked what kind of autonomy is referred to by Castells. In the case of the Internet it is the autonomy of social networks, and could therefore be described as a synergic autonomy. Synergic autonomy can be compared and differentiated to the notion of embedded autonomy used by Michael Woolcock. (Woolcock 1998)

### **Linear and complex models of the science-society relation**

The model of the relation of science and technology to society is also changing. Researchers in the OECD CERI project argue that investment in science and technology in higher education institutions and research centres does not guarantee greater levels of innovation. Indeed they observe that this linear model is “the exception instead of the rule” although “a prejudice still exists in this direction” (OECD 2004)

New models are based on a systemic approach which considers the complex relationships between organisations. Rosalba Casas (Casas (Coord.) 2001), and Matilde Luna (Luna (Coord.) 2003) and collaborators have analysed the problem of business-academic relations in Mexico from the perspective of the formation of knowledge networks. Ana María Barañano considers that “Innovation is a complex technological, sociological and economic process that involves a web of extremely intricate innovations, not only within the firm but between firms and between the firm and its economical, technical, competitive and social environment” (Barañano 2007). Sagasti considers the level of relations between different sectors as an indicator of the level of development of a society (Sagasti 2011), whilst Katz considers the lack of relations between organizations as one of the key factors explaining underdevelopment in México (Katz 2007).

If, as suggested, networks are the rule rather than the exception in the relation between science, technology and society, yet a situation of weak intersectorial relations predominates in the region, then clearly strategies which address this problem are urgently required. The following research findings indicate the principal elements which such a strategy must address.

### **Findings and interpretation**

#### **Identifying the contours and elements of the problem space**

The variable of open innovation was initially compared to demographics and economic performance across different sectors and then subject to further analysis to determine the impact of three independent variables: social networking across sectors; levels of knowledge management in HE and R&D centres; forms of social capital in the region.

#### **Open innovation and regional development**

With the objective of redressing the low levels of development in the South-East region of México, in 2010 a 30 month research project entitled “The Social Appropriation of Science, Technology and Innovation in the South” was financed by the Mexican National Council for Science and Technology (CONACYT). The following economic indicators were cited to justify the urgency of the project:

- GDP: This region contributes only 6.8% of the national average, as compared with 41.2% by the central region and 19.6% by the northern region.
- National Resource for R & D. The region was awarded only 4% of the national resources available in 2007 whilst the centre was awarded 65.4%

A comparative analysis of the results of 10 of the theses produced during the study were analysed by the author against the background of six regional seminars (Russell Archer y Barroso Tanoira 2012)

### **Demographic and economic contours**

Economic data for the 6 states of the south-east region, presented in a study by the author of the impact of a public programme to promote collaborative innovation between the academic and business sector (Programa Estimulación a la Innovación - PEI), showed low population density and small scale manufacturing sectors:

A low population density prevails, the largest state of Veracruz has a density of over 7.5 million and the smallest, Campeche, less than one million. Nevertheless, this smallest state is the second highest contributor in the region to GDP (3.2%), after Veracruz (4.7%) If state GDP is analysed by sector, then it becomes clear that in Campeche over 80% of the state wealth production is in the secondary sector. Yet, in Campeche 74.81 % of that production is in mining (oil and gas) and only 0.86 % in manufacturing, whereas in the states of Veracruz and Yucatan the predominant production comes from manufacturing. (Russell y Canul 2012)

### **Identifying correlation between open-innovation and levels of R&D**

The higher amounts of government funding for open innovation projects between business sectors and academic institutions appears coupled in the states of Veracruz and Yucatan with higher levels of industrial manufacturing, tentatively establishing an apparent correlation between economic development in the manufacturing sector and levels of participation in open innovation projects. As a consequence, *the question arose as to how in states where activities are based primarily on the extraction of primary sources, projects such as PEI to stimulate open-innovation can have a greater impact in expanding manufacturing activities as a percentage of GDP.* Firstly it was necessary to determine whether other variables have an impact in the region.

### **Levels of networking across sectors in open innovation projects in the region**

The study of the impact of the PEI in the cities of Merida, Campeche and Carmen (in the States of Campeche and Yucatan), from 2010 to 2011 included both quantitative and qualitative analysis of networking dynamics between sectors and public funding for innovation projects. The analysis of the results from the quantitative section of this study, showed that there was a direct relation between the level of business-government-academic networking and public funding of a project: the higher the levels of collaboration the more likely the project was approved. Nevertheless, the analysis of the qualitative section of this study showed that although the business community considers that his type of funding programme to be highly pertinent, they consider collaboration between sectors in open innovation projects to be very low.

The results in Campeche and Yucatan were found to be similar to a study of the Social Appropriation of knowledge in business organizations in the State of Quintana Roo by Adriana Valdivieso in which she identified the following:

- a) A positive factor was business orientated local and federal programmes
- b) A negative factor was the lack of collaboration between the business and the academic sector. (Valdivieso Ortiz 2012)

A further study in the state of Yucatán of experiences in the generation, diffusion and use of knowledge in Social and Productive Institutions by Nayeli Araiza found that there was little external transferral of knowledge, internal transferral predominated. (Russell Archer y Barroso Tanoira 2012)

### **Knowledge management in H.E. and R&D centres**

Knowledge management in the study of public funding exercise PEI in Campeche was also cited as a factor for low levels of collaboration across sectors. The business community considers collaboration between sectors in open innovation projects is very low for the following reasons:

- Knowledge gaps within institutions of their own production in science and technology
- Low levels of interest, on the most part, in analysing collaboration and open innovation opportunities
- As a result there is little diffusion of information about their research programmes
- Their networking practices are limited to traditional areas of student activities in social service and professional practice

A study of the implementation of a knowledge management data base in the Autonomous University of Campeche registered the institutional resistance to the concept and its implications. (2011) The project was abandoned after 2 years. The results in Campeche coincide with studies in other states in the region.

Jessica Ramos, another of the undergraduate students participating in the regional project, with a study of “The social appropriation of science and innovation. Experiences in the generation, diffusion y use of scientific knowledge in institutions of H.E. and research centres in the state of Yucatán”, found that efficient practices of knowledge management were confined to a limited number of institutions. A similar study “Diagnosis of the Generation of science and Technology by research Centres in the State of Quintana Roo” by Viridiana Ortega arrived a similar conclusions. (Russell Archer y Barroso Tanoira 2012)

All four studies registered that the lack of knowledge management in H.E. and R&D centres as a negative factor in following through open-innovation initiatives.

### **Means of networking in the region**

The study of public funding exercise PEI in Campeche also documented that when collaboration was achieved it was mainly through informal social networks: One businessman related that having unsuccessfully attempted to initiate an open innovation project with the Technical College in Merida through their outreach department which had informed him that the college did not pursue research in the area in question, was subsequently advised by a friend that heshould obtain an appointment with the Principal of the college; resulting in a very successful and on-going collaboration in open innovation. Variations of this example were recurrent in the study's findings and also mentioned in the other studies cited above. When formal collaboration procedures floundered it was informal social networking that took the project forward.

### **Concluding remarks on findings and their interpretation**

A preliminary analysis of economic data indicated a correlation between economic development in the manufacturing sector and participation in publicly funded open innovation projects, yet further analysis revealed additional variables to be involved:

- Low levels of knowledge management within H.E. and research institutions
- Inadequate functioning of outreach departments
- The positive relation between cross sector collaboration and achieving public funds for open innovation projects

- Low levels of formal cross sector collaboration
- Predominance of use of horizontal social networks
- Low levels of trust in the integrity of government institutions and hence operational integrity of funding procedures

These findings are evidence of the predominance in the region of the first and second forms of social capital as defined by the OECD, namely strong group bonding and vertical linking and the absence of the third form of cross sector bridging. Organizational path dependence and the low levels of trust which predominate in the region are often circumvented by informal horizontal social networks, thus this solution depends on individual social networks often accessed on the basis of ad-hoc encounters.

### **The design of an enabling environment**

management, effective outreach departments, institutional integrity and horizontal social networks were all identified as important factors in open innovation and regional development, but the question remained as to how they could be leveraged. The OECD challenge that “the crucial issue is not whether policy makers should intervene or not, but rather *what forms of intervention are likely to be most effective in actually existing situations.*” (OECD 2001) remained unanswered.

The response was the design of a strategy to promote open innovation through a Science-Knowledge-Society Web page. The author, formed an interdisciplinary, inter-sectorial group, with the local business-education foundation of which she is member and technical advisor since 1999, one public and one private regional university, to development of a Science-Knowledge-Society Web page based on the principles of open innovation to facilitate the transfer of knowledge between sectors to encourage innovation and development. The project achieved finance from the Mexican National Council for Science & Technology and the Society for the Divulgarion of Science & Technology.

The objective of creating an environment based on the concepts of autonomy and synergy which function as the principle upon which the construction of horizontal knowledge networks is facilitated, constituted the basis of the design. The objectives were i) to enable open innovation and regional development; ii) to better identify diverse social and different regional needs and issues; iii) to promote the participation of citizens in science monitoring and discussion groups, iv) to promote the participation, mobility and employment of young researchers; v) to promote the participation of local and regional ethnic groups to build bridges between traditional knowledge and modern science in the solution of regional issues.

New technologies of cloud computing and VPS dedicated servers were used to facilitate the creation of autonomous and synergic environments. Registration and participation would on an individual basis, in line with the underlying principles of autonomy of the project, to encourage the construction of horizontal networks in a region where a culture of vertical structures of authority predominate, at social and organizational levels, hindering innovation. Users would be required to enter only a minimum level of identification and further content will be optional, nevertheless they are recommended to include sufficient information in their profile relevant to the relations and networking they wish to achieve, as it is this information that other users will be able to access when considering the options that the system will produce concerning with whom to initiate direct communication according to individual areas of experience and interest. The end users would also be encouraged to participate, or initiate discussion groups according to topics of interest where they will also be able to identify end-users. Analysis of successful networking and innovation experiences will be posted on the site.

During the trial stage (May-June 2013), access to use the data base was available via invitation only, or on request: <http://www.cienciasabersociedad.org.mx/>. The results of the

user evaluation confirmed the need for redesign of the user interface to appeal more successfully to a cross sector user cohort of clients and the refinement of the data base classification systems.

## Conclusion

The analysis of empirical research clearly identified the positive impact in regional development of the appropriation of science and technology through open-innovation projects, particularly when it involved cross sector collaboration and consequently the pertinence of public funding of such initiatives. Nevertheless, it also revealed the existence of regional challenges to achieve the necessary networks of collaboration and hence the need for the design of alternative strategies to achieve this goal. The strategy analysed indicates that autonomous Web sites supported by public funds could provide an option to bridge the gap by providing a means of the management of information, facilitating the building of social networks and encouraging knowledge transfer to enable regional development.

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# EVALUATION OF PROBABILITY MODELS ON INSURANCE CLAIMS IN GHANA

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## Abstract

This study investigates the probability distributions that best fits the number of insurance claims. In particular, it compares the poisson distribution and the negative binomial distribution models to determine which distribution best fit insurance claim data obtained from two Insurance Companies in Ghana. Data on the number of claims of a funeral policy spanning from year 2006 to 2010 were used for the study. Probability distribution models and the parametric bootstrap methods were employed in analyzing the data collected. The Negative Binomial distribution was found to be superior to the Poisson distribution in fitting the claims data. Also, the result revealed that the estimates obtained by the probability models and that of the parametric bootstrap estimates have no significant difference.

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**Keywords:** Poisson, Negative Binomial, Insurance Claims, Parametric Bootstrap

## Introduction

Statistical methods have been paramount in the field of insurance due to risk involved in allocating insurance funds. Insurance funds may be invested in assets like bonds, equities and others. This helps to increase investment real returns in order to meet claim payment demands and other financial obligations.

An appropriate statistical estimation is needed to acquire concrete information about the uncertain liabilities. This helps us to ascertain good decisions pertaining to assets allocation, expected monthly claims and payment targets as well as future insurance pricing.

Policy holders expect a cushion in the event of economic loss as stipulated in an Insurance Contract. In view of this, the challenge of meeting the payment terms becomes an issue of much concern to the Insurer. A statistical estimation of expected claim liabilities of the Insurance Policies enables decisions on asset allocation and claim payment to be taken without much error.

The main objective of the study is to explore probability models that will model adequately the number of claims occurring under funeral insurance policies in Ghana to estimate the expected number of claims.

Specific objectives include but not limited to:

- To identify and explain seasonal variation within the number of claims.
- To compare the Probability distribution estimates of the number of claims.
- To derive the Probability distribution model that best fits the number of Claims for the funeral policies.
- To construct bootstrap confidence intervals for the Expected Number of Claims and compare with that of the estimates obtained from the models.

## METHODOLOGY

### Secondary Data

The data were collected from Star Life and Metropolitan life Insurance Company. The data consist of monthly recorded number of claims under a Family Funeral Insurance Policy for a period of Five years (2006 - 2010). This policy was chosen because it is one of the most patronised insurance policies in Ghana. These two insurance companies represent a major controlling force in Ghana's insurance sector.

### Shapiro-Wilk test for Normality

The Shapiro-Wilk test, proposed by Shapiro S. S. and Wilk M. B. (1965), calculates a  $W$  statistic that tests whether a random sample,  $x_1, x_2, \dots, x_n$  comes from (specifically) a normal distribution. Small values of  $W$  are evidence of departure from normality

$$W = \frac{\left( \sum_{i=1}^n a_i x_{(i)} \right)^2}{\sum_{i=1}^n (x_i - \bar{x})^2} \quad \text{-----1}$$

where the  $x_{(i)}$  are the ordered sample values ( $x_{(1)}$  is the smallest) and the  $a_i$  are constants generated from the means, variances and covariances of the order statistics of a sample of size  $n$  from a normal distribution. The Null hypothesis is rejected if the test statistic  $W$  is too small or the p-value is less than the significance level  $\alpha$ .

### The Kolmogorov-Smirnov test for Normality

The two sided Kolmogorov-Smirov test tests the null hypothesis that two samples  $x_1; x_2; x_3; \dots$  and  $x_1; x_2; x_3; \dots$  have a similar distribution.

The test statistic is

$$D_{n,n'} = \sup_x |F_{1,n}(x) - F_{2,n'}(x)| \quad \text{.....2}$$

Where:  $F_{1;n}$  and  $F_{2;n'}$  are the empirical distribution functions of the first and second sample respectively. The null hypothesis is rejected at level  $\alpha$  if p-value is less than the  $\alpha$ .

### The Poisson Process and Distribution Function

First of all, a Poisson process  $N$  is a stochastic process - that is, a collection of random variables  $N(t)$  for each  $t$  in some specified set. More specifically, Poisson processes are counting processes: for each  $t > 0$  we count the number of "events" that happen between time 0 and time  $t$ . The kind of events in the case depends on the application. For example the number of insurance claims led by a particular driver, or the number of callers phoning in to a help line, or the number of people retiring from a particular employer, and so on. Whatever you might mean by an "event",  $N(t)$  denotes the number of events that occur after time 0 up through and including time  $t > 0$ .

Finally, The Poisson distribution arises from independently and identically exponentially distributed inter-arrival times between events and is defined as follows:

Let  $X$  be a random variable with discrete distribution that is defined over  $N = \{0; 1; 2; 3; \dots\}$ .  $X$  has a Poisson distribution with parameter  $\lambda$  written as,  $X \sim \text{Poisson}(\lambda)$  if and only if the probability function is given by

$$P(X = k) = \frac{e^{-\lambda} \lambda^k}{k!}, \lambda \in \mathcal{R}, k = 0, 1, 2, \dots \quad \text{-----3}$$

The Poisson distribution has expected value,  $E(X) = \lambda$  and variance,  $\text{Var}(X) = \lambda$ .

The equality of the mean and variance is characteristic to the Poisson distribution and serves as the reference point of modeling count data. Modeling count data with the Poisson distribution requires randomness and homogeneity of the data which is referred to as equi-dispersion.

If X and Y are Poisson distributed as  $X \sim \text{Poisson}(\lambda)$  and  $Y \sim \text{Poisson}(\mu)$ , it follows that the random variable  $Z = X + Y$  is Poisson distributed as  $Z \sim \text{Poisson}(\lambda + \mu)$ .

### Negative Binomial Distribution

A discrete variable is negative binomially distributed if they were generated from an occurrence or duration dependence process or if the rate at which events occur is heterogeneous.

A random variable X has a negative binomial distribution with parameter  $\alpha > 0$  and  $\theta > 0$  written as  $X \sim \text{Negbin}(\alpha; \theta)$ , if the probability function is given by

$$P(x = k) = \frac{\Gamma(\alpha + k)}{\Gamma(\alpha)\Gamma(k + 1)} \left(\frac{1}{1 + \theta}\right)^\alpha \left(\frac{\theta}{1 + \theta}\right)^k, k = 0, 1, 2, \dots \quad \text{-----4}$$

$\Gamma(\bullet)$  denotes the gamma function such that  $\Gamma(s) = \int_0^\infty z^{s-1} e^{-z} dz$  for  $s > 0$ . The

probability generating function

$$pgf(s) = [1 + \theta(1 - s)]^{-\alpha} \quad \text{-----5}$$

The mean and variance are given by

$$E(X) = \alpha\theta \quad \text{-----6}$$

and

$$\text{var}(X) = \alpha\theta(1 + \theta) = E(X)(1 + \theta) \quad \text{-----7}$$

The value of  $\theta$  is called the dispersion parameter and measures the dispersion in the count data. Since  $\theta > 0$ , the Variance of the negative binomial distribution exceeds its mean hence it is overdispersed.

If X and Y are independently negatively binomial distributed with  $X \sim \text{Negbin}(\lambda, \theta)$  and  $Y \sim \text{Negbin}(\mu, \theta)$ , it follows that the random variable  $Z = X + Y$  is negative binomial distributed. i.e.  $Z \sim \text{Negbin}(\lambda + \mu, \theta)$ . The Negative Binomial is preferable to the Poisson distribution in claim modeling because it is overdispersed and actual experience shows that this is certainly observed in Insurance.

### Goodness of Fit Test

Two statistics that are employed in assessing the goodness of fit of a given distribution are the scaled deviance and the Pearson's chi square statistic. For a fixed value of the dispersion parameter  $\theta$ , the scaled deviance is defined to be twice the difference between the maximum achievable log-likelihood and the log-likelihood at maximum likelihood estimate of the parameters.

If  $l(y; \mu)$  is the log-likelihood function expressed as a function of the predicted mean values  $\mu$  and the vector  $y$  of responses then the scaled deviance is defined by

$$D^*(y, \mu) = 2[l(y, \hat{y}) - l(y, \mu)] \quad \text{-----8}$$

which can be expressed for specific distributions as

$$D^*(y, \mu) = \frac{D(y, \mu)}{\theta} \quad \text{-----9}$$

the scaled deviance for the Poisson and negative binomial distributions are given as follows:

$$2 \sum_i w_i \left[ y_i \log \left( \frac{y_i}{\mu_i} \right) - (y_i - \mu_i) \right] \quad \text{-----10}$$

and

$$2 \sum_i w_i \left[ y \log \left( \frac{y}{\mu} \right) - \left( y + \frac{1}{k} \right) \log \left( \frac{y + \frac{1}{k}}{\mu + \frac{1}{k}} \right) \right] \quad \text{-----11}$$

The scaled deviance is chi-square distributed with  $n-1$  degrees of freedom, where  $n$  is the number of observations.

### Parametric Bootstrap Estimation

The procedures for the Bootstrap estimation is outlined as follows:

- Given a random sample,  $X = (x_1, \dots, x_n)$ , estimate the appropriate probability distribution and calculate the desirable parameter  $\hat{\theta}$ .
- Sample with replacement from the estimated Probability distribution to obtain  $X^{*b} = (X_1^{*b}, \dots, X_n^{*b})$
- Calculate the same statistic using the bootstrap sample in step 2 to get  $\hat{\theta}^{*b}$
- Repeat steps 2 through 3,  $B$  times (i.e. the number of resamples desired).
- Use this estimate of the distribution of  $\hat{\theta}$  (i.e., the bootstrap replicates) to obtain the desired characteristics as follows:

$$\bar{\hat{\theta}}^* = \frac{1}{B} \sum_{b=1}^B \hat{\theta}^{*b}$$

$$SE_{\hat{\theta}}(\hat{\theta}) = \left\{ \frac{1}{B-1} \sum_{b=1}^B (\hat{\theta}^{*b} - \hat{\theta}^*) \right\}^{1/2} \quad \text{-----12}$$

$$bias_{\hat{\theta}} = \bar{\hat{\theta}}^* - \hat{\theta}$$

and the bias corrected estimator is given by

$$\hat{\theta}^c = \hat{\theta} - bias_{\hat{\theta}} = 2\hat{\theta} - \bar{\hat{\theta}}^* \quad \text{-----13}$$

## Results And Conclusions

### Seasonal Analysis

A study of the seasonal changes in the occurrence of the number of claims revealed an increasing pattern for both Portfolios along the period. The highest number of claims was observed in July and March, 2010 for StarLife and MetLife respectively. Several months between 2006 and 2007 recorded no claims (zero claims), that was linked to the reason that the policy was introduced in 2005 and as at the end of 2006, not much of the policies had been sold.

Figure 4.1 is a box plot of the monthly recorded number of claims on yearly basis for the underlying years (2006 - 2010). The yearly distributions of the number of claims were all tailed and skewed to either the left or right in the various years. The annual distributions of number of claims for MetLife were skewed to the right while those of StarLife were skewed to the left in 2010 but in the other years under review they were all skewed to the right (2006 - 2009). This revealed that the annual distributions were not conventionally bell shaped (normally distributed) in any of the years but were all tailed and skewed.

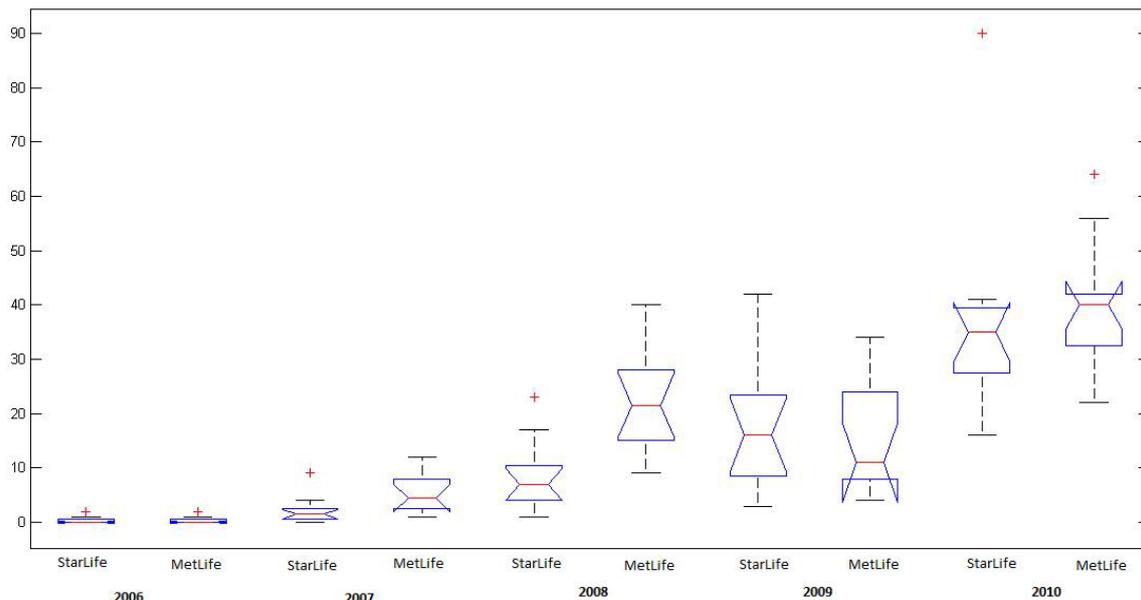


Figure 4.1: Boxplot of Yearly Number of Claims on Funeral Policy from StarLife and MetLife.

Considering, the annual distributions during the active years (2008 - 2010) where much of the policies had been sold, the year 2008 distribution of the number of claims from MetLife was heavily tailed, right skewed and fat arched (platykurtic) while that of StarLife was slightly tailed, right skewed and slender arched (leptokurtic). Furthermore, year 2009 distribution depicted a tailed, right skewed and slender arched (leptokurtic) for MetLife and tailed, right skewed and normally peaked (mesokurtic) for StarLife.

Finally in year 2010, the distributions for both portfolios were similar, tailed, asymmetric and slender arched (leptokurtic). Overall, the number of claims depicted increasing patterns across the years with rising annual averages (see Table 4.1 for details).

Year	2006	2007	2008	2009	2010
StarLife	0.33	2.08	8.25	17.72	36.67
MetLife	0.33	5.33	22.18	15.83	39.53

Table 4.1: Trend of Annual Averages of Number of Claims from Starlife and MetLife

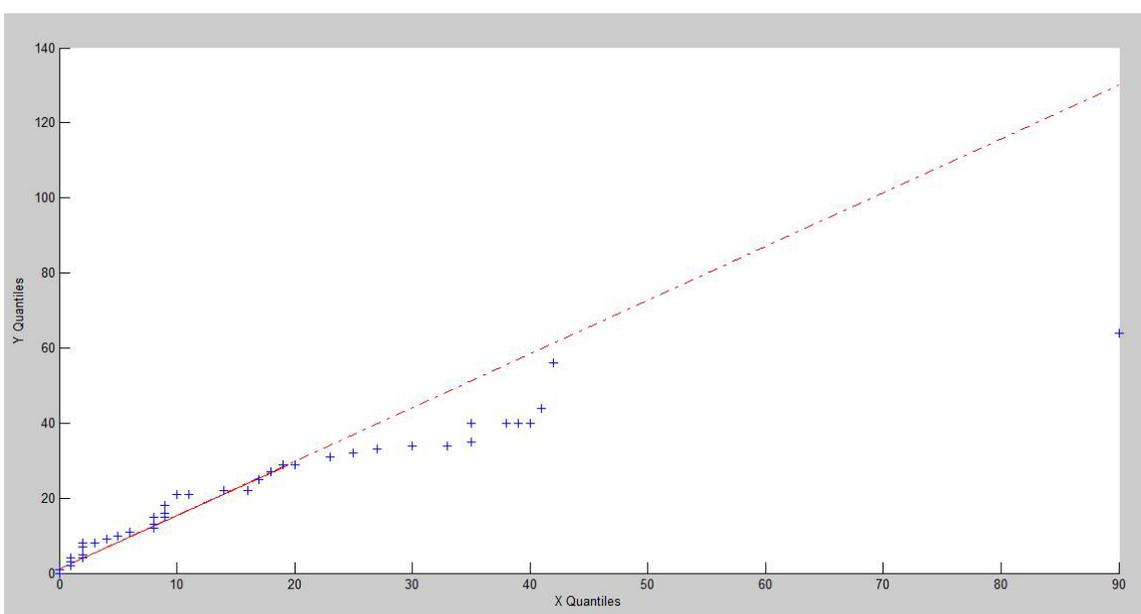


Figure 4.2: Quantile Quantile plot of Number of Claims on Funeral Policy from StarLife and MetLife.

### Comparison of the Distributions

The preliminary analysis on the number of claims suggests that the distributions of both portfolios were not normal. To confirm, the null hypothesis of normality was rejected at a p-value of  $1.28 \times 10^{-8}$  for StarLife and  $1.89 \times 10^{-4}$  for MetLife according to Shapiro-Wilk test of normality.

To answer the question as to whether the distribution of number of claims for both insurance companies came from the same distribution, a QQ plot displayed in Figure 4.2 was constructed and the fairly linear trend preliminarily suggest that the distribution of the number of claims for both insurance companies belong to a same distribution. Moreover, the p-value of  $2.13 \times 10^{-1}$  obtained by the two sided Kolmogorov-Smirnov test is statistically significant to ascertain that the probability distribution of the number of claim are the same.

### Fitting Probability Distribution to Claims

The density estimates as displayed in figure 4.3 for both portfolios are not significantly different; they both have a similar distribution but the StarLife distribution curve is steeper and slender than that of MetLife Insurance Company.

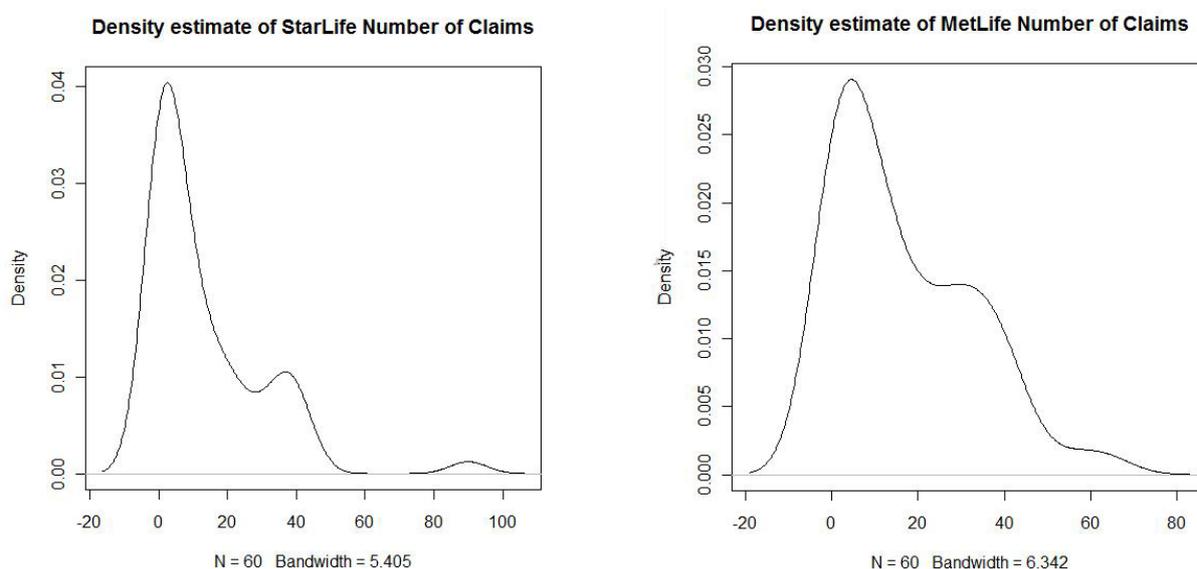


Figure 4.3: Density Estimate of Number of Claims on Funeral Policy from StarLife and MetLife.

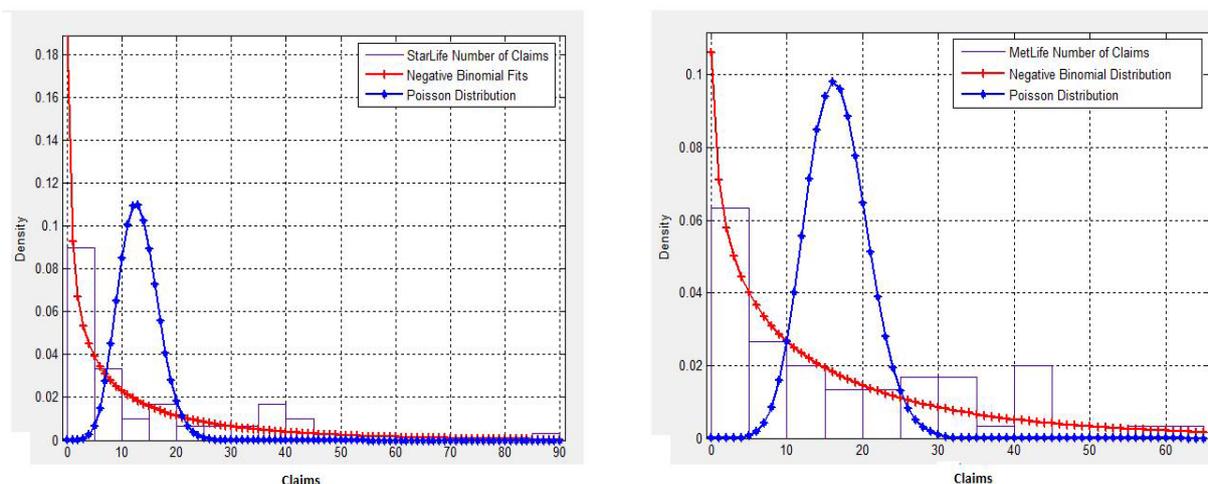


Figure 4.4: Negative Binomial and Poisson Distribution Fit to the Number of Claims on Funeral Policy from StarLife and MetLife.

Furthermore, it is visible that the sample distribution though uni-modal, has several turning points which is not typical of the conventional probability distribution at a glance. However, ascribing this abnormality to the presence of outliers in the data set may warrant smoothing (fitting) to depict a true probability distribution. Empirical Distributions that can be fitted to the observed data include the Mixed Poisson Distributions starting with the Poisson distribution as discussed in the literature.

Figure 4.4 and 4.5 were produced as a result of fitting the number of Claims for StarLife and MetLife respectively with the negative binomial and Poisson distribution. A critical look at the charts (figures 4.4 and 4.5) reveals that the Poisson distribution does not fit well to the number of claims from both StarLife and MetLife Insurance Companies. However the Negative Binomial Distribution fit the Number of Claims reasonably well.

The maximum likelihood estimates of the Poisson mean for StarLife and MetLife were  $\Lambda_s = 13.05$  and  $\Lambda_m = 16.65$  respectively. The 95% confidence interval for  $\Lambda_s$  and  $\Lambda_m$  were (12.1672; 13.9968) and (15.6489; 17.7152) and finally, the log-likelihood were 1228.3611 and 1810.5978. However, for the negative binomial distribution, the means were estimated to be  $\Lambda_s = 13.0500$  and  $\Lambda_m = 16.6500$  and the dispersion parameters to be  $\Lambda_s = 2.0166$  and  $\Lambda_m = 1.4323$  for the StarLife and MetLife number of Claims.

The variance of the random effect for both StarLife and MetLife were estimated to be  $V_s(\Theta) = 0.49588$  and  $V_m(\Theta) = 0.69818$  respectively. The 95% confidence interval for the dispersion parameters were (1.2633; 2.7699), (0.8912; 1.9734) and (0.3610; 0.7916), (0:5067; 1.1221) for their variance  $V(\Theta)$ .

The Log-likelihood of the Negative Binomial Distribution was 1667.5653 and 2175.5353 for StarLife and MetLife respectively which were far better than that of the Poisson distribution for both StarLife and MetLife respectively.

Finally, the confidence interval estimates of the monthly expected number of claims estimated by the Negative Binomial Model were approximately (9; 19) and (12; 23) claims for StarLife and MetLife.(see table 4.3 for details)

Figure 4.6 provides summary statistics of the Goodness of fit of the negative binomial distribution for both StarLife and MetLife Insurance Companies. The Scaled deviance of 69.3796 and 71.2286 for StarLife and MetLife compared to the asymptotic chi-square with 59 degrees of freedom yielded a p-value of about 0.15, which implies we cannot reject the null hypothesis that the specified negative binomial model is the correct model.

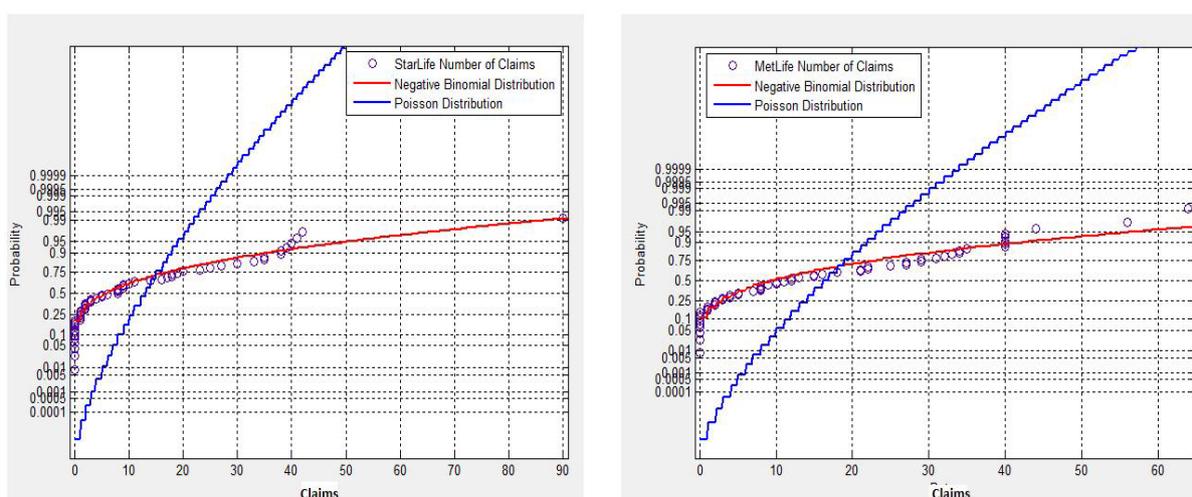


Figure 4.5: PP Plot of the Distribution of Number of Claims, Negative Binomial and Poisson Distribution.

Again, the dispersion parameter estimates were 2.0166 and 1.4323 for StarLife and MetLife respectively.

Company	Poisson Estimate	N. Binomial Estimate
StarLife	12.1672; 13.9968	9.0494 ; 18.8196
MetLife	17.7152 ; 17.7152	12.2227; 22.6804

Table 4.2: Interval Estimates of the Number of Claims from StarLife and MetLife

The deductions are that the number of claims from StarLife and MetLife is not purely independent as required by the classical Poisson process. The number of claims is duration and occurrence dependent because the composition of the number of portfolios are constantly varying (either increasing or decreasing) as a result of continuous sales of the policy.

In effect the assumption of independence of the random process is being violated hence the inadequacy of the Poisson model. However, the Negative Binomial Distribution produced considerably good fits in the sense that it is the limiting form of the resulting distributions that arise in the situation of occurrence and duration dependence and is known as Pölya - Eggenberger distribution.

StarLife			
Criteria for Assessing Goodness of Fit			
Criterion	DF	Value	Value/DF
Deviance	59	69.3796	1.1759
Scaled Deviance	59	69.3796	1.1759
Pearson Chi-Square	59	46.7985	0.7932
Scaled Pearson X2	59	46.7985	0.7932
Log Likelihood		1667.5653	

MetLife			
Criteria for Assessing Goodness of Fit			
Criterion	DF	Value	Value/DF
Deviance	59	71.2286	1.2073
Scaled Deviance	59	71.2286	1.2073
Pearson Chi-Square	59	36.4253	0.6174
Scaled Pearson X2	59	36.4253	0.6174
Log Likelihood		2175.5353	

Figure 4.6: Criteria for assessing goodness of fit of the Negative Binomial model of the Number of claims.

Again, the number of claim process is not homogeneous as required by the poisson distribution. The occurrence of death which drives the number of claims varies with every policy holder as a result of unobservable social, moral, economic and health factors. Again, the poisson distribution assumption of homogeneity is being violated and the negative binomial distribution arises as the limiting distribution and for that matter is adequate.

### Bootstrap Estimates

Company	$\hat{\theta}$	$\hat{\theta}^*$	Bias	$\hat{\theta}^c$	$SE_B(\hat{\theta})$
StarLife	13.05	12.9978	-0.0522	13.1022	1.9923
MetLife	16.65	16.7274	0.0774	16.5726	1.7831

Table 4.3: Summary statistics of Bootstrap replicates of Number of Claims from StarLife and MetLife.

Table 4.3 shows the summary statistics of the bootstrap estimate of 100 resamples from the estimated probability distribution of the number of claims from StarLife and MetLife. A comparison between the expected monthly number of Claims  $\hat{\theta}$  obtained by the

probability models and that obtained from the bootstrap method  $\hat{\theta}^c$  showed no significant variation as they were set at 13 and 17 claims for StarLife and MetLife insurance company.

### Conclusion

The Negative Binomial distribution appears to be superior to the Poisson distribution for fitting insurance claims and therefore, provides somewhat reliable estimates for planning, decision making as well as estimation in insurance administration.

The bootstrap estimates did not vary from the estimates obtained by the probability models. This research only focuses on choosing between the Poisson and the Negative Binomial distribution for fitting insurance claims and estimating the monthly expected number of claims.

The bootstrap estimates should be obtained and compared with the estimates from the probability models to authenticate the estimates.

Further work should be conducted using other models including mixed poisson probability models.

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# METHODOLOGICAL PROBLEMS OF STATISTICAL CALCULATIONS OF MACROECONOMIC INDICATORS

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## Abstract

The paper highlights the basic issues in the area of statistical methodology of calculations of macroeconomic indicators. In particular, it is proved that a single, internally consistent methodology and methods of the GDP calculation do not exist. Moreover, current methodology and methods of the GDP calculation have significant drawbacks. From the point of view of the theory of cycles of resources self-renewal which is still developing, both theoretically and practically, modern methods of the GDP calculation do not reflect the final results of such a complex system as the economy is. From our viewpoint, in order to reflect adequately the final results of the economic system as a whole it is necessary to use such indicators as:

- Gross increase in all types of resources in all sectors of the economy for  $\Delta t$ ;
- Net increase in stocks of all kinds of resources for  $\Delta t$ .

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**Keywords:** Final results of a whole economic system functioning, gross domestic product, the cycles of resources self-renewal, gross increase in stocks of all kinds of resources (including human resources), net increase in stocks of all types of resources.

## Introduction

It is known that the GDP or the gross domestic product is one of the most important and widely used in international practice macroeconomic indicators. It is difficult to identify the problems that lie in the field of statistical calculation of this index and have not been solved today. Especially, if these problems refer to the methodology of the GDP calculation. However, we are going to draw your attention to the fact that there are unresolved issues.

It is generally accepted that the basis of calculation of GDP with any of its methods (officially, there are three such methods) is the concept of the so-called "end product", "end results" of functioning of the national economy or "final consumption resources". Economic literature suggests various approaches to the definition of "outcomes" or "final consumption resources" [1,2,3].

According to one of these approaches, and in strict accordance with the System of National Accounts (SNA) interpretation of the boundaries of production activities, the end result of such activities should be all the volumes of material benefits (goods and services) which are produced in their industries and spheres of production for a period of time  $\Delta t$ , and which eventually leave the sphere of production and move into their final consumption by households regardless of the source of funding of the final consumption of households [4,5].

From this perspective, the final product is formed only by the resources (goods and services) that will forever leave their sphere of production. Those resources that are completely consumed in production for the unknown segments  $\Delta t$ , in strict terms are intermediate resources (intermediate goods and services). Characteristics of resources as "intermediate" or "ultimate" resources are defined by objective technological value of these

resources in the manufacturing sector. All resources defined as “intermediate” are factors in the production of “ultimate” resources, which are the result of the required factors of production activities and leave the sphere of production.

Resources that remain in production as definite unconsumed stocks are also “intermediate” from the point of view of the above understanding of the “end product” or “final consumption resources”. Although these resources are not consumed within a specified period of time  $\Delta t$ , in all cases, whether their volume is consumed or not consumed in the form of stocks, they are factors of production of the final product that will never leave the sphere of production and, therefore, they are “intermediate” resources.

Another possible criterion for resources division into the intermediate and ultimate ones may be a condition of their full or partial consumption for the unknown  $\Delta t$ . That is, if some resources for some given  $\Delta t$  are consumed in full volume, they are considered to be intermediate in the volume of such total consumption of resources. Then, increase in stocks of resources unconsumed within  $\Delta t$  will be considered as ultimate resources. From this perspective, all kinds of material goods (resources) are both intermediate and ultimate resources at the same time. So, resources are final in terms of increase in their unconsumed stocks, but they are intermediate resources in terms of their total consumption [1].

Nowadays the existing methodology and practice of the GDP calculation use both of these criteria simultaneously. Thus, in accordance with the method of the GDP calculation as total resources of final use, it includes four groups of resources, such as:

1. Goods and services that make up the final consumption of households. This group includes most of the so-called consumer goods and services produced within some  $\Delta t$ ;
2. Gross fixed capital accumulation. This value is the gross fixed capital accumulation over a period  $\Delta t$ , made at the cost of all sources of funding by all the economic units producing material goods.
3. Stockbuilding of real working assets inventories. This value represents a net accumulation of inventories of raw materials, materials of incomplete production and finished products for unknown  $\Delta t$ .
4. Balance between export and import of goods and services for  $\Delta t$ .

As it can be seen from the above definitions, records of volumes that make up all these groups of final consumption resources don't differ in using common methodology.

Thus, the first group of final consumption resources represents the total amount of material goods produced by all economic units for a certain  $\Delta t$  and consumed by all the households.

It doesn't matter that considerable mass of goods and services produced for  $\Delta t$  is not physically exist at the end of a given period  $\Delta t$ , as it is consumed by households. That is, a significant amount of resources (commodities) produced for example, throughout the year, has been already consumed at the end of that year.

However, in the volume consumed, these goods and services are part of the GDP. Therefore, the criterion for their inclusion in the GDP is the fact that they are the “end result” in relation to the factors of production, and they finally leave the sphere of production. So, commodities are included in the GDP not only to the extent of increase in their unused stocks, but also in the volume of their consumption. That is, in essence, we deal with the overall volume of gross output of all kinds of material resources consumed by all households for some  $\Delta t$ .

A very different approach is characteristic for calculation of the third group of final consumption resources which is part of the GDP. In contrast to the case for the calculation of the first group of resources, it doesn't take into account the volumes of all circulating material resources produced for  $\Delta t$ . That is, not the entire gross volume of current material resources output which in fact has taken place over a period  $\Delta t$  is accounted for in the GDP, but only

the volume which is not consumed for  $\Delta t$  and forms a net increase in unconsumed stocks of these resources. The criterion for inclusion of these resources in the GDP is the rate of unconsumed stocks change of these resources.

Calculation of the second group of resources which is called “gross fixed capital accumulation” is based on the third approach. Gross fixed capital accumulation consists of two groups: the net increase in unconsumed stocks of fixed capital for the period  $\Delta t$  plus the volume of fixed capital consumption for the same  $\Delta t$ . Neither the first criterion for assignment of resources to the GDP (resources leaving the sphere of production) nor the second one (increase in stocks of unconsumed resources) are not applied here in their pure form.

When calculating this group of resources, a combination of the first and the second criteria is used. Fixed capital resources don't leave the sphere of production, so it would seem that it should be taken into account in the GDP in the volume of net increase of its unconsumed stocks, that is, according to the second criterion. However, it is taken into account in the volume of its gross accumulation, i.e. with its consumed part, as it was in the case under the first criterion. So, in its natural-and-material composition or in terms of the final consumption resources the GDP, if one doesn't take into account the balance between export and import, consists of three groups of resources: all goods and services which are produced for some  $\Delta t$  and mostly consumed by all households over the same  $\Delta t$ ; increase in gross fixed capital stocks; net increase in inventories of circulating material resources for the same  $\Delta t$ .

Thus, one can see that the criteria by which certain kinds of resources or their groups are classified as “final consumption resources” and included in the GDP, are diverse and quite blurred. There is no reason to believe that there won't be some new, additional or hybrid criteria. All this leads us to conclude that a single, internally consistent methodology and, therefore, methods for calculating such macroeconomic indicator as GDP don't exist today.

It may seem that the GDP calculated by production method or by using such indicator as gross added value (GAV) is devoid of the shortcomings that are inherent in the method of “final consumption resources”.

It is known that according to natural-and-material composition of the GDP, not all of the economic units are able to produce its elements directly. Therefore, according to the objective technological chains, all economic units are divided into those that directly produce relevant elements of the “final product” and those that directly produce only elements of the “intermediate product” which is fully consumed in the production of “final product”.

However, if some economic unit itself doesn't produce final goods and services, but produces only intermediate ones, it is considered to produce the final product indirectly and, therefore, has the right to claim its share in the production and distribution of the final product. The so-called production method of the GDP calculation is connected with the determination of these shares in the GDP for any economic unit. The share of the GDP (the final product) attributed to the economic activity of any unit is called the gross added value (GAV) [2]. Without going into detail of a special analysis of the GAV method, let's pay attention to the fact that this method of the GDP calculation is fully based on the above concept of “final and intermediate consumption resources”. It is known that the GAV is the difference between the value of goods and services produced (output) and the value of goods and services consumed in the production process or cost of resources that form the intermediate consumption.  $GAV = O - IC - T + S$ , where T means tax, S means subsidy. The cost of GAV includes employees' salary with all the finance charges on it, plus amortization charges, plus gross profit.  $GVA = S + A + GP$ . Such a structure of the GAV is consistent with accepted methods of the GDP calculation based on the “final consumption resources”.

As you know, amortization and share of profits are invested in gross increase of fixed capital stocks (the second group of resources included in the final product or the GDP). Salary is invested in purchasing of consumer goods by households (the first group of final consumption resources). Share of profits is invested in a net increase in inventories of circulating material resources (the third group of final consumption resources). An amount of profits is invested in private consumption of entrepreneurs who own economic unit of production (the first group of final consumption resources).

Finally, the rest of profits is invested in a net increase in consumption of human resources. This share of profit doesn't fit into the concept of calculation of the GDP based on purely material "final consumption resources". This share of profits, under any circumstances, can not be a part of the material GDP as it is embodied in the natural form of human resource. Therefore, in strict terms, it should be excluded from the GAV used for the calculation of the GDP.

All the above allows us to conclude that a single and internally consistent methodology as well as methods of the GDP calculation don't exist. In order to identify some of the ways that could lead to the creation of a monistic and consistent methodology, i.e. the method of calculation of the GDP, let's pay attention to the following.

The concept of calculation of the GDP based on the material "end-product" doesn't reflect, and may not reflect all the results of such a complex system as an economy. From the viewpoint of the theory of cycles of resources self-renewal which is still developing, there isn't any kind of resource or group of resources, including human resource, which would have been the most important. From natural-material and purely technological positions it is impossible to say which resources are "final" and which ones are "intermediate" [6,7].

All the individual types of resources and their groups including all consumer goods and man-power (human resource), in the technological sense are "intermediate" that is, moving into each other and consumed by each other.

At the same time, a resource such as  $i$ -th resource, is technologically moving to another resource, and that one is moving to the third resource, the third is moving to the fourth, etc. Finally, for example on the tenth step of such technological transitions, the tenth resource is moving to the initial  $i$ -th resource. Thus, the processing chain of resources transition into each other is closed. Such a closed technological transition is typical for all types of reproducible resources.

So, the consumption of  $i$ -th resource in full or in part volume of its stocks is a necessary technological condition for the same process of production. That is,  $i$ -th resource is self-producing or self-renewing. From the viewpoint of the process of resources self-renewal, any resource at the same time and in full volume of its stocks is both the intermediate product (resource) and the final product (resource). And this is typical for all kinds of reproducible resources available in the economic system,  $i = 1 \dots z$ .

All resources taken together form a single, closed, emergent, self-updating system in which they act simultaneously, in their full stocks as both intermediate products (resources) and end products (resources) [6,7].

From these perspectives, all kinds of reproducible resources in statistical calculations of macroeconomic indicators should be taken into account in full gross volume of their production and in full gross volume of their consumption. Therefore, all kinds of resources as the "end results" should be taken into account in full gross amounts of their output or volumes of renewal for  $\Delta t$ , no matter how much of them has been consumed. As the "intermediate products" (resources), all kinds of resources should be taken into account in full gross volume of their consumption, no matter how much of them has been issued.

Proceeding from the above, the question arises naturally enough. How do the statistical surveys evaluate the final results of these constantly recurring, cyclical processes of consumption and renewal or self-renewal of resources?

We believe that the following factors are able to be considered as end results of processes of resources self-renewal that occur in all economic units (including households) and in any other institutional structures of society:

- gross increase in stocks of all kinds of resources for self-renewal (for their consumption and recovery) within  $\Delta t$ ;
- net increase in stocks of all kinds of resources for self-renewal within  $\Delta t$ .

Gross increase in stocks of all kinds of resources for self-renewal within  $\Delta t$  is the gross volume of resources consumption for  $\Delta t$  plus the net increase in stocks of resources for self-renewal within  $\Delta t$ . Gross and net increases in stocks of resources for self-renewal contain all kinds of resources (including human resource) functioning in any sectors or parts of economy as a whole, including such sectors as households.

From the point of view of the theory of self-renewal cycles of resources, the indicator of economic system development as a whole is the level of stocks of all types of resources in all sectors of the system, and the end results of its operations for some given  $\Delta t$  are both gross and net increases of the resource stocks for the unknown  $\Delta t$ . From this perspective the level of GDP reflects only a part (and not necessarily that the largest one) of the gross increase in stocks of all types of resources in all sectors of the economy for some given intervals  $\Delta t$ .

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## CHARACTERISTICS OF FAMILY BUSINESSES IN THE CZECH REPUBLIC

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### Abstract

Family businesses are often considered to be different from non-family businesses because they are led or owned by family members whose aim is to continue the activities of their companies across multiple generations. According to the existing research, family businesses seem to outperform non-family businesses in terms of efficiency and financial performance. However, in the Czech Republic, the question of family business has been neglected. In this paper, we deal with basic characteristics of family firms in the Czech Republic. We also assess their financial performance and compare it with other firms using return on assets, return on equity, return on sales and labor productivity. The results are multivalent. Family businesses outperform other firms in terms of return on assets and return on equity, but other firms are more efficient in terms of return on sales and labor productivity.

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**Keywords:** Family businesses, Characteristics, Performance

### Introduction

While there is an ongoing debate on what are the roles and relationships among management of companies, their owners and other stakeholders, family businesses are often considered to be different from non-family businesses because they are led or owned by family members whose aim is to continue the activities of their companies across multiple generations. It is possible to assume a certain degree of altruism among family members which is based on the moral and normative order in almost all cultures in the world.

Family businesses represent a substantial part of the world economics. For instance, according to Anderson and Reeb (2003), family firms represent one third of all companies included in the Standard & Poor 500 index. In some collectivist cultures, for example in Asia or Latin America, family businesses represent a prevalent form of entrepreneurship (Carney and Gedajlovic, 2002).

A question which necessarily arises is that family businesses outperform non-family businesses and why. The result of family involvement in the firms is often referred to as *family effect*.

In this paper, we will deal with basic characteristics of family businesses in the Czech Republic. In the first part of the paper, we will present the existing experience with measuring performance gaps between family and non-family firms. In the next part of the paper, we will describe the data used in our analysis which will represent the basis for further research. Then, we will describe the basic characteristics of Czech family firms in terms of headcount, sales and net earnings. In the last part of the paper, we will evaluate the financial performance of family businesses using profitability ratios and compare it with the Czech economy as a whole.

## **Family Businesses and Their Performance**

Family firms have a number of financial and non-financial goals. Some authors suggest that while the owners of family firms attempt to maximize the long-term value of their companies, managers of non-family firms concentrate to a shorter time period and focus on their personal goals (see e.g. Daily and Dollinger, 1992). The involvement of family on the ownership and management may have positive as well as negative consequences. Among the positive effects of family involvement, we may cite possible intimate relationships among managers and owners as well as other employees which may result in a better dissemination of knowledge within the firm. However, it is also possible that family businesses, especially the small ones, are not motivated to follow financial goals and are satisfied with maintaining the status quo (see e.g. Birley, 2000). Therefore, existing studies which examined the performance of family businesses present ambiguous results.

While many authors observed a better performance of family firms (Aguiló and Aguiló, 2012; Allouche et al., 2008; Cassia, De Massis and Kotlar, 2012; Coleman and Carsky, 1999; Gallo and Estapé, 1992; Maury, 2006; McConaughy, Matthews and Fialko, 2001; San Martin-Reyna and Duran-Encalada, 2012; Shyu, 2011, among others), other researches present opposite results: a negative relationship between family involvement and performance (for instance, Gallo, Tapiés, and Cappuyns, 2000; Lam and Lee, 2012; Lin and Chen, 2012; Oswald, Muse, and Rutherford, 2007; Perez-Gonzalez, 2006; Westhead and Howorth, 2006). A number of other authors did not observe a significant effect of family involvement of business performance (Chrisman, Chua and Litz, 2004; Demsetz and Villalonga, 2001; Himmelberg, Hubbard and Palia, 1999; Schulze et al., 2001).

According to some researchers, family businesses outperform non-family businesses, but their performance decreases across generations. The control of firms by heirs is often associated with a lower profitability and growth of firms (Bennedson et al., 2007; Morck, Strangeland and Yeung, 1998; Villalonga and Amit, 2006). Moreover, non-family firms often grow faster than family firms because family members attempt to maintain family ownership at the expense of growth (Birley, 2000; Daily and Dollinger, 1993).

It is also assumed that the family involvement has a positive impact on business performance, but only up to a certain level; after having exceeded a certain limit, the negative effects of family involvement may prevail. This aspect is modelled using an inverted U-shaped curve (Ernst, Kraus and Matser, 2012; Holdermess et al., 1999; Kowalewski, Talavera and Stetsyuk, 2009; Sciascia and Mazzola, 2008).

We should not omit various performance measures used in the analyses. In the majority of existing studies, the performance of companies has been measured using return on assets (ROA), followed by Tobin's q and sales growth (Machek, Brabec and Hnilica, 2013). The diversity of performance measures may have resulted in contradictory results that the studies presented.

## **Family Business Definitions**

The definition of family business is far from being standardized. Some authors define a family business as any company in which majority ownership or control is carried out by a single family and in which two or more family members are or at some time were directly involved in the business. Leach (2007) defines family businesses as companies where family members own at least 50 percent of the business. Other authors consider a firm as a family enterprise when a family or a private person controls 20% or more of the voting rights (Anderson and Reeb, 2003), while others define family businesses as enterprises in which one or more family members are officers or directors, or own 5% or more of the firm's equity, either individually or as a group (Villalonga and Amit, 2006). Most definitions of family business vary in terms of degrees of family involvement. It follows that since the

definitions of family businesses vary, most studies on performance gaps between family and non-family businesses will differ in the data sample definition, which has a fundamental impact on the results.

### Basic Characteristics of Czech Family Businesses

In this section, we will present basic characteristics of family businesses in the Czech Republic. While some authors dealt with the relationship of ownership concentration and performance in the Czech Republic (Claessens a Djankov, 1999), no analyses of Czech family firms have been carried out in the past research.

The distinction of family and non-family businesses is extremely difficult, especially because of three reasons:

- There is no unique definition of family business.
- Czech companies have no legal obligation to disclose whether they are family firms or not. Such data are not available in any publicly accessible databases.
- It may be difficult to trace up the real physical owner if the ownership is realized through multiple legal persons.

We obtained the initial data set from the database “Magnus” (maintained by the Bisnode company) which contains complex information about Czech economic subjects. The time period under consideration was 2006-2012. From the available data, we had to filter out firms which can be classified as family firms.

To distinguish family firms from non-family firms, we decided to use the family name criterion. A firms has been marked as a family firms if there were multiple persons of the identical family name among

- managers, or
- owners, or
- executive boards.

During the filtration process, we took into consideration that in the Czech Republic, female family names usually end in –ová (for instance, if the husband’s name is Novák, the name of the spouse is Nováková). Only firms with more than 10 employees and total turnover greater than 30 mil. CZK (ca 1.164 mil. EUR) have been included in the sample.

The resulting data set contains 5 709 family firms which operated on the Czech markets in the period under consideration.

Among the basic characteristics, we present the number of employees, total sales and total net earnings (for 2012, the dataset is not complete).

**Tab. 1 Basic characteristics of Czech family businesses**

	No. of subjects	Headcount			Sales (1000 CZK)		Net earnings (1000 CZK)	
		Total	Average	Median	Average	Median	Average	Median
<b>2006</b>	2617	303 468	115.96	50.00	139 180	40 139	10 928	2 038
<b>2007</b>	3183	331 168	104.04	47.00	149 489	44 725	14 026	2 942
<b>2008</b>	3578	344 819	96.37	44.00	161 392	46 047	10 886	2 140
<b>2009</b>	3708	338 789	91.37	40.00	149 375	40 938	11 987	1 407
<b>2010</b>	3811	329 587	86.48	39.00	167 648	43 354	8 389	1 701
<b>2011</b>	3553	314 861	88.62	40.00	195 902	48 474	12 585	2 148
<b>2012</b>	1093	139 725	127.84	47.00	248 690	51 089	15 329	2 026

Source: Own calculations; Magnus database.

Apparently, most of the Czech family businesses belong to the class of small and medium enterprises (SMEs) since the median of the number of employees does not exceed 50. We can also assume a positive skewness of the distribution since the average is almost two times greater than the median. The same observation applies for total sales and net earnings.

### Financial Performance of Czech Family Businesses:

In order to assess financial performance, we employed frequently used profitability indicators, in particular return on assets (ROA) as the ratio of earnings before interests and taxes (EBIT) over total assets, return on equity (ROE) as the ratio of net earnings over equity, and return on sales (ROS) as the ratio of EBIT over total sales.

Further, we calculated the labor productivity as the ratio of personnel costs over value added. The comparison has been made with the sample of *all* Czech firms whose sales exceed 30 mil. CZK and number of employees exceeds 10 (this sample contains 11 782 firms).

**Tab. 2 Financial performance comparison**

	Family Businesses				Czech Republic			
	ROA	ROE	ROS	Labor productivity	ROA	ROE	ROS	Labor productivity
<b>2006</b>	0.076	0.130	0.094	0.498	0.072	0.148	0.088	0.652
<b>2007</b>	0.082	0.148	0.105	0.516	0.080	0.162	0.098	0.643
<b>2008</b>	0.067	0.110	0.084	0.540	0.064	0.120	0.081	0.687
<b>2009</b>	0.068	0.114	0.091	0.529	0.049	0.083	0.069	0.711
<b>2010</b>	0.042	0.078	0.053	0.552	0.054	0.097	0.073	0.708
<b>2011</b>	0.060	0.105	0.071	0.561	0.053	0.096	0.070	0.696
<b>2012</b>	0.070	0.113	0.075	0.514	0.050	0.088	0.060	0.719

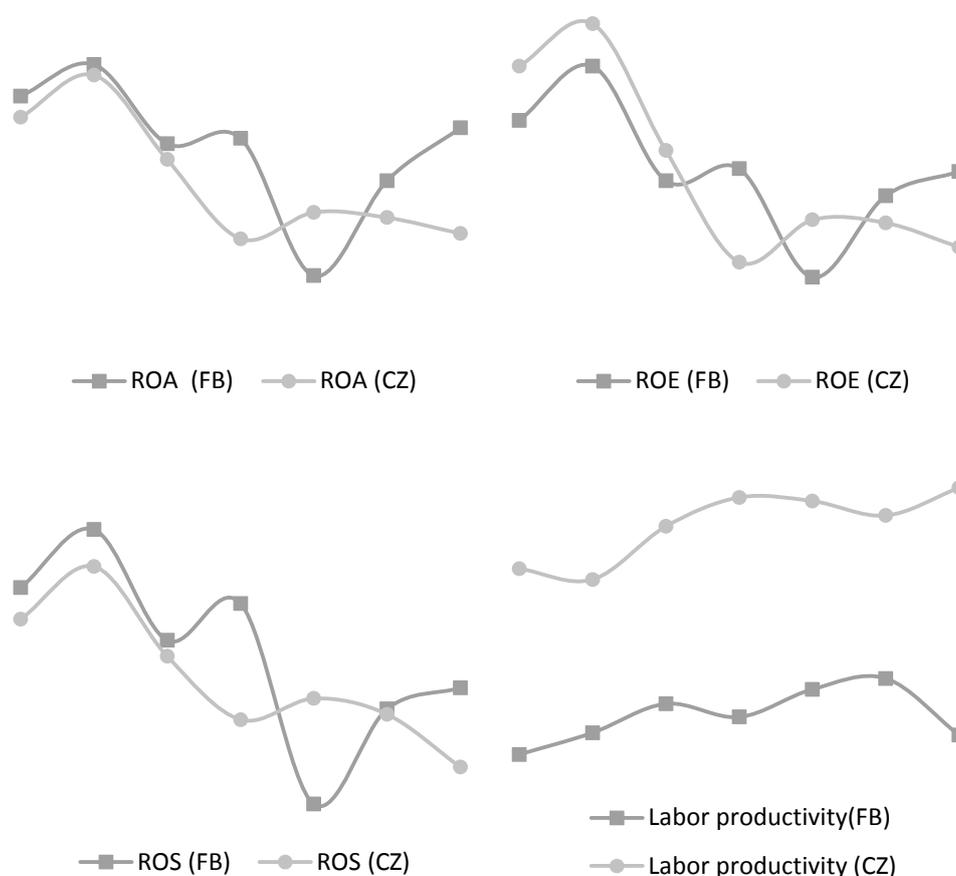
Source: Own calculations; Magnus database.

The mutual comparison can be also illustrated using the following figures (FB denotes family firms, CZ denotes Czech Republic). If we had used only ROA to evaluate financial performance (like most studies in the past did), we would observe that in the period under consideration, family businesses outperformed other firms (with the exception of 2010), while the difference was not substantial. In terms of ROS (profit margin), the findings would be analogous.

However, when taking into account other indicators, the more profitable group of firms is not clear-cut. Return on equity of non-family firms is greater than the one of family firms in 2006-2007 and 2010, while in terms of labor productivity, the average labor productivity in the Czech republic is significantly higher than the one of family businesses.

So, we are not able to determine the more profitable group of firms. However, our analysis differs in the number of evaluated subjects. While the average number of subjects in past analyses (carried out until 2013) was 947 firms (Machek, Brabec and Hnilica, 2013), the number of evaluated subjects in our analysis is of 5 709 firms. However, our time period 2006-2012 is limited. It is also important to stress the possible bias due to the data filtration method: on one hand, there may be firms which are actually non-family firms in the sample (due to a possible namesake within the firms), and on the other hand, some family firms may not be included in the sample (for instance, if the spouse decided to maintain her name after marriage).

**Figure 1: Financial performance comparison**



Source: Own calculations; Magnus database.

## Conclusion

This article is one of the first outcomes of the project which deals with the difference of family and non-family firms. The collection of the sample of Czech family businesses is very challenging. To distinguish family and non-family firms, we observed multiple occurrence of identical family names among managers, owners or executive board members. This definition has some limitations. Firstly, it may be difficult to trace up the real physical owner if the ownership is realized through multiple legal persons. We also have to pay attention to frequent Czech family names which could possibly distort the sample of family firms. Last but not least, the family name criterion fails if two persons decide to maintain their family names after marriage. However, if we assume the above-mentioned definition to be one of the few possible ways to collect a large sample of family businesses, we can analyze their properties and compare them with other firms.

In this paper, we presented the basic characteristics of Czech family businesses in terms of number of employees, turnover and net earnings. Most Czech family businesses belong to the class of small and medium enterprises. The fact that companies with less than 10 employees have been excluded from the analysis only confirms this hypothesis.

As to financial profitability, family businesses outperformed other firms in terms of return on assets or return on sales. In terms of return on equity and labor productivity, family firms performed worse than the average of the Czech economy.

However, it is necessary to stress the possible bias due to the above-mentioned data filtration method. The future research will be focused on a more accurate definition of family

business sample, as well as on refining the sample we already collected to reduce the possible bias. The performance of firms may also be measured using other indicators, such as total factor productivity or firm growth.

### **Acknowledgement**

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## NATURAL GAS MARKET DEVELOPMENT - IMPLICATIONS FOR DIVERSIFICATION OPTIONS OF EU: CASE STUDY OF SLOVAKIA<sup>6</sup>

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### Abstract

European Union has been exposed to major changes on global natural gas markets since beginning of 21. century. Shale gas, development, liberalization on Russian market accompanied by lower consumption due to economic crises and interconnecting of natural gas network created a matrix of interacting elements which can clearly influence energy security of EU. The aim of this article was to analyze how the global trends on natural gas market from recent years so far affected the EU natural gas market in terms of diversification with special focus being dedicated to Slovakia. We came to conclusion that shale gas has so far only indirect implications, LNG impact is limited and EU will be in the closest future affected mainly by Russian natural gas export politics. As case of Slovakia documents EU diversification efforts have not been successful so far and EU internal energy market suffers from policies distorting market environment.

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**Keywords:** Natural Gas Market, EU energy security, Shale Gas, Slovakia

### Introduction

During last years the natural gas market has gone through significant changes. It has now been more than 12 years since U.S. started large scale extraction of shale gas, reverted up the state of what seemed to be inevitable decline of domestic production and Golden age of gas was announced (IEA, 2011). New LNG supplies that came on stream at the same time as new endogenous sources of U.S. natural gas were made available led to gas glut situation and global LNG trade that was pushed by economical and physical availability of new sources has risen by 129 % during that time. These changes on supply side have clearly consequences to demand side. EU efforts for reaching gas supply security now looks realistically more achievable and despite some hurdles, better conditions for gas consumers might be reachable in not so distant future as a result of not only LNG going global but also EU infrastructure integration initiatives and development on Russian natural gas market.

The aim of this article is to analyze how the global trends on natural gas market from recent years so far affected the EU natural gas market in terms of diversification with special focus being dedicated to Slovakia. The article continues with characterizing the development on global gas market, especially changes concerning shale gas (r)evolution and Russian gas market. In second part of our article we focus on analyzing whether these changes has already impacts on EU natural gas market mainly in terms of actual gas flows related to EU diversification goals. The third part of this article is a case study on example of Slovakia, as

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a country that was (together with Bulgaria) most affected by 2009 gas crisis and continuously being almost 100 % dependent on Russian gas.

### **Natural gas market development – shale gas phenomena**

During the course of debates on shale gas importance for EU some widely believed misperceptions regarding current state of affairs occurred, such as U.S. is already exporting significant volumes of natural gas to Europe or that Europe is about to be future shale gas bonanza (this is coming from initial shale gas hopes which somehow stayed in minds of general public).

To set the things straight, in 2013 large scale shale gas extraction is still being realized only in U.S. Originally started on Barnett shale Texas, now being actively developed on multiple shells in different states the shale gas drilling is in spite of its macro and microeconomic benefits still far from unanimously seen as undisputable success mainly due to environmental concerns and issues related to sustainability of shale gas production<sup>7</sup>. In any case, even if U.S. shale gas will hold to expectations predicted by EIA (2013), the exports of natural gas itself remain uncertain. The discussion regarding economic benefits to U.S. economy between options of gas exports and its domestic usage in form of cheap feedstock for chemical industry or alternative transportation fuels is still running. Preliminary permissions to export LNG are still subject to further approval process. And quite likely no substantial exports of U.S. LNG will be seen during next years, as U.S. politicians might as well decide to pursue centrist approach to energy issues. This will surely depend on ability of various stakeholders in promoting their interest towards policy makers (with energy companies willing to sell gas on more profitable European and Asian markets, and chemical companies and general public pushing policy makers to limit international exports in order to keep American natural gas prices in lower levels and so supporting industrial production and consequently employment). The exporting option is moreover administratively complicated by fact that U.S. could currently export natural gas only to countries it has signed Free Trade Agreement with – not the case of EU so far. Therefore, at this moment more feasible option for EU to get to (possible) American shale gas exports seems to be 2012 proposal by then-Senator Lugar suggesting NATO could gain legal status of FTA for this mater.

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<sup>7</sup> Except for direct pollution due to fracking fluids leakage or methane migrating to water wells due to mismanaged casing and flow back water treatment, and undisclosed fracking chemical issues (all believed to be technically solvable issues), the debate triggered by paper of Howarth – Santoro - Ingraffea (2011) reporting extensive amount of fugitive methane emissions questioned the whole positive environmental contribution of shale gas replacing coal energy mix. This finding was not able to withstand the scientific scrutiny and proved to be flawed – the question remained widely discussed though. Breakthrough Institute (2013) on the other hand claims that shale gas actually has a net environmental benefit as it is replacing coal in electricity generation. This has already led to decline of consumption of coal in yearly magnitude of 50 million tons. Cheaper natural gas has also positively contributed with more than \$100 billion to the economy every year since 2009. B. Warner (2013) however noted that this coal was not left in ground but exported to Europe where it replaces natural gas from energy mix which naturally negates global positive impact of shale gas. The second large shale gas issue continuously being discussed is the sustainability of U.S. shale gas extraction due to rapid production rates decline of drilled wells during first two years. That forces the growing speed of larger amount of wells being drilled if production growth should keep its production growth trend or at least stay at plateau. Since sweet production spots will be running out the overall financial sustainability of shale gas drilling is questioned. The answer for this is production of associated NGL which makes production of shale gas profitable even at low prices of natural gas<sup>a</sup>.

<sup>a</sup>Rao (2012) argues as follows on example of Marcellus Shale. Wet gas (liquids associated with natural gas) averages 7 gallons per mcf. That is 0,17 barrels since each barrel contains 42 US gallons. Take an oil price of \$100/bbl. For natural gas assume \$4 per mcf. The liquid component is worth  $0.17 \times \$100 \times 0.3$  (discount factor added for conservatism) = \$5.10. While associated gas is worth \$4. No matter what reasonable discount you apply, the liquids materially add to the profitability of gas.

The situation regarding the shale gas drilling in EU is not very promising either. The general overview of situation is clearly visible from EIA (2013) updates of its first estimate of world shale gas resources (EIA, 2011) that downgraded the resource base by some 27 %.

Table 1 Shale gas resources in Europe

Country	Technically Recoverable Shale Gas Resources (bilion m3)	
	2011	2013
France	5 040	3 836
Germany	224	476
Netherlands	476	728
Norway	2 324	-
U.K.	560	728
Denmark	644	896
Sweden	1 148	280
Poland	5 236	4 144
Lithuania	112	56
Romania, Hungary, Bulgaria	532	-
Romania, Spain, Bulgaria	-	1 540
<b>Total</b>	<b>456 288</b>	<b>355 152</b>

Source: EIA (2011), EIA (2013)

The simple comparison shows that original assessment was overestimated and multiple experts have already come to conclusion that shale gas extraction will be more challenging and importantly, significantly more expensive in EU. The situation in individual countries differs as shale gas faces heavy opposition which led France and Bulgaria to put moratorium on development of this resource. Even countries supporting shale gas extraction did not record any extraordinary success due to geology factors, lack of equipment and complexity of landownership's right. Initial optimism of Poland is slightly fading after government granted concessions for 100 wells (48 drilled so far) did not bring expected results and some companies (Marathon Oil, Talisman Energy, Exxon Mobil) already pulled out<sup>8</sup>. The new shale gas center moved to UK, where it gained support not only from D. Cameron but also, less expectedly, from J. Lovelock<sup>9</sup>. However results can not be expected very soon. As H. Rogers (2013) noted public acceptance, successful drilling test and overall framework for shale gas extraction is far from being at place, concluding that even in positive scenario plateau production is not likely to arrive before 2023-2028. The other EU countries currently examining the possibilities of shale gas drilling are Netherland, Romania, Latvia and Ukraine<sup>10</sup>.

By adding to above mentioned difficulties the issues of social acceptance of hydraulic fracturing technique, inappropriate market regulation and external influences, lead times of successful project can be expected closer to 2020 then in near future, with Poland currently still seemed to be forerunner.

<sup>8</sup> Reuters (2013) recently reported that Lane Energy Poland, an oil and gas exploration company controlled by ConocoPhillips has a very promising results from its test well drilled in Lebork.

<sup>9</sup> British environmentalist and author of Gaia theory.

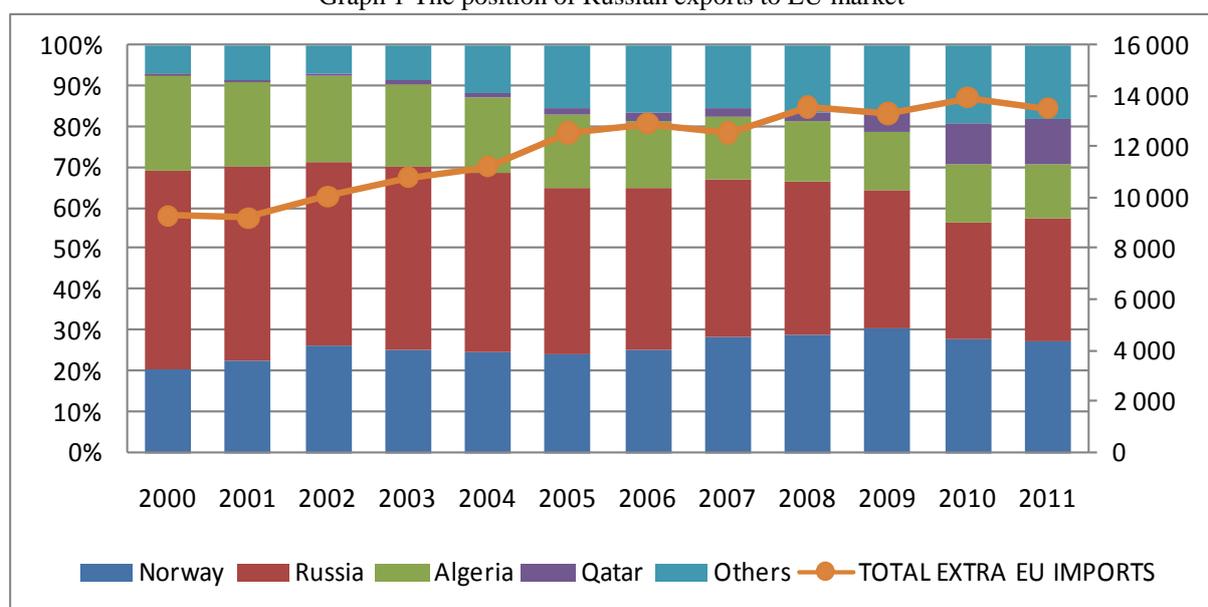
<sup>10</sup> Ukraine is aiming at signing Association Agreement with the EU in November and decline on Russian offer to join Custom Union (Russia, Belarus and Kazakhstan) which would award Ukraine with natural gas import prices decrease to \$160/1000m3 (Hafner, 2012). Unconventional gas seemed to be a tool that could help to break Russian influence on Ukraine and therefore reported Russian pressure to halt Ukraine unconventional gas drilling, for instance by efforts to gain ownership over pipelines, is not surprising (Gonchar, 2013).

### Russian factor – Gazprom losing ground

Even though shale gas development gained prime attention in recent years, as we have shown in first part of our article, it has not a chance to physically access the EU natural gas network so far and its impact on EU natural gas market is only indirect. Taking into account the factor of time, more interesting development for EU occurred on Russian natural gas market.

Russian federation holds 26,6 % of world gas reserves (Gonda, 2013), of which Gazprom owns 70 %. Gazprom as a sole operator of trunk pipeline system (Unified Gas Supply System) and the only exporter of Russian natural gas was many years covering the largest share of EU imports and was considered as a reliable gas supplier to EU countries. Despite EU efforts for diversification, no major changes of this state could be expected. Things has however started to change due to well known development on global energy markets – U.S. shale gas increased gas supply on American continent releasing the incremental LNG sources, natural gas demand in EU stumbled as a result of Great Recession, and oil prices reached historical records and kept at level around \$100/bbl which consequently increased the natural gas prices in EU still linked to oil prices. Lagging reaction of Gazprom on this development together with natural gas crisis from 2000s was enough for him to weaken his position on EU natural gas market. Since the beginning of century we could observe Gazprom market share on third countries imports of gas to EU has fallen from almost 50 % (with exports of 4 540 PJ) in 2000 to some 30 % in 2011 (4 102 PJ). During this period the overall decline of importance was not caused by declining imports but rather by rising European demand for imports that Gazprom did not manage to catch. Norway for instance almost doubled it exports to EU throughout the observed period (1921 PJ vs. 3 715 PJ). During last 3 years EU demand stagnated and the market share of Gazprom has looked stabilized. In some existing contracts Gazprom has revised its gas pricing formula such that Take or Pay volumes of contracted gases were lowered from 85 % to 60 % and 15 % of indexation is now related to gas average price on gas hubs in EU (Konoplyanik, 2012). And even if Gazprom did not manage to prevent from concessions and arbitrages with its European customers, the oil price indexation formula stayed at place. On the other hand this also meant Gazprom kept loosing on his attractiveness and in 2012 his leadership on European market was overpassed by Norwegian gas exports for the first time (Euractiv, 2013).

Graph 1 The position of Russian exports to EU market



Source: Authors, based on Eurostat data

But this is not the only challenge Gazprom suddenly needed to handle. Russian domestic gas prices were historically subsidized in order to stay affordable for households and supportive for enterprises. Also this ceased to be true in recent years. Average natural gas prices to Russian industry have increased consistently in recent years, from \$0.4 per million British thermal units (MBtu) in 2000 to \$2.8/MBtu in 2010. The stated aim, since 2007, has been to increase industrial prices to EU “netback parity”. The original deadline of 2011 was postponed till 2014-2015 due to rapidly increasing reference price in Europe (due to mentioned oil linkage of prices) (IEA, 2011). More importantly, this price increase had “side effects” and made Russian domestic market attractive and profitable for other Russian producers such as Novatek, Rosneft, Lukoil and others. These started to challenge Gazprom initially on Russian market (Henderson, 2013; Pirani, 2013) and now even expansion to international Gas market seems to be viable in near future. Such development should be supported by EU since these suppliers are able to operate more efficiently and so far it seems they could even offer prices based on European hubs and not only the oil linked model that is preferred by Gazprom. Moreover with Gazprom position of Russian geopolitical weapon shaken by Rosneft – TNK BP takeover, even Gazprom strategy towards its customers might needed to be more market oriented. Nevertheless, according V. Drebentsov the Russian government has still given Gazprom a chance to show he can defend his position and business model in Europe, otherwise new and very likely more effective Russian gas producers will gain the access to international market which was basically confirmed by D. Medvedev (Tibold, 2013). The „moment of truth” is expected to come in the second part of this decade, when new substantial LNG volumes coming on stream will bring new liquidity to global natural gas market.

### **Diversification options of natural gas supply for EU**

EU gas production itself is currently mainly concentrated in two countries: UK where the production trend is declining and Netherland that producing on plateau level during last years. With natural gas being considered the fossil fuel of 21.century the rising important dependence of EU is inevitable and energy security questions naturally arise. Creation of unified gas market in EU and diversification of sources were therefore primary objectives of EU gas policy during last decade. Focusing on diversification from Russia, EU eventual options includes the Caspian region, North Africa, new sources in Levantine basin and LNG. Countries of Caspian region however as it seems nowadays are more likely to orient their export towards Asia, with Azerbaijan exports via the planned TAP pipeline being the only exception right now. North African diversification option includes Libya, Egypt and Algeria<sup>11</sup>. These countries have substantial gas reserves 8,1 Trillion cubic meters (Tcm) (BP, 2013) and in 2011 their combined export to EU already reached 50 % of Russian. Its further extension is for now limited by political and violent regime changes in these countries, which do not create environment suitable for further growth of exports and domestically subsidized gas consumption even limits the export options from operating fields. Moreover, terroristic attack on Algerian gas facility in January 2013 might have negatively influence foreign investment in this sector for the future. New discoveries of natural gas fields in Levant Basin represents another options diversify suppliers of natural gas. Current estimations of natural gas reserves by EIA (2013) is 3,4 Tcm with substantial share belonging to Cyprus and Israel. However the political stability of region long terms suffer and currently is threatened by continuing civil war in close Syria and export infrastructure that needs to be put in place in order to export suggests this will not be a „cheap“ gas (Okumus, 2013). Even if all the issues will be resolved successfully, the export volumes are likely to be some 13-14 bcm/year. To

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<sup>11</sup> Algeria shale gas resources are even estimated to overcome those conventional.

put things into perspective EU natural gas consumption was 443 bcm and imports from third countries reached some 294 bcm (BP, 2013). Importance of LNG for EU was growing during last years due to above mentioned development. Since the turn of millennia 103 bcm of capacity was added which is in contrast with consumption that virtually has not changed (440,3 bcm in 2010 vs. 443,9 bcm in 2012), however need for 85,9 bcm of incremental imports due to declining endogenous production occurred during the same period which explains the ratio behind this. GIE data shows that LNG capacity should continue in its growth trend and by 2022 could be even 87 % higher (see table 2).

According to IEA (2011) New Policy Scenario at that time EU consumption shall be roughly at nowadays levels and therefore LNG imports could cover as much as 100% natural gas net imports projected in EC (2009) reference scenario of 283 bcm in 2025. The rationality of such capacity building can be questioned not only with respect to threat of congestions in natural gas infrastructure in Western Europe under LNG glut assumption (Dieckhöner – Lochner – Lindenberger, 2013). Competitiveness of LNG supplies raise (at least for now) another questions when despite the growth of LNG terminals capacity, imports peaked in 2010 reaching some 88 bcm and then went down when 2012 import of 61 bcm was even below 2009 level of 63 bcm (BP, 2013) resulting in some 40 % capacity utilization. LNG imports are used mainly to meet winter peak demand and remain underutilized during the rest of the year. Reason for this, except for contracted volumes of natural gas from pipeline suppliers, is pricing, when LNG coming to Europe is still in many cases priced on the oil indexation basis (Ratner et al., 2013)

Table 2 LNG terminals (number & capacity) – existing, under construction and planned

Year	2013		2017		2022	
	No. terminals	Nominal capacity/bcm	No. terminals	Nominal capacity/bcm	No. terminals	Nominal capacity/bcm
Spain	6	60,1	8	71,9	9	79,8
UK	4	51,1	5	64,1	5	64,1
France	3	23,8	4	36,8	5	61
Netherlands	1	12	1	16	1	16
Italy	2	11	3	14,7	6	43,3
Belgium	1	9	1	12	1	12
Portugal	1	7,9	1	7,9	1	7,9
Greece	1	5,3	3	12,9	3	12,9
Sweden	1	0,5	3	1,3	3	1,3
Norway	1	0,2	1	0,2	1	0,2
Croatia			2	12	2	12
Estonia			2	5,5	2	5,5
Finland			1	0,1	2	2,1
Ireland			1	3	1	3
Latvia			1	5	1	5
Lithuania			1	4	1	4
Poland			1	5	1	5
Malta					1	2
<b>Total</b>	<b>21</b>	<b>180,9</b>	<b>39</b>	<b>272,4</b>	<b>46</b>	<b>337,1</b>

Source: Authors, based on data from [www.gie.eu.com](http://www.gie.eu.com)

Seeing these limits of EU diversification effort, the obvious conclusion is continuing dependence on natural gas coming from Russian Federation. Therefore we continue with analyzing development on natural gas market from this angle.

### **Pipeline politics impacts on CEE countries**

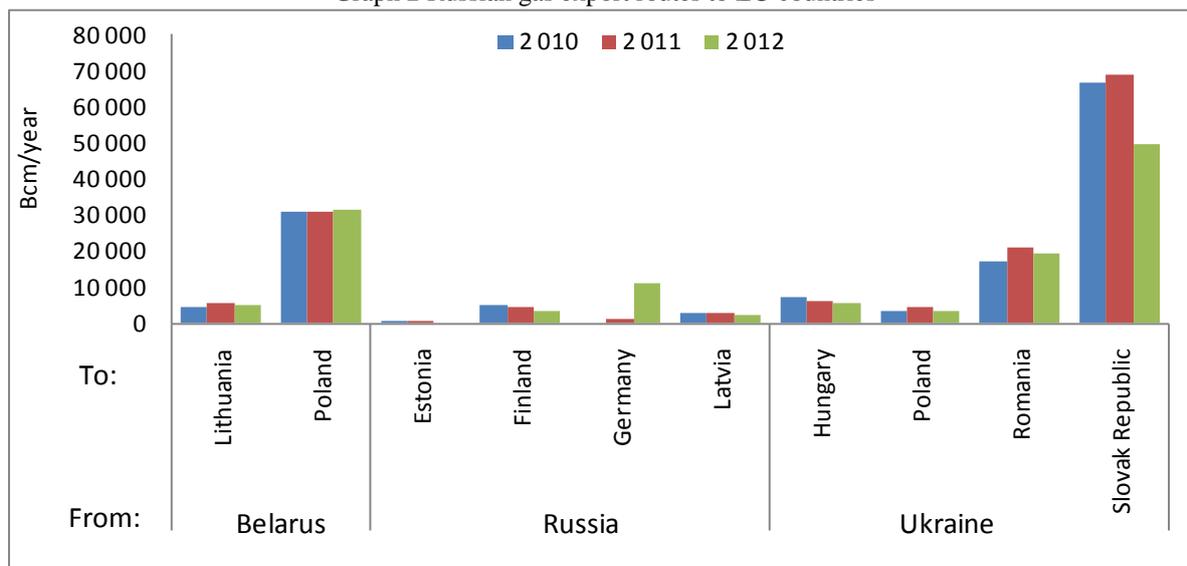
According to B. Schaffer (2013) there exist 3 different types of relationships between importers and exporters of natural gas: mutual dependence, one of the parties is dependant on exported/imported natural gas, none of the countries is dependant on this relationship. It is clear that mutual relationship of individual EU countries towards Russia differs with respect to their size, natural gas consumption, sourcing diversification but also technological level and mutual trade with other goods. If EU could act as a single player, it could obviously significantly improve not only security of supplies but also its position for contracts negotiations. The need to do that has been seen at least since two major cut offs of Russian gas flows from the first decade of century, that had negatively impacted countries primarily located on eastern part of continent. As the EC concluded in 2010, the severity of impact could be much lower if any, if better mutual interconnections between EU countries exist, since there was abundance of natural gas supply in other parts of EU (Boersma, 2013). The planned deadline for finalization of unified natural gas market for 2014 is not going to be matched and according to 2012 EC report multiple national states still did not adopted rules of "Third Energy Package". Some analysts even comments that creation of unified gas market can be the question of decades of institutional development before functioning properly (Makholm, 2012) – this means Russia can continually enjoy the state of asymmetrical dependence with individual EU states.

Nevertheless, EC also noted that significant improvement had been reached already. For instance the ten fold increase in natural gas hub based trading and tools such as EEP have already enabled the greater connectivity of intra EU gas infrastructure. According EC energy webpage as in September 2012 there were thirteen infrastructure projects (interconnectors and reverse gas flows) finished and another 18 were supposed to be finished by 2015. This indeed evokes greater security of supplies as most of the finished projects were realized in countries of Central and Eastern Europe (CEE), countries most dependant on single supplier from Russia. However the real contribution of these projects shall only be visible after creation of single gas market. This is clear from simple comparison of gas flows in Europe between 2010 and 2012, when only major change was that gas from Russia was not exported via Slovakia and Czech to Germany but flew via Nord Stream directly to Germany which is becoming the main European Hub<sup>12</sup>.

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<sup>12</sup>This may however bring positive consequence when taking into account development on German gas hubs (NCG and Gaspool) which may replace UK NBP position of European most liquid hub and become reference points for price creation in continental Europe and provide access to spot traded gas to traditional Central European gas transit states.

Graph 2 Russian gas export routes to EU countries



Source: Authors, based on IEA data

Note: For this purposes gas flowing via Ukraine and Belarus is considered to be Russian without further analysis, as Eurostat records only minimum Ukraine gas exports and none from Belarus during observed period.

It is clear that presence and close future on EU natural gas market is very likely to be influenced by Russian pipeline politics. Russian effort do diversify its export routes that began in 1990s with building Yamal pipeline going through Belarus and Poland further to Germany with capacity 33 bcm/year and now with two lines of Nord Stream with capacity of 55 bcm/year created a solid platform to replace gas flowing via Brotherhood pipeline through Ukraine. Brotherhood pipeline with original capacity of 170 bcm/year and currently capable to transport some 115 bcm/year is still backbone of Russian gas transit routes with total capacity of 256 bcm. With potential of South Stream four pipelines and possible construction of Nord Stream 3 and 4 adding another 118 bcm/year capacity the Ukraine route might be abandoned in the future (Hafner, 2012).

As already mentioned, the finalization of Nord Stream (and related interconnectors) has already altered the gas patterns flows in Central Europe, when east to west transmission stopped being only viable option. On the other hand Nabucco project failure means that only the transportation risk was resolved while at the same time Russian gas lever towards EU Central European countries transiting gas has grown as a result of multiple Russian options of export routes. The planned TAP pipeline is without doubts of lesser geopolitical significance compared to Nabucco which was intentionally aimed to reveal the 80 – 100 % dependence of these countries on Russian gas (Koranyi – Brzezinski – Bryza, 2013) no matter what EU official statements claim. Another Russian project – South Stream – which will have similar impact on Southeast Europe is already under construction and potential Yamal Europe pipeline would only strengthen the Russian leverage over individual EU transit countries and undermine economical feasibility of any future attempts to revive Nabucco project.

According R. Likvern (2012) the Norway gas production has already reached its plateau and will start declining till 2020 so relying on incremental volumes for CEE countries from this source might be risky. Basically, for time being, this implies that for countries of CEE, LNG and North-South Natural Gas corridor despite all the risks may be the only viable option to increase its gas diversification in the close future.

### Case Study: Slovakia

Natural gas is with some 35 % most important element of Slovakian energy mix. Endogenous resources are negligible, with production peaked in 1958 – 1962 at levels 1,1 - 1,3 bcm and currently reaching only around 100 Mcm/year. Country is so almost 100 % dependant on imports from Russia. Slovakia, thanks to its history, has extensive network of gas distribution network (second largest in Europe after Netherland) and 94 % of inhabitants has direct access to gas supply since the natural gas consumption was supported by subsidized prices of natural gas resulting from former ties to Russia. So far, the maximum consumption was reached in 2000 with 6,9 bcm (BP, 2012). During the first decade of millennium the consumption moved toward 5 bcm as a result of rising prices and higher industrial efficiency of usage and at the end of decade was pushed upward to 6 bcm mainly by start up of new 440 MW CCGT power plant<sup>13</sup>.

Energy security was for a long time outside the scope of interest within Slovakia as country could rely on its importance of transit state. The Brotherhood pipeline was transporting over 90 bcm a year that continued to Austria, Czech Republic and above. Only the Ukraine – Russia gas crisis from January 2009 highlighted the vulnerability of Slovakia. Slovak Republic was cut off from supplies for 11 days, gas supplies to manufacturing enterprises had to be interrupted and economical damage is estimated to 1 billion EUR (Duleba, 2009). This happened only few months after Slovak republic signed 20 year contract on natural gas supply and issued Energy Security Strategy – this basically helped Slovakian officials to handle the situation, and within the few days of supply interruption a back flow of natural gas from Czech Republic was enabled, the very same day as Ukraine and Russia reached agreement and original natural gas supplies were restored.

In order to prevent future occurrence of such situation Slovakia started to pursue a strategy of diversification via integration into Central European gas network, upgrading the transmission system into bidirectional flows and natural gas storage extensions, which was financially supported by EEPR. Under assumption of continuity of current geopolitical trends, this is certainly crucial for the future of Slovakian energy security. Gazprom already cut the shipments transported to EU via Brotherhood pipeline from some 90 bcm to approximately 50 bcm after the opening of Nord Stream. 50 bcm a year is reportedly the volume contracted by Slovak transmission system operator – Eustream – under the ship-or-pay clause till 2028 to move through the country further to EU (TASR, 2012). At that time South Stream and potentially Nord Stream 3-4 can be built which would made Brotherhood pipeline only one of many choices. If current political climate between Russia and Ukraine does not change, this will surely not be pipeline of choice. This was confirmed by Russian intention to build Yamal – Europe (going from Poland to Slovakia, Hungary and Austria) branch that could cover the grey zone of Russian gas supplies after possible exclusion of Ukraine as a supply route option.

On the other hand Slovakia has still potential to benefit from its vast gas transporting infrastructure even after the potential rerouting gas flows towards bypassing the Ukraine in the future. Even if the Open season for new interconnection between Ukraine and Slovakia did not prove successful, already current technical conditions enable Eustream to transport 80 Mcm/day (28,8 bcm/year) to Ukraine that is with 50 bcm/year consumption third largest consumer in Europe. Nowadays Ukraine is still in dispute with Gazprom in order to negotiate conditions for such actions and future interest of Ukraine will definitely depend upon the its achievement in development of domestic sources, although Slovakia needs to keep

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<sup>13</sup> This power plant with operation efficiency of 59 % is likely going to be conserved after only two years of operation (or even the possibility of its dismantling and moving to Turkey is being discussed) due to high natural gas prices and strong electricity generation from RSE that are covering the most valuable peak electricity demand.

considering this option if it does not want to lose all the financial benefits resulting from gas transportation.

As for non Russian diversification option of Slovakia, we already mentioned that Slovakia was supposed to benefit from Nabucco pipeline originally intended to be destined in Baumgarten gas hub in Austria, close to western border of Slovakia. This will likely not happen, even though the final cancelation of Nabuco (West) project is still off the table and this project is still on EU priority list (Reuters, 2013). LNG option for Slovakia include so called North-South gas corridor. This would include bidirectional connection between LNG terminals Adria (Croatia) Świnoujście (Poland) with aggregated capacity of 17,5 – 22,5 bcm integrating also Hungary, Slovakia and Czech Republic. The aggregated consumption of natural gas in these five countries in 2012 was some 44 bcm so this route would indeed have significant diversification potential. Looking at this option nowadays we can observe that this project is still quite far from being finalized. LNG terminal in Poland is projected to be finished in 2014 however the interconnection to Slovakia is missing, while interconnection between Slovakia and Hungary is being finalized, however the ADRIA LNG has currently only form of proposal and could be operational at best case in 2016.

### **Recent trends**

In 2012 5,4 bcm of natural gas flew to Slovakia and partially further to Austria from Czech republic. This not only highlighted the diversification options but has direct impact for Slovakian natural gas consumers since this natural gas, originating from German hubs, constituted some 2 bcm of 6 bcm of Slovakian consumption in 2012 as ICIS (2013) reported. Spot traded natural gas gained access to Slovakia thanks to liberalization on Slovak natural gas market which attracted multiple suppliers that, unlike Slovak national incumbent SPP, are not limited by long term gas supply contract with Gazprom and therefore can be more flexible towards market needs. In spite of that, prices of natural gas in Slovakia for small enterprises and households have shown growing trend during last years as they were historically capped on artificially low levels by decisions of National regulation authority, repeatedly accused of unclear methodology of price settings – meaning the sector of natural gas supply to households is long term unprofitable business. Those aspects, according to various commentators, were the main reasons of recent reshuffle on Slovakian natural gas market. In 2013 E.ON and RWE (now former 49 % shareholders of SPP) backed out from SPP and sell their part to local equity company – EPH, that consequently sold the trading part of the company struggling with changing market environment to Slovak state, leaving only profitable divisions of company (distribution and transportation) for itself. In autumn 2013 this transaction was finalized despite wide disagreement of Slovak political opposition parties that accused ruling party of corruption and even tried to appeal prime minister. Even if not taking these aspects of deal into account, it is very clear that under assumption of Slovak government owning gas trading company and with power over regulation authority a serious threat of market distortion arise. This may endanger the overall potential benefits of Slovakian diversification effort as on regular basis some market players will decide not to trade on Slovakia and *diversification* infrastructure being built will be put only in position of emergency backup.

### **Conclusion**

American shale gas development has undoubtedly become a prime driver of world scale changes on natural gas market especially in EU. Extension of shale gas extraction to EU remains questionable. However indirect impacts are already visible in form of changing business model of former largest EU natural gas supplier – Russia – that might need to consider revamping its business model of natural gas trading in near future. Competition

between multiple Russian natural gas exporters would surely be beneficiary for EU citizens as Russian importance to EU with respect to natural gas will remain and its negotiating position towards some EU countries will be even reinforced by its diversified transport routes. As for now, only LNG has the real potential to alter it. This will however materialize only in case the additional infrastructure is built and LNG business model together with world scale competition for LNG supplies create incentives for EU customers to prioritize this source – for now this is not the case and private investments to new gas infrastructure projects within EU can be expected only on limited scale when the current message conveyed by the European Commission says that there will be no more gas in 2050 (Badida, 2013). To sum it up EU with respect to natural gas can currently be seen as a passive observer not the driver even in its own territory. And as the example of Slovakia clearly documented, these changes (shale gas, EU liberalization together with extensive regulation, accompanied by subsidized renewable energy sources) have potential to significantly distort traditional organization of market with potential of negative impacts on gas consumers and threat to country's energy security.

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## **LEADERSHIP SKILLS IN ORDER TO INCREASE EMPLOYEE EFFICIENCY**

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### **Abstract**

The role of leadership as a core management function becomes extremely important in the case of rapid changes occurring in the market, and then within an organization that must adapt to new changes. Therefore, management becomes a central topic of study within the field of management. Terms of managers and leaders are not equal, and have not same meaning. The manager may be the person who operates in a stable business environment; a leader is needed in terms of uncertainty that identifies new opportunities for the company in a dynamic business environment. Therefore, leadership, charisma and inspiring employees, and the use of power, are becoming the key to the success of the enterprise market, and among its competitors. There is no dilemma that is leadership crucial for its success or not, the importance of leadership is unquestioned. Therefore the study of this area management as a management tool is importance for the success of the business. A leadership skill derives satisfaction of employees work activity. The company, which have no leader will result , with bad results, not motivated and disgruntled employees, while the opposite, organization that are based on knowledge and expertise in the field of management will be successful in their own business domain. Because of its importance in achieving the goals set out by managers and organizations, purpose of this paper is to examine the effects of a valid, leadership on the effectiveness of employees in the enterprises. The results show that a leadership skill affects the efficiency of enterprises and employee motivation. Leadership skills becoming a key success factor in business and in achieving the organization's objectives.

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**Keywords:** Management, enterprises, leadership, efficiency

### **Introduction**

Nowadays companies operating in conditions of rapid change, and are forced to change their established ways of doing business on the new, innovative and creative way. The reason for this is the desire to achieve the objectives of which are in most business plans more than ambitious. Managers has to set a high goal to achieve, and it will not be possible without motivated and satisfied employees who will be willing to provide more in terms of engaging the business tasks of what is actually needed. It is not uncommon, that only those employees who are motivated will have such a desirable behavior.

If employees want to "survive" the dynamics of the environment and if they want to achieve the set goals of the organization, they have to change its behavior. Signals changes in employee behavior primarily come from the management. Therefore, we need leaders who will adapt the organization and staff to new changes that occur. Provide such conditions in the business where are everyone involved in the process of creating a product or service, have to be satisfied and motivated, is a big challenge for a leader and a pretty complex job.

But precisely the role of such a leader has a key significance of which will depend efficiency of the entire organization.

### The difference between managers and leaders

The fact is that the most successful managers are good leaders too, but this fact does not equate these two terms. Leaders are persons that are able to influence others and who possess managerial authority (Robbins, Decenzo 2004). Leadership is not a position in the organization; it has the ability to influence others. The difference between managers and leaders is described in the following figure 1. (Marusic, 2006):

**Figure 1. Differences between manager and leaders in relation to personal and situational variables**

PERSONAL AND SITUATIONAL VARIABLES	MANAGER	LEADER
Source of power	Embed director	Elected leader
Source od authority	Delegated below	Accepted above
Basis of aithority	Law and regulations	Personal skills
The justification for authority	Institutionalized values	Distinctive contribution to the group
Relationship manager-subordinate	Dominance	Personal effects
Responsible to:	Senior manager	Superiors and subordinates
Behavior model:	Authoritative	Democratic

Source: Marušić, Upravljanje ljudskim potencijalima, 2006., p. 90.

Figure 1. show personal and situational variables and different situations when considering managerial positions in relation to the position of leader. Observed significant differences between these two positions, and thus managerial positions determined by their superiors as opposed to leaders who actually chosen most often stems from the group, and was accepted by his superiors. The style and manner of managing managers and leaders is actually very different. The ideal situation is when a manager has the skills and characteristics of leaders, and when the leader has the managerial skills and knowledge, which in practice is not always the case.

The most important factor of leadership is the leader himself and his ability to influence others. According to (Judge, 2002) there is a model of personality that is composed of five factors which are related to the most important characteristics of the personality. Five factors include: neuroticism, extraversion, openness, agreeableness and conscientiousness.

**Figure 2. Desirable characteristics of leaders**



Source: authors

Leadership (Crossan, 2013) does not focus on power and position rather than on an individual's ability to use all the best of them to support and enable others to thrive and achieve results in the businesses in which they work and thus contribute to society.

However, the characteristics of good leaders come to the fore when an individual can express and implement. If an employee has the characteristics of a good leader, but not at a higher hierarchical level within the company, its good features and charisma does not contribute to the organization. Therefore, it is advisable to set the manager has the required characteristics of a leader. Without the existence of the desired characteristics, the manager can become counterproductive, and its impact on the environment becomes demotivating and does not achieve the desired results of the company

### **Keeping up with the changes and new way of thinking about the role of leadership**

When considering the importance of leadership in terms of relationships within the group, the role of leaders is crucial in addressing and achieving business goals. Within the group there may be situations when leaders and followers are in a formal relationship to each other (eg, CEO of leading employees of the organization, Team leader leads the team members, etc.) and there may be one group of employees who may "not in play" because of the small the importance of leadership and therefore sometimes understood only as a nuisance (Hogg, Knippenberg & Rast 2012). It is necessary to integrate these employees into the organization, but it will be only with the help of an experienced leader who will actually motivate you to "run" ahead.

Every employee of the organization or team should be equal to each other in terms of avoiding any kind of discrimination (such as gender, religion, habits) by the leaders. Actually only one employee who feels welcome and valuable in the organization will be motivated and will also contribute to achieving the goals of the organization, and thus will affect the greater efficiency of the leaders.

In today's fast, chaotic changes in society, leadership nabuts in the sphere of spirituality and therefore asking questions that have always been the topic of discussion of spiritual traditions and philosophical systems, such as how to live in uncertainty, without any knowledge of the future, which makes sense of life, etc. (Wheatley, 2013). The same author state: "Life does not stop to teach us to change. If you find yourself in the role of leader, we strive to subtle, carefully and skillfully - as excellent coach - lead people to support them in the process of discovering the wisdom of life".

This meaning shows that it is necessary to think about the meaning and purpose of work and their own role, and encourage and employees so that they realize that they actually work their influence changes that are positive and that they should feel spiritually fulfilled. In the absence of pleasure in performing everyday tasks then we can ask the question what is the purpose of work and what actually needs to be done in such a situation, and whether the role of the leader and his positive attitude to contribute to the changing such a business environment.

Mewton (2009:12) states that the leadership, both, now and in the future in the business world, require integration another significant and important steps that will demonstrate the resonance of emotional intelligence subsystem. It is necessary to consider:

*Self-awareness.* Know yourself, your strengths, and your emotional blind spots. Be open to others without judgment.

*Active listening.* Listen to understand. Focused listening brings the reward of relating more fully. *Compassion and empathy.* Support other people's emotional reality to create trust and genuine connections.

*Integrity.* Communicate with others through your personal core values, demonstrating commitment to your beliefs.

Emotional intelligence becomes the first factor is the backbone of good leadership. A leader who has more empathy towards employees will certainly be more appreciated by the employees than the one that it does not sufficiently developed. Therefore, it is necessary to continuously improve leadership skills and emotional intelligence in order to increase employee satisfaction and efficiency in a business environment.

### Research approach

The purpose of the study was to explore creation of an instrument to measure employees' perception of leadership using questions, as shown Figure 3.

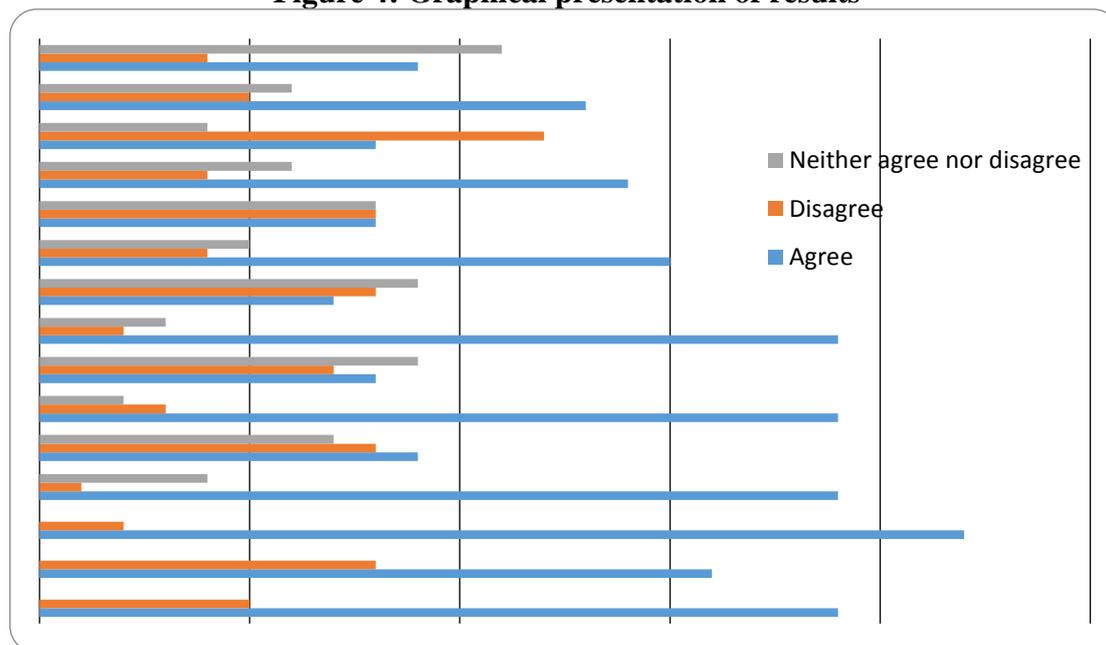
Employee research was conducted using a questionnaire that was sent to the e-mail employees in selected Croatian company<sup>14</sup>. The questionnaire consisted questions that asked the respondents to answer the questions and answer, "agree", "disagree" or "neither agree nor disagree." Answers to these questions are aggregated and presented in absolute and relative numbers.

Figure 3: Attitudes of employees about their boss

Questions	Respondends (n=24)	Agree	(%)	Disagree	(%)	Neither agree nor disagree	(%)
1. Do you consider your work environment positively		19	79%	5	21%	0	0%
2. Does your boss behavior can motivate you		16	67%	8	33%	0	0%
3. It is your pleasure to work in a team		22	92%	2	8%	0	0%
4. My relationship with the boss is correct / satisfactory		19	79%	1	4%	4	17%
5. I feel free to suggest innovations in business processes		9	38%	8	33%	7	29%
6. I'm ready to do more than what is expected of me		19	79%	3	13%	2	8%
7. When I have a problem in business without fear presents it		8	33%	7	29%	9	38%
8. Feel free / or always ask for advice		19	79%	2	8%	3	13%
9. I accept changes in work because I know that won't happen anything wrong		7	29%	8	33%	9	38%
10. I always receive feedback		15	63%	4	17%	5	21%
11. Do you think that someone on the team is treated differently from other		8	33%	8	33%	8	33%
12. Do you trust your boss and he inspires you		14	58%	4	17%	6	25%
13. Boss always proposes the best solutions and a vision		8	33%	12	50%	4	17%
14. Boss is always available to talk		13	54%	5	21%	6	25%
15. Boss will admit a mistake and take responsibility		9	38%	4	17%	11	46%

Source: Authors

<sup>14</sup> X – indicates the selected company because it is not permitted to getting the names in this paper

**Figure 4: Graphical presentation of results**

Source: Authors

Individuals were all working adults, who indicates that they were all exposed to work environments and had all experienced the effects skilled leadership.

The results showed that the boss actually has features and characteristics of a good leader, and 79% of respondents' rate their relationship with the boss is very fair and satisfactory. Furthermore, nearly 79% of respondents rated their work environment as positive and ready to do more than what is needed. Teamwork in this survey has surpassed individual and as much as 92 % of respondents feel the pleasure of working in a team. Asked whether your boss can motivate as many as 33 % of respondents believe that it cannot, then the same percentage show that they do not feel free to propose innovative solutions and they are not really sure what might happen if they accept the changes.

This area is actually a signal that the boss should work on yourself and his skills, because number of respondents should be minimized. There is interesting to note that as many as 46% of respondents were not sure that boss will head to take responsibility in the event of any errors made. This area also need further work on the acceptance of responsibility by the boss.

Analyzing the results, it can be concluded that the observed company has superior qualities of leaders, but it is necessary to work on those skills that are rated with a high percentage of disagreement (Figure 3).

### **Conclusion and recommendations for organizations**

Positive work environment actually creates and maintains a good manager who is also the leader of incentive employees, and affects their motivation. When employees recognize the characteristics of good leaders they are ready to give their best in achieving its treasury goals in their careers as well as company goals. Continuous testing of employees about their relationship with a boss will provide valuable information that will identify areas where improvements are needed. Efforts to improve the skills of leaders will affect the efficiency of all employees and company as a whole, and this would create a positive organizational climate as is found in the examination of the attitudes of employees.

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# APPORT A L'ETUDE DES RISQUES DE L'INFRASTRUCTURE FERROVIAIRE, QUELLES IMPLICATIONS SUR LA DISTRIBUTION PHYSIQUE DES VEHICULES DU SITE DE PRODUCTION AUTOMOBILE DE MELLOUSA<sup>15</sup> (TANGER - MAROC)?

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## Abstract

The logistics optimization issues are at the heart of the concerns of industrial enterprises. Indeed, a better management of the supply chain lies in the control of constraints QCT (quality-cost-time), the three pillars of performance.

In this context, the choice of solutions for physical distribution of products is of capital importance, since they determine the optimization goal.

The choice is even more compelling, with the current trend towards green logistics.

In this regard, "Renault Tanger Exploitation", freshly implanted in northern Morocco, with 94% of production for export, directs the management of downstream logistics processes to more fluidity thanks to the use of the railroad.

Therefore, several questions arise around security approach – transport of vehicles.

Does the railroad provide operational continuity of logistics flows? What are the current and potential risks that can be identified? ...

The objective being to reduce the risk of stopping the rail flow which has a direct impact on the ability of the storage of manufactured vehicles and the production flow.

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**Keywords :** Risk Management, rail transport, qualitative analysis, quantitative analysis ...

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## Résumé

Les enjeux d'optimisation logistiques sont aujourd'hui au cœur des préoccupations des entreprises industrielles. En effet, une meilleure gestion de la chaîne logistique réside dans la maîtrise des contraintes Q.C.T (qualité -coût- temps), trois piliers de la performance.

Dans cette optique, le choix des solutions de distribution physique des produits revêt une importance capitale, dans la mesure où ils conditionnent cet objectif d'optimisation.

Le choix est d'autant plus contraignant, avec les tendances actuelles vers une logistique écologique.

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<sup>15</sup> Le site de Melloussa se situe dans le périmètre de la commune rurale de Jouamaa, à 15 kilomètres au sud-est de la ville de Tanger.

A ce propos, « Renault Tanger Exploitation », fraîchement implanté au nord du Maroc, avec 94% de la production destiné à l'exportation, oriente la gestion de ses processus logistiques avals vers plus de fluidité grâce notamment à l'utilisation de la voie ferrée.

Dès lors, plusieurs questions se posent autour de la sécurisation de l'approche - port des véhicules.

Cette liaison assure-t-elle la continuité opérationnelle du flux logistique ?, Quels sont les risques actuels et potentiels pouvant être recensés?...

L'objectif étant de réduire le risque d'arrêt du flux ferroviaire qui a un impact direct sur la capacité du site de stockage des véhicules fabriqués et le flux de production.

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**Mots clés :** Management des Risques, transport ferroviaire, analyse qualitative, analyse quantitative...

## Introduction

Situé à la lisière de l'Europe et de l'Afrique, le Maroc a lancé depuis quelques années de grands chantiers pour le développement économique et industriel du pays. C'est dans cette optique et avec la stratégie Emergence<sup>16</sup>, que ce dernier a focalisé ses efforts de développement industriel sur les filières pour lesquelles le pays possède des avantages compétitifs clairs et exploitables.

Afin d'exploiter ces potentialités, la stratégie industrielle Marocaine vise à renforcer l'attractivité du pays via la définition d'une offre dédiée aux Equipementiers et aux constructeurs.

Dans ce cadre, le secteur automobile a vécu pendant les cinq dernières années un fort développement au Maroc, notamment avec l'implantation du site d'assemblage Renault. Leader de l'industrie automobile, l'alliance Renault-Nissan a installé la plus grande usine automobile au sud de la Méditerranée, en Afrique et dans le monde arabe à Tanger.

Afin d'accompagner la montée en cadence, l'usine Renault Tanger Exploitation (RTE) devra nécessairement maîtriser et optimiser les différents flux de sa chaîne de distribution aval des véhicules, avec les contraintes de temps, de fiabilité, de coût et de qualité, en vue d'acheminer ses marchandises de manière sûre et efficace et d'assurer une livraison « juste à temps ».

C'est dans ce contexte qu'une grande question se pose :

La région de Tanger dispose-t-elle d'une infrastructure de transport ferroviaire adaptée aux exigences du développement de l'industrie de production automobile et permettant par conséquent de participer à l'attractivité industrielle de la région ?

Le choix d'autres solutions d'acheminement, ne s'avère-t-il pas plus viable et ne permet-il pas d'atteindre encore mieux les objectifs de performance du flux aval ?

Nous tenterons, à travers le présent développement, à répondre à la question posée ci-dessus, à travers **l'étude d'un cas spécifique**<sup>17</sup>, à savoir le cas de la liaison ferroviaire entre le site de production Renault à Melloussa et le port de Tanger Méditerranée (T.M), en se focalisant plus sur **les risques** attendant à cette dernière, et comment ces risques peuvent avoir un **impact** indéniable **sur l'activité de l'équipementier automobile**.

L'étude préconisée dans le cadre de la présente communication repose principalement sur la méthodologie basée sur l'approche D.M.A.I.C<sup>18</sup> (Définir, Mesurer, Analyser,

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<sup>16</sup> Le plan Émergence est une stratégie industrielle qui a été lancée en 2005. Les objectifs de ce Plan sont la mise à niveau du secteur industriel, sa modernisation et la consolidation de sa compétitivité. (<http://www.diplomatie.ma/Economie/lesStrategieSectorielles/tabid/175/vw/1/ItemID/321/language/en-US/Default.aspx>)

<sup>17</sup> Il s'agit d'une étude ponctuelle, c'est-à-dire réalisée dans une période donnée.

<sup>18</sup> FRECHET Caroline, « Mettre en œuvre le SIX sigma », édition d'organisation, 2005.

implémenter et contrôler). Toutefois, les parties implémentation et contrôle ne vont pas être traités dans la mesure où il s'agira de proposer un plan d'action et de mesurer ses conséquences en terme de cout uniquement.

Il s'agira dans un premier temps, de présenter la vocation du management des risques et les apports théoriques liés à l'évaluation des risques du transport ferroviaire, afin de procéder au traitement du cas pratique lié à l'étude.

Du point de vue empirique, l'objectif principal de la présente communication : est de mesurer l'ampleur des risques éventuelles liées à la mise à disposition des marchandises de la zone de Melloussa au port TM et leurs impacts sur la continuité opérationnelle du flux logistique aval des expéditions par voie ferroviaire, entre l'usine R.T.E à Melloussa et le Terminal Véhicules Renault (T.V.R) au Port T.M.

Les raisons principales qui nous ont poussé à mener la présente étude :

- L'ampleur du projet Renault et ses ambitions en terme d'objectif (production et exportation).
- L'importance de la liaison ferrée dans l'acheminement du fret .
- La relation étroite entre le flux aval, le flux de stockage et les flux internes de production.
- Les effets des retards de livraison et leurs impacts en terme de compétitivité (Commerciale et financière).

## I- Management des risques

Le management du risque<sup>19</sup> s'attache à identifier les risques qui pèsent sur les organisations et peuvent avoir des conséquences en termes de performance économique et de réputation professionnelle mais également au niveau de l'environnement, de la sécurité et de la société.

C'est pour cela que la gestion<sup>20</sup> des risques<sup>21</sup> a pour vocation d'aider concrètement les entreprises à obtenir de bons résultats dans un contexte d'incertitudes multiples (ISO 31000<sup>22</sup>).

### 1. Le processus général d'analyse du risque

D'après M. Lasagne (2004), le processus général d'analyse des risques s'inscrit dans une démarche en quatre temps, généralement suivie d'une étape de choix de mesures de réduction des risques. (1-Analyse du système, 2-Identification des risques, 3-Modélisation qualitative des risques, 4-Quantification des risques).

A chacune de ces phases vont correspondre certains outils que nous allons passer en revue de manière synthétique<sup>23</sup>.

**La phase d'analyse du système** va généralement faire appel à des outils tels que l'analyse fonctionnelle qui vise à identifier les principales fonctions et finalités du système étudié et leurs interactions. Elle permet d'établir un état des lieux qui sert ensuite de fondement au reste de l'analyse.

**L'identification des risques**<sup>24</sup>, utilisera des outils qualitatifs tel que l'analyse des modes de défaillances, de leur effet et de leur criticité (A.M.D.E.C).

<sup>19</sup> KEREBEL Pascal (2009), « Management des risques », Editions Organisations.

<sup>20</sup> Encyclopédie numérique wikipedia. [http://fr.wikipedia.org/wiki/Gestion\\_du\\_risque](http://fr.wikipedia.org/wiki/Gestion_du_risque) (consulté le 10.12.2012)

<sup>21</sup> Commission d'experts pour le transport de marchandises dangereuses, Fil conducteur, la 42ème session » (Madrid, 21-25 novembre 2005)

<sup>22</sup> ISO 31000 : 2009 est une norme lié au *management du risque elle édicte les principes et lignes directrices*, fournit un cadre et des lignes directrices pour gérer toute forme de risque. (<http://www.iso.org/iso/fr/home/standards/iso31000.htm>).

<sup>23</sup> LASAGNE Marc, thèse de doctorat, « Management des risques, stratégie d'entreprise et réglementation : le cas de l'industrie maritime », 7 décembre 2004, p : 21.

<sup>24</sup> LANDY Gérard (2007), « AMDEC Guide pratique », AFNOR, (2<sup>ème</sup> édition).

**L'analyse qualitative des risques** se fonde sur l'avis d'experts qui associent à chaque fonction du système considéré les risques qui en découlent, et leurs conséquences. (Démarche peu formalisée liée plus au savoir-faire et la connaissance du terrain d'étude).

La dernière phase de l'analyse des risques consiste à procéder à **une quantification**. Pour aboutir à une hiérarchisation des risques, et déterminer les priorités du plan d'actions

## 2. Les facteurs d'évaluation du risque

Selon M. QUATRE (2012), « en prenant en compte tous les aléas, chacun est caractérisé, par une probabilité d'occurrence. Il s'agira ainsi, de réaliser, par les méthodes d'analyse de risque, une évaluation à la fois en termes de gravité et de probabilité d'occurrence... ».

« ...Il est bien évident que le résultat de ces analyses ne peut s'exprimer de manière synthétique pour donner des éléments de conduite d'une politique destinée à éviter accidents et événements graves, c'est-à-dire « une politique de sécurité ».

L'analyse de risque est de plus en plus complexe, lorsque l'incident est dû à plusieurs causes ou lorsqu'il est lié à un enchaînement de causes faisant ainsi intervenir des aléas d'origines diverses. Il est donc important d'innover en matière de plans d'action et de disposer de scénarios viables.

S'agissant du transport. En installant ces barrières au niveau de la prévention, de la récupération en cas de défaillance, de l'atténuation et finalement de l'intervention, il en résultera une réduction très forte des risques encourus dans le système transport.<sup>25</sup>

Le produit de la probabilité (P) par la gravité (G) caractérise le risque encouru et s'appelle la **criticité** (C). L'objectif étant de réduire cette criticité ou, plutôt, de se situer dans une zone considérée comme acceptable : très forte probabilité et faible gravité ou très faible probabilité et forte gravité – cet extrême devant même être évité.

Les défaillances placées sur cette matrice vont ensuite pouvoir être traitées dans une optique de management<sup>26</sup> des risques. Les défaillances de la zone sud-ouest seront peu critiques (zone acceptable de criticité), par contre celles de la zone nord-est devront faire l'objet de mesures de réduction des risques<sup>27</sup>.

## II- Le Transport ferroviaire et les risques du rail

Statistiquement, le transport ferroviaire est l'un des moyens de transport les plus sûrs<sup>28</sup>. Cependant, le transport ferroviaire étant un transport de masse, les accidents prennent parfois des proportions spectaculaires et entraînent de véritables catastrophes<sup>29</sup>, notamment, dans le cas où le système ferroviaire ne possède pas une infrastructure avec des dispositions de sécurité bien adaptées.

A ce propos, une gestion globale s'impose, impliquant la gestion préventive des risques pouvant surgir tout au long du transport par voie ferroviaire<sup>30</sup>.

Dans cette optique, nous présenterons, dans un premier temps, une vue d'ensemble sur les différents aléas ferroviaires et par la suite, nous exposerons la typologie des risques liés au système.

<sup>25</sup> QUATRE Michel, « Transport et risques » article UNIVERSALIS 2012.

<sup>26</sup> MAZOUNI Mohamed-Habib (2008). Pour une Meilleure Approche du Management des Risques. l'Institut National Polytechnique de Lorraine. Université de Nancy. France

<sup>27</sup> LASAGNE Marc, *Ibid*

<sup>28</sup> PIMOR Yves et Fender Michel (2008), « Logistique », DUNOD, (5<sup>ème</sup> édition).

<sup>29</sup> <http://www.techno-science.net/?onglet=glossaire&definition=14587> (consulté le 10.12.2012)

<sup>30</sup> Site officiel de la Direction Départementale de L'Oise – France. [www.oise.equipement-agriculture.gouv.fr/cahier-no85-le-risque-tran](http://www.oise.equipement-agriculture.gouv.fr/cahier-no85-le-risque-tran), (consulté le 07.01.2013).

- **Les aléas rencontrés et les principales causes de dysfonctionnement**

Tous les composants d'un système de transport peuvent être défaillants ou perturbés : le matériel lui-même mais aussi ceux qui l'utilisent ou le conduisent. De plus, des éléments extérieurs peuvent intervenir.

**Le système matériel :** Il comporte : des dispositifs de prévention qui peuvent être constitués d'éléments redondants, de moyens d'arrêt en cas de danger ou d'atténuation en mode dégradé, comme la limitation de vitesse ; des dispositifs de récupération en cas de défaillance comme le contrôle de vitesse externe au train sur le chemin de fer, des dispositifs atténuateurs des effets d'un accident comme un bouclier protecteur à l'avant des trains ou la ventilation des tunnels en cas d'incendie.<sup>31</sup>

Tous ces moyens mécaniques électriques ou électroniques ont de très faibles probabilités d'être défectueux s'ils sont correctement entretenus et renouvelés. La sûreté de fonctionnement permet d'évaluer leurs performances en distinguant la fiabilité, la maintenabilité et la disponibilité.

**Le facteur humain :** Après les aléas matériels, interviennent tous les éléments qui proviennent du comportement de l'Homme face à la machine. Plusieurs améliorations ont été apportées à ce niveau. Ces améliorations n'éliminent en aucun cas le facteur humain, dans la mesure où ce sont les Hommes qui conçoivent et innovent en matière de processus. Ils sont chargés du contrôle de la mise en œuvre des politiques de maintenance. Le nombre d'accidents est dû à une maintenance mal réalisée ou mal conçue ou dont les résultats n'ont pas été correctement testés.

**Les risques externes au système :** Les systèmes transport sont toujours soumis à des aléas externes selon des degrés de vulnérabilité variables. En plus des risques technologiques et naturels, les conditions météorologiques font parties des aspects dont les dispositifs de surveillances et d'alerte sont le plus élevés quant aux contraintes de l'exploitation. (risques liés au manque de stabilités, ralentissements, retards, déroutement, fermeture des gares).

**La sûreté :** Le traitement des risques dus aux aléas de fonctionnement des systèmes de transport, qu'ils soient d'origine matérielle ou qu'ils relèvent du facteur humain est une opération de sécurité (safety en anglais). Celle-ci se décompose en plusieurs stades :

**la prévention** pour éviter la survenance de l'événement redouté,

**l'alerte** pour prévenir les exploitants, les usagers et les services de secours,

**la protection** pour limiter les conséquences de cet événement,

et enfin **l'intervention** pour porter secours.

Dans le cas d'actes illicites<sup>32</sup> qui ne sont plus aléatoires mais intentionnels (comme la délinquance comme la fraude au titre de transport, la malveillance et le sabotage ainsi que les actes de terrorisme), ces divers stades sont toujours valables mais doivent être adaptés, en particulier celui de la prévention. Le terme employé est alors celui de sûreté (security en anglais).

- **Typologie des risques ferroviaires :**

Il existe cinq risques ferroviaires<sup>33</sup> : Le nez-à-nez - Le rattrapage - La prise en écharpe - Le déraillement - L'obstacle.

### **Risques liés à la circulation des trains**

- Nez-à-nez : il s'agit d'une collision frontale entre deux trains
- Rattrapage : il s'agit ici d'une collision par l'arrière.
- Prise en écharpe : collision latérale qui se produit à une intersection de voies ou (passages à niveau).

<sup>31</sup> QUATRE Michel, *Op.cit*

<sup>32</sup> QUATRE Michel, *Ibid*

<sup>33</sup> <http://www.techno-science.net/?onglet=glossaire&definition=14587> (consulté le 10.12.2012)

- Dérive: il peut s'agir d'un ou de plusieurs véhicules (voiture, wagon) qui se mettent en marche suite à une immobilisation défailante, notamment en présence d'une pente importante. Mais le plus fort risque reste l'inefficacité du freinage d'un train, appelé enrayage.

#### **Risques liés à l'état du matériel roulant**

- Échauffement de boîte de roulement (la boîte d'essieux).
- Rupture d'essieu.
- Défaillance du système de freinage.

#### **Risques liés à l'état de l'infrastructure**

- Effondrement d'un ouvrage : pont, viaduc, voûte d'un tunnel ou plate-forme supportant la voie.
- Cassure d'un rail.
- Déformation de la voie courante.

#### **Risques liés à une erreur humaine**

- Non-respect de la signalisation (franchissement d'un signal d'arrêt fermé, excès de vitesse...).
- Erreur d'aiguillage sur un poste.

#### **Risques liés à des éléments extérieurs**

- Actes illicites.
- Obstacle sur la voie : risque de collision avec un objet (voiture, camion, coulée de boue, wagon...).
- Intempéries : un train en circulation peut être déséquilibré, voire emporté, par des rafales de vent<sup>34</sup>.

Le transport ferroviaire reste un des transports les plus sûrs quant à l'acheminement du fret. Toutefois, cela n'empêche pas qu'il reste soumis à des contraintes d'exploitation. Une défaillance d'un des éléments du système constitue sans aucun doute un facteur de risques.

La liaison ferrée reliant le site de Melloussa et le port TM, peut constituer un facteur de productivité ou d'improductivité. Cela dépend de la maîtrise du facteur risque et de la capacité d'exploitation de la ligne dans les conditions normales. L'infrastructure ferroviaire, joue, à cet effet, un rôle très important. Des facteurs peuvent entraver l'atteinte de cet objectif de productivité, pour ne citer que la nature du terrain.

### **III- Etude du flux d'expédition ferroviaire de fret via le port Tanger Med : Cas de l'automobile**

Début 2008, l'Alliance Renault-Nissan a démarré les travaux d'implantation du complexe industriel « Renault Tanger Méditerranée ». Le nouveau site, installé sur un terrain de 300 ha dans la Zone Economique Spéciale de Tanger Méditerranée, comprend une usine d'assemblage avec accès à la plateforme portuaire du Port de Tanger-Med. L'activité de ce complexe a débuté en 2012 et l'entreprise s'appuie sur la position stratégique du port de Tanger entre l'Atlantique et la Méditerranée, un tissu développé et compétitif de fournisseurs, et une main d'œuvre formée aux meilleures techniques automobiles.

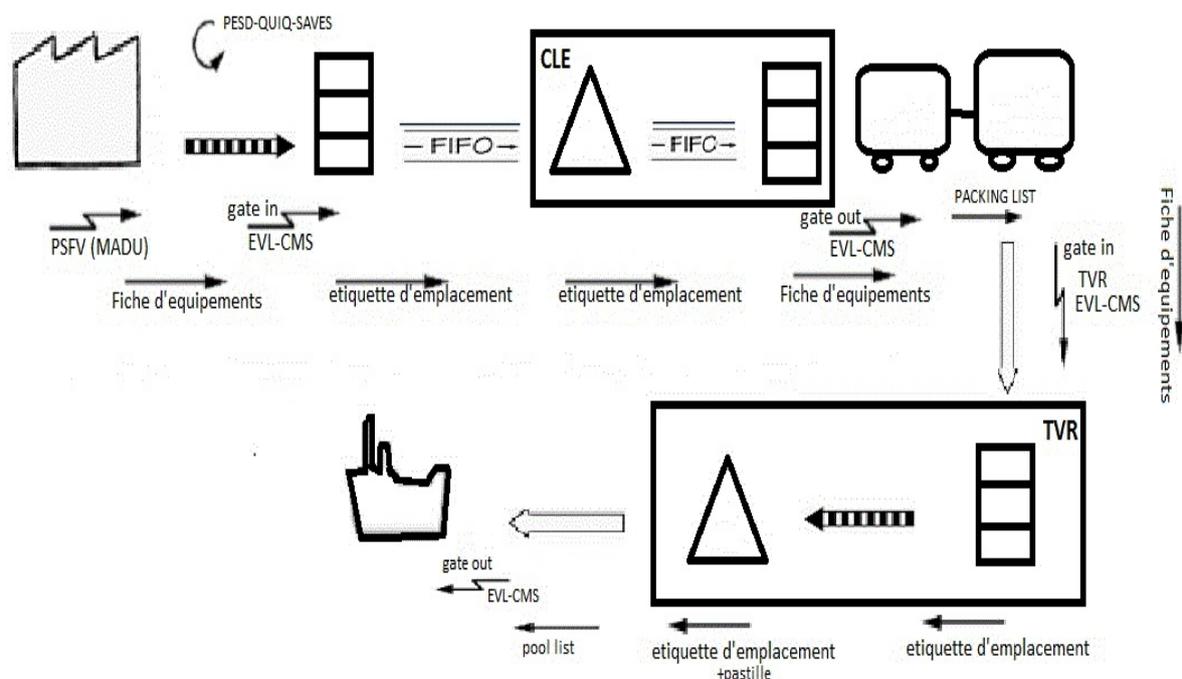
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<sup>34</sup><http://www.techno-science.net/?onglet=glossaire&definition=14587> (consulté le 10.12.2012)

## 1) Etude du processus d'expédition

L'usine Renault Tanger Exploitation (RTE), produit des Véhicules Neufs, Environ 94% en moyenne de sa production totale est destinée à l'exportation, et doit transiter par le port de Tanger Med vers les marchés de destination. Les pays de destination des véhicules exports sont connus à leur sortie de l'usine. La totalité des véhicules exports doivent être transportés par train entre le CLE (Centre Livreur Expéditeur) attendant aux usines de fabrication des véhicules et le Terminal portuaire.

**Figure2** : Cartographie générale du flux logistique aval export<sup>35</sup>



La cartographie ci-dessus, illustre le flux physique et d'information des véhicules depuis la sortie Usine, jusqu'à l'arrivée au Terminal portuaire Tanger Med.

A la sortie usine, le Prestataire GSTM<sup>36</sup> (Groupe STVA) qui a conçu des wagons spécifiques pour l'acheminement des véhicules de l'usine Renault-Nissan de Melloussa vers le port de Tanger-Med, gère le Centre Livreur Expéditeur (CLE), le Terminal Véhicules Renault (TVR) et assure également le chargement et le déchargement des wagons ferroviaires, en flux tendu, entre l'usine et le port. Il effectue un contrôle qualité en présence d'un représentant de l'usine.

<sup>35</sup> PSFV: système d'information de gestion de production

(MADU) : mise à disposition usine : c'est la déclaration -sur le système PSFV Renault-, qui signifie que le véhicule est validé Bons, complets et conformes (BCC) et qu'il est sorti.

Gate In : c'est l'entrée des véhicules sous la responsabilité du Prestataire GSTM, lors du saisi des Véhicules sur le système EVL-CMS,

EVL-CMS : Module du système d'information de la gestion du centre ; EVL« European vehicle logistics »

Gate out : c'est la sortie des Véhicules déclaré sur le Système EVL-CMS,

Packing list : liste de colissage des véhicules chargés sur le train,

POOL list : contient les lots de véhicules à expédier par navire,

PESO-QUIQ SAVES : prélèvement sur véhicules pour le contrôle qualité,

FIFO : « First In First Out », méthode de stockage sur le centre,

<sup>36</sup> Geodis-STVA Tanger Méditerranée (Filiale du groupe STVA).

STVA : Le prestataire logistique qui a conçu des wagons spécifiques et dédiés pour l'acheminement des véhicules de l'usine Renault-Nissan de Melloussa vers le port de Tanger-Med. Il gère le Centre Livreur Expéditeur, le Terminal Véhicule Renault et assure également le chargement et le déchargement des wagons ferroviaires, en flux tendu, entre l'usine et le port.

L'ONCF<sup>37</sup> assure la traction, selon un planning qui permet d'effectuer au maximum 3 sillons<sup>38</sup> par jour (3 aller-retour), 6 jours par semaine. 2 sillons par jour au minimum doivent être effectués.

Ceci signifie qu'une rotation dure au maximum huit heures ; le Prestataire dispose de quatre heures pour effectuer les opérations de chargement / déchargement du train.

Les véhicules sont chargés à bord du train au terminal ferroviaire de Melloussa, et déchargés au terminal ferroviaire de Tanger Med dans un délai maximum de quatre heures.

Les prestations suivantes doivent être appliquées à ces véhicules exports :

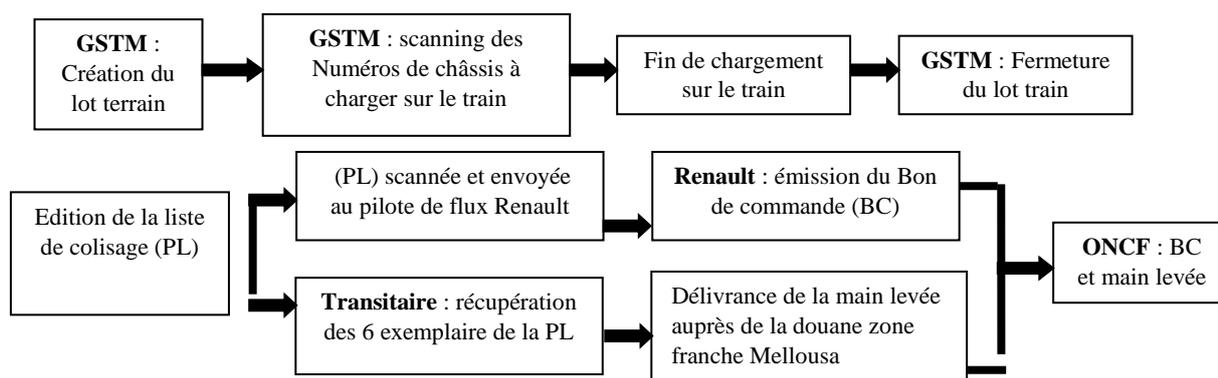
- Transfert de l'usine au CLE,
- Manutention sur le CLE,
- Chargement sur le train pour transfert vers le terminal,
- Déchargement du train à l'arrivée au terminal portuaire,
- Manutention sur le terminal portuaire
- Chargement à bord des navires.

### 1- Analyse fonctionnelle du système étudié :

L'étude du processus expédition<sup>39</sup> (qui commence depuis le chargement train dans la zone dédiée à cet effet, jusqu'au déchargement au TVR) peut être répartie en 3 étapes.

**Etape 1 :** Le chargement du train. Cette étape génère des flux physiques et informationnels et fait intervenir différents acteurs.

**Figure 3 :** Etapes de chargement des véhicules sur wagon au départ du site de Melloussa



### Etape 2 : Le trajet.

La mise en marche de cette ligne de transport est le fruit d'un partenariat stratégique entre l'ONCF et le port de Tanger-Med. L'ONCF a réalisé des terminaux ferroviaires à l'usine Renault et au port de Tanger-Med. Ces derniers peuvent assurer le traitement de 400.000 véhicules par an. Un unique train assure cette liaison ferroviaire.

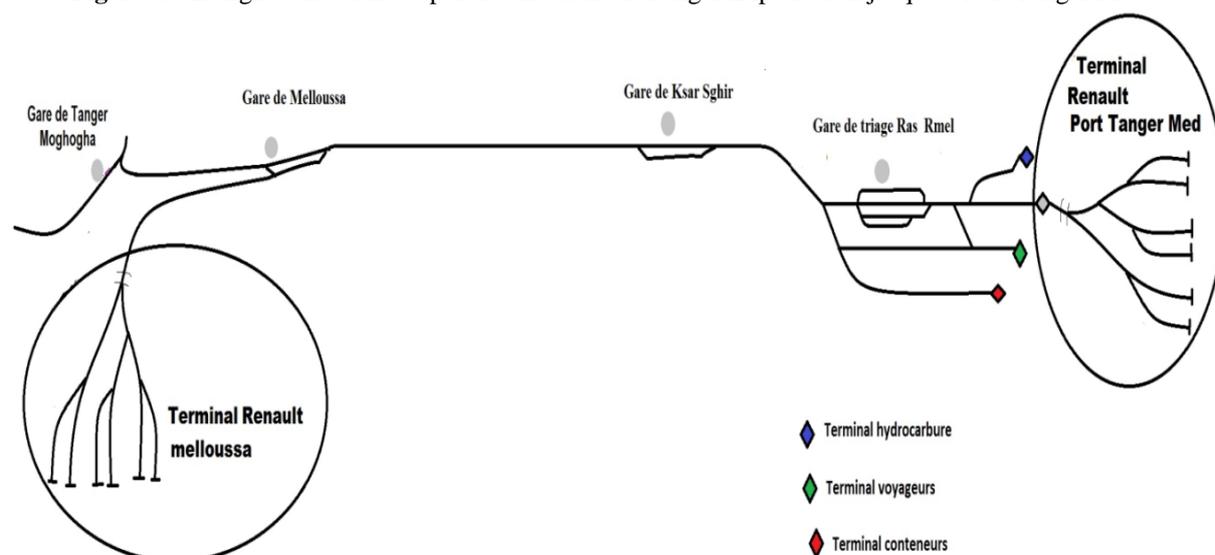
L'ONCF se charge des manœuvres de division et de formation de la rame et assure la traction.

- Les manœuvres de division de la rame en deux parties à chaque arrivée train.
- La traction entre Melloussa et le Port Tanger-Med.
- Les manœuvres de formation des deux parties de la rame pour chaque départ train.

<sup>37</sup> Office National des Chemin de Fer

<sup>38</sup> Sillon : rotation train

<sup>39</sup> le processus de l'expédition met en interaction plusieurs acteurs, à savoir : GSTM ; les pilotes de flux logistique aval du service DLO (Direction Logistique Opérationnelle) Renault, l'ONCF, le transitaire, la douane, et TMPA (Tanger Med Port Authority). Ceci dit, que le flux est assuré par la contribution de chacun des acteurs cités, ce qui explique la complexité du flux et la nécessité d'assurer une meilleure communication entre les différents acteurs.

**Figure 4 :** La ligne ferroviaire depuis l'usine Renault Tanger Exploitation jusqu'au Port Tanger Med

L'analyse de la ligne ferroviaire (Tanger – Tanger Med) montre que la voie ferrée commence par un embranchement particulier depuis l'usine jusqu'à la gare de Melloussa. A partir de Melloussa, le train prend une voie ferroviaire commune, qui est le prolongement depuis la gare de Tanger vers celle de Ras Rmel, pour arriver à l'embranchement particulier du terminal de Tanger Med. La voie passe par trois gares de triage, deux tunnels et sept viaducs.

L'exploitation de la voie est commune entre le train porte-véhicules de Renault, le train porte-conteneurs et le train voyageurs actuellement, ainsi le train d'hydrocarbure éventuellement.

### Etape 3 : Déchargement au niveau du Terminal Véhicule Renault

A la fin du déchargement train, le prestataire, chargé de la mise à disposition, effectue un contrôle qualité des véhicules déchargés sur la zone tampon du terminal portuaire, en présence de l'ONCF.

- **Evaluation de la performance et analyse qualitative**

Un dispatching des tâches du flux ferroviaire entre Tanger Med et Melloussa est effectué selon un planning minutieux. Le temps de mis à disposition est trop serré, les retards ne sont pas tolérables, ce qui nécessite le respect des horaires pour pouvoir maintenir trois rotations sur 24 heures.

Pour pouvoir évaluer la performance du processus, une opération de chronométrage a été effectuée sur le terrain, en prenant un échantillon d'opération et un calcul d'indicateurs de performance (KPI<sup>40</sup>) est fait selon les indicateurs ci-dessous

**L'écart temps** = heure réelle- heure allouée

**L'écart de durée** = (Durée réelle-Durée Planifiée)/ Durée Planifiée

- Avec L'indicateur "Ecart temps", on mesure si une tâche a été faite au temps prévu.
- Avec l'indicateur "Ecart de durée" ou le taux de dépassement de la durée, on mesure si une tâche a duré plus longtemps que ce qui avait été planifié initialement.

<sup>40</sup> Key performance indicator (Indicateurs clé de performance)

On calcul par la suite : **Le taux d'impact global** = écart temps /durée de la rotation

- Le taux d'impact global représente le taux de l'effet des retards sur le temps global alloué à une rotation.

Les résultats obtenus, nous ont révélé les écarts suivants :

- Ecart de la durée de chargement d'une moyenne de 37 minutes,
- Des retards au niveau de la durée de l'acheminement vers le Terminal Véhicule Renault, d'une moyenne de 12 minutes et au niveau de l'arrivée train à Melloussa, d'une moyenne de 16 minutes,
- Des retards au niveau de l'arrivée au Terminal Véhicule Renault, d'une moyenne de 20 minutes,
- Des écarts de la durée de déchargement d'une moyenne de 33 minutes.

Les constats suivants, nous ont amené à élaborer une analyse des défaillances, de leurs causes et de leurs effets, en vue de proposer un plan d'actions.

Mais, avant tout, grâce au diagramme Ishikawa, nous avons pu répertorier les causes inhérentes pouvant causer l'arrêt du train.

#### **IV- La liaison Melloussa –Tanger Med : Analyse des défaillances et risques potentiels**

Menée sous deux aspects (qualitatif et quantitatif), l'analyse des risques et des défaillances potentielles est focalisée sur la partie du processus qui commence depuis le chargement train dans la zone dédiée à cet effet, jusqu'au déchargement au Terminal Véhicule Renault.

Cette partie a été décortiquée en 3 étapes, en détaillant le déroulement des tâches dans chacune d'entre elles. Afin de bien cerner l'étude et de faciliter le recensement des défaillances et risques y afférents.

Le processus de l'expédition met en interaction plusieurs acteurs, à savoir : GSTM ; les pilotes du flux logistique aval du service DLO Renault (Direction Logistique Opérationnelle), l'ONCF, le transitaire, la douane, et TMPA.

**Analyse qualitative :** Le tableau suivant regroupe tous les risques et défaillances<sup>41</sup> potentiels, leurs causes et leurs effets, qui peuvent perturber, retarder, ou affecter le bon déroulement des opérations d'expédition par train, depuis Melloussa vers le terminal du port T.M.

**Tableau 1 :** Analyse qualitative des modes de défaillances, de leurs causes et de leurs effets

Etapes du processus	Défaillance	Mode de défaillance	Causes	Effets
Avant le chargement train	Impossible de créer les lots navires	Le système informatisé ne fonctionne pas	Un problème au niveau du suivi de la distribution,	Sans impact sur le flux ; car la création du lot se fait J-4,
Chargement Train à Melloussa	Retard du chargement train	Retard d'arrivée train	Le conducteur de la locomotive arrive en retard, Manque de carburant dans la locomotive, Panne sur la locomotive, Occupation de ligne, obstacles.	Retard du départ train, risque de perte du prochain sillon.
		Problème de fonctionnement du système informatisé	Mauvaise manipulation, ou modification Panne du réseau Renault et du réseau STVA, L'application de suivi du centre véhicule ne fonctionne pas.	Impossible d'ajouter les véhicules au chargement, Impossible de contrôler les véhicules bloqués, Impossible d'éditer la liste de colisage.
		Wifi inaccessible à la zone du chargement	Problème WIFI.	Impossible d'ajouter les véhicules au chargement.
		Problème de fonctionnement du scanner	Mauvaise manipulation de l'appareil, Matière (batterie déchargée), Matériel (panne), Milieu (wifi indisponible).	Impossible d'ajouter les véhicules au chargement
		Sélection des véhicules bloqués ou débloqués.	Blocage/déblocage véhicules en temps réel, de la part du service qualité usine sans information, Matière (véhicules bloqués ou débloqués), Milieu (stockage en vrac: difficulté et retard au niveau du prélèvement du stock).	Retard du chargement train.
	Retard du départ train	Manque de documents (liste de colisage notamment)	Problème du réseau impression ou problème de l'application	Perturbation du flux de départ.
		Retard de la main levée	Retard transitaire, retard inspecteur de douane.	Retard du départ train.
		Manque documents (bon de commande notamment)	Impossible d'imprimer le bon de commande, Absence d'interlocuteur, problème connexion.	
		Problème technique du matériel	Panne locomotive, panne wagons.	Retard du départ train ou sillon raté.

<sup>41</sup> NEAU Erwan. Directeur de publication. Site web sur l'innovation et l'information stratégique <http://erwan.neau.free.fr/Toolbox/AMDEC.htm> (consulté le 01.02.2013)

**Tableau 1 (Suite) : Analyse qualitative des modes de défaillances, de leurs causes et de leurs effets**

Etapes du processus	Défaillance	Mode de défaillance	Causes	Effets
Transport train	Impossibilité d'acheminement par train	Grève: ( Société de transport du personnel, GSTM, ONCF, TMSA).	Problèmes sociaux.	Risque de saturation du Centre Livreur Expéditeur (CLE), Problème arrêt usine.
		Problèmes techniques liés à l'ONCF.	Problème de signalisation, Voie abimée, blocage de la voie pour diverses raisons.	Retard et accumulation des expéditions dans le parc.
		Inondations	Circonstances climatiques	Accumulation des expéditions dans le CLE (saturation), problèmes arrêt usine.
	Risques au cours de l'acheminement train	Accident train.	Troupe d'animaux	Dégâts locomotive, et par la suite, prochain sillon raté.
			Avec un autre train : collision avec une Avec une voiture dans un passage à niveau.	Dégâts : dépendent de l'accident, par la suite , soit un retard des envois d'un jour ou plus. Endommagement d'un ou deux wagons.
		Arrêt train : Panne machine, Panne de la voie électrifiée.	Panne locomotive, Faible courant dans une partie de la caténaire ou caténaire coupée.	Le sillon suivant sera raté.
		Déraillement train.	Provoqué par la présence d'une pâte graisseuse issue de la chute des feuilles morte ou des mauvaises conditions climatiques, Eboulement de pierres.	Retards des prochains sillons, Wagons endommagés.
		Incendie train	Coup de circuit caténaire de la voie électrifiée	Antenne véhicule montée, Porte coffre véhicule mal fermée, Mauvais temps : vent violent.
	Collision avec un train porte-matière dangereuse (combustible).		Risque d'incendie.	Arrêt des envois par train.
	Vandalisme.		Pyromanie, clandestins...	Dégâts (wagons endommagés), perturbation du flux, retards.
	Retard de l'arrivée train	Retard de mise à disposition de la rame.	Problème lors de l'acheminement, Retard départ au niveau de Melloussa, Retard d'arrivée (TMPA).	Retard du retour train et perte du prochain sillon.

**Tableau 1 (Suite) : Analyse qualitative des modes de défaillances, de leurs causes et de leurs effets**

Etapes du processus	Défaillance	Mode de défaillance	Causes	effets
Déchargement train au TVR	Saturation zone de stockage	Port consigné : arrêt des opérations au niveau du port.	Circonstances climatiques : vent violent	Arrêt des envois vers le port et par la suite saturation au niveau du CLE Melloussa.
			Incident de sécurité, incident de sureté (alerte à bombe, sabotage terroriste), Instructions étatiques.	Arrêt des envois vers le port et par la suite saturation au niveau du CLE Melloussa.
	Retard du déchargement train	Retard des agents de douane	Déplacement de l'agent de douane du local de l'Administration des douanes vers la zone TVR, La navette TMSA est effectuée chaque 30 min, Arrivée avant l'heure et attente de l'arrivée du train.	Retard du retour train, Prochain sillon sera raté.
		Perte de la clé du dernier véhicule plombé	Manque de communication, Perte de la clé.	Retard du déchargement, Prochain sillon sera raté.
		Impossibilité de déchargement train	Voie publique bloquée à cause d'un accident.	Perte des prochains sillons.
		Problème de fonctionnement du scanner.	Matière: batterie déchargée. Matériel: panne. Milieu: wifi indisponible.	Impossible de scanner les véhicules et de déclencher les impressions d'étiquettes automatiquement.
		problème de fonctionnement du système informatisé.	Matière : Panne du système informatisé. Milieu : Panne réseau Renault.	Impossible de scanner les véhicules et de déclencher les impressions d'étiquettes automatiquement, Impossible d'entrer les véhicules dans le système informatisé, Problème de stationnement des véhicules après saturation de la zone tampon.
		Manque d'agent de conduite des véhicules	-Blessure. Absence... -Majorité des agents déchargent ou chargent des navires en même temps, -Retard après la pause déjeuner, -Arrivée du train pendant la pause (aucun agent n'est disponible).	Retard du départ train (un sillon raté).
	Un véhicule bloque le déchargement du train	Problème de batterie, Accident à bord.	Retard du déchargement, prochain sillon raté.	

Suite au traitement des modes de défaillance nous avons défini les aspects liés à : la gravité, la fréquence et la détection.

Une notation a été attribuée<sup>42</sup> Pour évaluer la criticité<sup>43</sup> des problèmes relevés.

**Tableau 2 :** Grille de cotation de la gravité

Cotation	Gravité	Durée de défaillance
1	Défaillance minimale	Sans conséquence sur le flux : 10 min
2	Défaillance mineure	Perturbe le flux : Entre 10 et 45 min
3	Défaillance majeure	Perte d'un sillon : plus de 45 min à 24 heures
4	Grave	Arrêt durant entre 24 heures et 4 jours
5	Critique	À partir de 5 jours d'arrêt de flux (Saturation zone de stockage (5600) et Arrêt de la chaîne de production après 6 jours.

**Tableau 3 :** Grille de cotation de la fréquence

Cotation	Fréquence
1	Pratiquement inexistante
2	Moins d'une fois par mois
3	1 fois par mois
4	1 à N fois par semaine
5	1 à N fois par jour

**Tableau 4 :** Grille de cotation de la détection

Cotation	Détection
1	Efficace
2	Risque de non-détection
3	Détection peu fiable
4	Aucune détection

Après avoir listé les risques et élaboré l'analyse quantitative de la criticité, nous avons procédé à la hiérarchisation de ces derniers, selon leur degré de criticité, dans le but de prioriser et d'agir sur les problèmes les plus critiques. A ce propos, l'étude apporte des solutions pour les différentes défaillances représentant presque 70% des arrêts du flux, classées selon le degré de gravité de l'arrêt.

<sup>42</sup> Notation attribuée en fonction des contraintes professionnelles de mise à disposition du site de production jusqu'au port TM.

<sup>43</sup> **La criticité ou l'indice de criticité** : appelé aussi indice de priorité du risque (IPR) ou nombre de priorité de risque (NPR). C'est le produit **occurrence** × **détection** × **gravité**. Il caractérise le niveau de fiabilité du système étudié. Plus l'indice est élevé, plus le traitement du mode de défaillance est urgent.

**La gravité** : C'est l'estimation des conséquences sur la tâche qui suit. L'impact est évalué par rapport au critère temps. Plus l'effet de la défaillance cause des retards, plus il est coté grave. L'évaluation s'est faite selon les éléments suivants :

- Pour la durée de la rotation du train qui est de 8 heures, un retard de 10 minutes est sans conséquence sur le flux, Or après 45 minutes de retard, on risque la perte du sillon prochain. Ceci dit, ne pas pouvoir assurer les 3 sillons sur les 24 heures.

Aussi, prenant en compte la capacité du stockage sur le CLE qui est de 5600 places (94% pour l'export, 6% marché

local). Et si on considère que le CLE est déjà rempli à 30% dans les conditions normales. On aura alors,  $5600 \times 0,7 = 3920$  places disponibles  $3920 \times 0,94 = 3684$  places disponibles pour les VN export

Et sachant que l'usine produit 653VN/jour, dont 614VN sont destinés à l'exportation, la durée d'absorption de la production par le CLE est de :  $3684p/614V = 6$  jours de production.

**La fréquence** (probabilité d'apparition) : la probabilité que la cause apparaisse et qu'elle entraîne le mode de défaillance.

**La détection** : la possibilité de non-détection de la défaillance avant qu'elle se produise.

**Tableau 5 : Classification des défaillances par ordre décroissant selon leur criticité**

N°	Modes de défaillances	IPR	% IPR	Cumul IPR	% cumul IPR
1	Arrêt du train : panne locomotive/ panne voie électrifiée	36	11%	36	11%
2	Système informatisé est inaccessible au buffer	27	8%	63	19%
3	Sélection parmi les véhicules bloqués ou débloqués	24	7%	87	26%
4	Inondations	20	6%	107	32%
5	Coup de circuit caténaire de la voie électrifiée	20	6%	127	38%
6	Collision avec un train porte-matière dangereuse	20	6%	147	44%
7	Vandalisme	20	6%	167	50%
8	Manque documents : packing list	16	5%	183	55%
9	Grève	15	4%	198	59%
10	Déraillement train	12	4%	210	63%
11	Wifi inaccessible au BUFFER	12	4%	222	66%
12	Manque d'agent de conduite des véhicules	12	4%	234	70%
13	Accident train: troupe d'animaux	9	3%	243	73%
14	Accident train: Avec un autre train/Véhicule	9	3%	252	75%
15	Retard d'arrivée train	8	2%	260	78%
16	Système informatisé inaccessible	8	2%	268	80%
17	Problème technique de la machine	8	2%	276	82%
18	Retard mise à disposition de la rame	8	2%	284	85%
19	Retard agents de douane	8	2%	292	87%
20	Manque documents : Bon de commande	6	2%	298	89%
21	Problèmes techniques de l'ONCF	6	2%	304	91%
22	Port consigné : Circonstances climatiques	5	1%	309	92%
23	Port consigné : Incident de sécurité/sureté	5	1%	314	94%
24	Problème de fonctionnement du scanner	4	1%	318	95%
25	Retard main levée	4	1%	322	96%
26	Problème de fonctionnement du scanner	4	1%	326	97%
27	Un véhicule bloque le déchargement train	4	1%	330	99%
28	Impossibilité de déchargement train	3	1%	333	99%
29	Perte de la clé du dernier véhicule plombé	2	1%	335	100%
30	Le système informatisé de l'entreprise ne fonctionne pas	---	----	----	----

**On distingue trois zones :**

**Zone A :** c'est la zone critique expliquant 70% des arrêts. Il faudra alors concentrer les efforts et engager les actions palliatives appropriées.

**Zone B :** la zone moins critique expliquant 21% des arrêts, il faut chercher des actions pour éliminer les 21% des effets.

**Zone C :** expliquant 9% des arrêts. A ne pas négliger.

**V- Recommandations et propositions d'actions**

Les solutions techniques peuvent être proposées portant sur les Défaillances recensées. elles peuvent être représentés sous trois aspects. (les solutions des défaillances causant un arrêt du flux de courte durée, de moyenne durée ou de longue durée).

**Tableau 6 : Plan d'actions et recommandations**

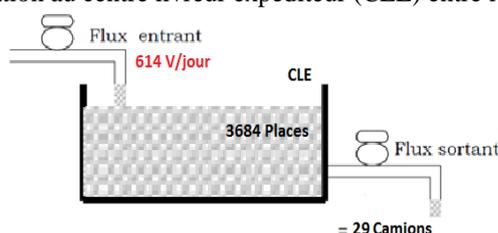
Mode de défaillance	Durée du blocage flux	Actions	Responsable
Arrêt du train	Courte durée	Remplacer la locomotive de la gare la plus proche. Rattraper les sillons ratés le dimanche.	ONCF
Problème de fonctionnement du système informatisé	Courte durée	Ramasser les étiquettes et réaliser le scan dans un fichier Excel. Avant chaque chargement, on recommande de préparer une liste Excel des véhicules à charger sur le train, ce qui constituera un élément de comparaison avec les véhicules qui sont encore sur la zone de chargement. Soit ,demander aux pilotes de flux Renault une extraction de la liste des châssis chargés sur le train, ou ramasser les étiquettes des véhicules neufs chargés et les scanner à nouveau.	GSTM
Sélection parmi les véhicules bloqués ou débloqués.	Courte durée	Améliorer la qualité des véhicules neufs (VN) à la source. Pour minimiser le temps perdu de l'enlèvement des véhicules on propose : le traçage de la zone et des recommandations au prestataire et la réorganisation du stockage à la zone de chargement permettant une flexibilité de l'enlèvement.	GSTM
Inondations	Un arrêt de durée moyenne, nécessitant une solution palliative pour transporter les VN	Transporter les véhicules neufs par camions.	Renault
Coup de circuit caténaire de la voie électrifiée	Un arrêt de longue durée (plus d'un mois), nécessitant une solution palliative pour transporter les VN	Equiper les wagons d'extincteurs. Transporter les véhicules neufs par camions	Renault
Collision avec un train transportant des matières dangereuses.	Un arrêt de longue durée	Transporter les véhicules neufs par camions	Renault
Vandalisme	Un arrêt de longue durée	Transporter les véhicules neufs par camions	Renault
Manque de documents : notamment la liste de colisage	Courte durée	-Copier les Numéros des châssis chargés du lot dans un fichier Excel et le remettre signé et cacheté au transitaire (Sorte de liste de colisage provisoire pour le départ train).	GSTM
Grève: GSTM	Moyenne durée : le problème peut être résolu par des modes dégradés.	-Si grève de la société de transport du personnel : opter pour des navettes internes. -Si Grève des employés de GSTM : opter pour l'intérim. -L'ONCF assure la continuité des envois même avec grève des employés. -Transport des véhicules par camions à défaut d'indisponibilité de l'ONCF.	GSTM
Déraillement du train	Courte durée	-Mobiliser le train à 8 wagons et celui de rechange maintenance (au total 9 wagons), en attendant la réparation des wagons endommagés. -Si les dégâts sont énormes, se servir des camions, dans l'attente des wagons.	GSTM
Wifi inaccessible dans la zone de chargement train	Courte durée	Développement du logiciel Scan & Save.	STVA
Manque d'agents pour conduire les véhicules	Courte durée	Renégocier avec le prestataire les méthodes de travail.	GSTM

En plus des solutions préconisées, nous proposons le développement d'une solution alternative au réseau ferré. A savoir, le transport des véhicules produits par l'usine Renault par des camions<sup>44</sup> depuis l'usine Melloussa jusqu'au port maritime. Cette solution aura pour effet positif de pallier aux arrêts critiques du flux (les arrêts de longue durée).

Cette solution étudiée dans le but d'éviter la situation d'arrêt de la chaîne de production, engendrée par la saturation du centre livreur expéditeur, peut être présentée sous trois cas de figure.

A noter que les chiffres énoncés pour l'estimation des coûts restent des estimations approximatives. Il faudra pour affiner l'analyse se doter des chiffres réels (à se procurer sur le site Renault).

**Figure 5 :** La situation au centre livreur expéditeur (CLE) entre le flux amont et aval



En fonction des données de l'analyse et des contraintes de la solution transport des voitures par véhicule routier spécialisé (voir notes de bas de page), trois solutions nous paraissent possibles. Ces différentes solutions ont des implications en terme de coût.

#### <sup>44</sup> Données d'analyse de la solution de transport des voitures par véhicule routier spécialisé :

Avec la montée en cadence la production (653 V/jour), dont 614 V doivent être expédiés par train vers le port.

- La capacité de stockage au CLE est de 5600 V ; et considérant que le CLE est rempli à 30% de sa capacité le jour de l'arrêt ; on aura : 3684 places vides.

- Le cycle de fonctionnement des camions sur la boucle :

✓ Horaire de 8h à 20h du lundi au samedi avec possibilité de sortie Melloussa après 18h (horaire de sortie Melloussa à valider).

✓ En considérant les délais de passage du scanner actuel au Port (1 heure en moyenne sur l'horaire de journée) et les formalités de Melloussa (40 min constatée), le temps de cycle d'une rotation sera de entre 3h30 et 4h, soit 3 rotations par jours. Les perfectionnements des cycles permettent d'augmenter le nombre de rotation à 4 rotations.

Le camion transporte 7 véhicules ; avec 3 rotation on aura besoin de :  $614/21 = 29$  camions.

#### - Contraintes de la solution - transport des voitures par véhicule routier spécialisé :

Selon le prestataire de transport routier actuel qui agit en tant que commissionnaire de transport, la flotte existante ne permet pas cette solution vu le volume à transporter et l'indisponibilité de camions en arrêt.

Le transporteur dispose de près d'environ 70 camions dans tout le Maroc, qui font desservir déjà d'autres lignes régulières. Et sachant que les camions dédiés au transport des véhicules Renault, sont aussi engagés dans le flux export /import entre la SOMACA et le port Tanger-Med.

Tout cela empêche le prestataire de garantir l'engagement pour un arrêt longue durée.

Par contre pour un arrêt d'une durée moins d'un mois, la proposition est la suivante : La flotte possible peut aller jusqu'à 15 camions en fonction de la situation du marché sans aucun engagement sur la date de mise à disposition, ni la durée, ni la volumétrie de camion à mettre à disposition.

**Tableau 7 : Les solutions de transport des voitures par véhicules routiers spéciaux**

	Sans engagement Renault	Avec engagement Renault
<b>Solution courte durée</b>	Flux (import /export) via camions entre casa et le port Tanger Med. Une flotte atteignant 20 camions - Capacité d'évacuation : 20 camions font 3 rotations/jour et transportant 7 véhicules : peuvent évacuer un nombre de 420 VN, ce qui représente 68 % de la production journalière.	Mise à disposition de 29 camions, avec garantie de la disponibilité de ces derniers en permanence à chaque fois que le besoin s'exprime. En contrepartie l'engagement de la part de Renault à payer un forfait mensuel d'immobilisation de ces camions; Renault s'engage à payer 70%. Le reste est supporter par le prestataire.
<b>Solution moyenne durée</b>	L'offre du transporteur routier actuel de mise à disposition d'une flotte possible jusqu'à 15 camions:  - Capacité d'évacuation : 15 camions font 3 rotations/jour et transportant 7 véhicules : peuvent évacuer un nombre de 315 VN, ce qui représente 51 % de la production journalière	- Capacité d'évacuation : 29 camions font 3 rotations/jour et transportant 7 véhicules : peuvent évacuer 609 V/jour, ce qui représente la production journalière.
<b>Solution longue durée</b>	Aucune offre de camions pour une longue durée sans engagement, ce qui implique des perturbations de la chaîne de production.	

Le tableau ci-contre présente certains de ces avantages et inconvénients suite au choix probable opérer par l'entreprise.

### Première synthèse des solutions

On remarque que si on veut se servir des camions et sans engagement pour :

- Courte durée : solution non fiable vu son impact sur les autres flux, et ne permet pas l'évacuation du stock.
- Moyenne durée : la flotte est insuffisante et n'est pas garantie, avec un cout élevé.
- Longue durée : le prestataire ne s'engage pas là-dessus.
- Dans ce cas, on risque des fortes perturbations de la chaîne de production. Or si l'entreprise Renault s'engage à payer le forfait d'immobilisation des nouveaux camions, on pourra garantir une autre solution sécurisé pour tous les cas de figures, dans la mesure où on aura un blocage du flux ferroviaire, voir même on pourra préconiser une solution bimodale (train – camions) (à étudier la faisabilité technique et économique sur le long terme tout au long du trajet et à destination (France)).

En appuyant cette solution, et en comparant le coût engendré par l'arrêt de production avec le cumul du coût payé dans 3 années d'engagement. Nous pouvons estimer ce qui suit :

**Tableau 8 : Comparaison des solutions de transport des voitures par véhicule routier spécial**

Solution	Avantages	Inconvénients
Sans engagement Renault : jusqu'à 15 camions	- Permet d'évacuer la moitié de la production journalière ce qui va retarder la saturation du CLE pour 12 jours, et par la suite éviter les perturbations de la chaîne de production, - Sans aucun engagement de la part de Renault.	- Date de mise à disposition non garantie, dépendant de la situation de marché dans la période de demande, - Flotte insuffisante : Nombre de camions n'est pas garantie, - Durée d'utilisation non garantie, - Coût élevé, - $3684v/315 = 12$ jours de production et on aura le CLE saturée.
Avec engagement Renault (29 Camions)	- Flotte garantie en cas d'appel de l'usine, - Les camions seront au service de l'usine tant que le train est en arrêt et même après le démarrage du train, - C'est une solution valable en permanence et pour tous les cas de défaillances cités causant des blocages de flux, - Solution de secours sécurisée, en évitant	Paiement d'un coût supplémentaire de l'immobilisation.

Solution	Avantages	Inconvénients
	l'arrêt de production. Ainsi les coûts engendrés, - Le coût de cette solution est inférieur au cout de la solution sans engagement et raisonnable tenant compte de l'arrêt de chaine de production.	
Camions qui assure la desserte flux (import /export) entre Casablanca et le port Tanger Med (jusqu'à 20 camions)	- Solution permettant d'évacuer 64% de la production journalière, - Permet de retarder la saturation du CLE pour quelques jours.	- Perturbation du flux SOMACA <sup>45</sup> et du flux Import depuis Tanger Med. - Augmentation du niveau de stock import au TVR - Augmentation du niveau de stock à SOMACA - Retard des livraisons clients. - Solution valable que pour une durée courte (3jours), vu son impact sur les autres flux.

### Deuxième synthèse des solutions

En analysant ces données, on constate que le cumul du forfait payé pendant les 3 années est inférieur au cout de deux jours engendrés par les perturbations de l'usine de production.

**$\Sigma$  forfaits des 3 années  $\leq$  coût engendré de 2 jours de perturbations.**

Nous pourrions donc conclure que la solution optimale est l'engagement de Renault à payer le forfait mensuel pour les trois années et en contrepartie, avoir des camions à sa disposition à chaque fois qu'elle en exprime le besoin.

Sans oublier qu'avec la nouvelle ligne de production « TangerII », la capacité d'absorption du stock au Centre Livreur Expéditeur (CLE) va diminuer de 40%. Ceci dit, avec deux lignes de production qui débouche dans la même zone de stock, la saturation du CLE est plus accentuée, ce qui engendre un risque d'arrêt usine plus élevé avec des coûts de dommage beaucoup plus considérables.

A ce propos, cette solution devient de plus en plus légitime. Ainsi, vues les pertes qui vont être évitées, l'investissement sera rentable à terme.

### Conclusion

Le présent article a des implications à la fois académiques et d'ordre managérial.

Du point de vue académique, il nous a permis de focaliser l'étude sur une problématique encore peu traitée par les chercheurs au Maroc, à savoir l'étude des risques du point de vue économique de la mise à disposition des marchandises par voie ferrée (le cas du secteur automobile).

Et du point de vue managérial, le présent article vise à donner des solutions, grâce à l'utilisation d'outils de gestion moderne, aux problèmes causant l'improductivité du processus de mise à disposition des véhicules automobile produits à Melloussa et à destination du port TM (Cas pratique).

De plus, l'étude empirique a permis de contribuer à la recherche de solutions palliatives afin de remédier aux différents dysfonctionnements relevés.

On peut conclure que la gestion du flux logistique aval, figure parmi les défis majeurs qu'une entreprise de production automobile doit relever. Ce défi se pose avec acuité à cause principalement de l'interaction de plusieurs acteurs, à la fois interne et externe.

Nous pouvons à l'issue de cette recherche reposer une question initialement citée lors de la rédaction du présent article. A savoir, si nous disposons (au Maroc) d'une véritable infrastructure ferroviaire capable d'accompagner le développement industriel ? qu'en est-il des prévisions de développement des voies ferrées pour le cas des projets en cours (référence au projet de Nador et au développement du Rail/route).

<sup>45</sup> La Société Marocaine de Construction Automobile. Casablanca. Maroc

Autant de question qui se posent et dont les réponses restent le gage principal de l'attractivité des investissements au Maroc.

Le secteur ferroviaire, certes, est un mode de transport écologique<sup>46</sup>, mais dont les dégâts, en cas d'avènement de risque, sont désastreuses. Ceci dit, l'étude des risques du transport ferroviaire y compris son infrastructure et la recherche de solutions alternatives pour éviter une dépendance modale constitue un des aspects fondamentaux qu'une entreprise exportatrice devra étudier en vue de tirer profit des palettes de solutions à sa disposition. L'objectif principal étant, l'optimisation du flux visant des processus de plus en plus performants.

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<sup>46</sup> [www.accenture.com/fr](http://www.accenture.com/fr) (consulté le 05.12.2012). Rail 2020.

<http://www.iso.org/iso/fr/home/standards/iso31000.htm>, (consulté le 10.01.2013)

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Rail 2020. Accenture Research est un centre d'expertise mondiale dédié aux études économiques, industrielles et stratégiques.

(<http://www.diplomatie.ma/Economie/lesStrategiessectorielles/tabid/175/vw/1/ItemID/321/language/en-US/Default.aspx>), (consulté le 10.01.2012)

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## FRENCH “*FIDUCIE*” AND RUSSIAN “*ДОВЕРИТЕЛЬНОЕ УПРАВЛЕНИЕ ИМУЩЕСТВОМ*” (TERMINOLOGICAL PECULIARITIES)

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### Abstract

“Trust” is “the greatest and most distinctive achievement performed by Englishmen in the field of jurisprudence”. This universal institution appeared in the Medieval English law and has become very popular during the last decades. Different variations of a trust mechanism have emerged in some world countries. The given paper tries to answer the demands of the modern epoch via making a precise description of the French and Russian trust-like devices. It makes an in-depth analysis, singles out major terminological units and underlines the fact, that the newly-established French and Russian mechanisms have to undergo several stages for turning into faithful reflections of the Anglo-American model of “trust”.

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**Keywords:** Estate trust management, fiducie, patrimoine d'affectation, patrimony, trust

### Introduction

“Trust” is “the greatest and most distinctive achievement performed by Englishmen in the field of jurisprudence”<sup>47</sup> (F. W. Maitland). It “is undoubtedly an extremely versatile instrument which is suitable for a great variety of purposes, even leading some commentators to qualify it as a “universal fix-it”<sup>48</sup>. The roots of trust-like devices can be seen in Roman law of the 1<sup>st</sup>-3<sup>rd</sup> centuries A.D.: the Roman citizen (a *principle*) could transfer property to a “*fiduciary* on the basis of a certain condition (*fidei fiduciae causa*), which obliged him (her) to use the property in accordance with the terms of the contract and to return it immediately after the emergence of the conditions specified in the contract”<sup>49</sup>. The original form of the institution of “trust” appeared later – in common law of the Middle Ages. However, contemporary law seems quite remote from that – Medieval - practice. Nowadays, a “trust” is defined as a juridical agreement under which a “settler” (“grantor”) transfers the property to a “trustee”, who has to exercise and manage it for the benefit of a “beneficiary” – an equitable and a beneficial owner of the property. For several centuries the institution of “trust” was considered as a sole possession of the Common law. However, a significant phenomenon has occurred throughout the world during the last decades. Trust-like devices have been appearing in Civil law jurisdictions at an increasing rate.

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<sup>47</sup> Gallanis, T.P. (2012). The trust in continental Europe: A brief comment from a U.S. observer. *The Colombia Journal of European Law Online*, Volume 18, 2. Retrieved from <http://www.cjel.net/wp-content/uploads/2012/08/CJEL-Trust-Law-Final1.pdf>

<sup>48</sup> Koessler, J. (2012). Is there room for the trust in a Civil law system? The French and Italian perspectives. Retrieved from [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2132074](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2132074)

<sup>49</sup> Zambakhidze, T. Trust (Historical Review). Samartali, 2000.

The given paper is dedicated to the precise description of the French and Russian trust-like instruments. It makes an in-depth analysis, singles out major terminological units and underlines the fact, that the newly-established French and Russian mechanisms have to undergo several stages for turning into faithful reflections of the original model of “trust”.

### The French “Fiducie”

Conventionally, the biggest feature of a trust was the “separation between the trustee’s common-law power and the beneficiary’s equity power. For this reason, civil law countries were unable to adopt a legal structure in which common-law power and equity power belong to separate entities”<sup>50</sup>. Despite this fact, in the recent years, trust-like devices have been introduced in certain legal systems of Europe. The major purpose of the rapid implementation of these institutions was the perspective of increasing the international competitiveness of European countries via the promotion of economic activities carried out with the use of “trust”.

“On 7 February 2007 the French Parliament adopted a new law instituting the “fiducie” as a creature of the French legal system. On 19 February 2007, President Jacques Chirac promulgated this new law: the fiducie proudly left the quotation marks, and became a reality”<sup>51</sup>. This tailor-made institution drew upon “the Roman concept of fiducia and the experience of analogue institutions from other civil law jurisdictions such as Luxembourg, but also from the common law trust”<sup>52</sup>. Article 2011 of the newly adopted law defined “*fiducie*” as: “a transaction by which one or several settlers transfer assets, rights or security interests, or a totality of assets or of security interests, present or future, to one or several fiduciaries who by maintaining them separately from their own patrimony, act in furtherance of a determined objective to the benefit of one or several beneficiaries”<sup>53</sup>. The given definition clearly indicates to the main elements of trust relationships:

- Settler (*constituant*) – a legal entity, which creates a trust.
- Trustee (*fiduciaire*) – a restricted concept of the French law, which comprises credit institutions, insurance companies and advocates (including English solicitors and barristers, but not notaries). Fiduciaries have many rights and responsibilities. They vary from trust to trust depending on their type. Hence, they can be removed if the interests of beneficiaries are in danger.
- *beneficiaries (bénéficiaires)* – it’s a well-known fact, that “a fiducie is null and void if it is created with the sole intention of benefiting the beneficiary”<sup>54</sup>. Despite this fact a concept of beneficiary exists. Moreover, “the *constituant* or the *fiduciaire* may be the beneficiary or one of the beneficiaries of a contract of fiducie”<sup>55</sup>.

The law of 2007 was followed by the Law of 4 August 2008 and an order of 30 January of 2009, which brought some innovations in the world of the French “fiducie”. Therefore, nowadays, a settler is represented by a natural person or a legal entity, a lawyer

<sup>50</sup> Watanabe, H. “Trusts without Equity” and Prospects for the Introduction of Trusts into European Civil Law Systems. Retrieved from <http://www.win-cls.sakura.ne.jp/pdf/23/20.pdf>

<sup>51</sup> Matthews, P. The French Fiducie: And Now for Something Completely Different? *Trust Law International*, Vol. 21, No. 1, 2007.

<sup>52</sup> Koessler, J. (2012). Is there room for the trust in a Civil law system? The French and Italian perspectives. Retrieved from [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2132074](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2132074)

<sup>53</sup> Grimaldi, M. Introduction of the Trust into French Law. *Henri Capitant Law Review*, 2. Retrieved from <http://www.henricapitantlawreview.org/article.php?lg=en&id=309>

<sup>54</sup> Staub, A. (2007). La fiducie: a form of French trust. Retrieved from [http://larevue.ssd.com/La-fiducie-a-form-of-French-trust\\_a1024.html](http://larevue.ssd.com/La-fiducie-a-form-of-French-trust_a1024.html) .

<sup>55</sup> Matthews, P. The French Fiducie: And Now for Something Completely Different? *Trust Law International*, Vol. 21, No. 1, 2007.

(*avicat*) is included in the list of possible fiduciaries and the maximum duration of “fiducie” is 99 years (instead of previously existed 33 years). It should also be noted, that “in France and Luxemburg the core of the concept of trust is *patrimony*”<sup>56</sup>. Prof. H. Watanabe characterizes “patrimony” as a counterpart of the French “*patrimoine*” and gives the following description:

“Patrimony is a concept that represents the aggregate of an individual’s property (the sum of his/her assets and liabilities). Every individual ... cannot have more than one patrimony. However, the beneficiary of a trust has a *special patrimony* which is segregated and independent from his/her patrimony in general terms. Such special patrimony is a trust property”<sup>57</sup>.

It’s worth mentioning, that the French legal reality does not present the term “*patrimoine special*”. Hence, it distinguishes the term “*patrimoine d’affectation*”, which “refers to the idea central to the contract of the fiducie, that a new patrimony has been created which is entirely separate both from that of its creator (the *constituant*) and from that of its owner (the *fiduciaire*) and is instead to be dedicated to (*affecté*) the purposes or persons who are the objects of the contract of fiducie”<sup>58</sup>. The scholars present different translations of the phrase “*patrimoine d’affectation*”/“*patrimoine d’affectation autonome*”, for instance, J. Koessler believes, that it means “an autonomous estate by appropriation”<sup>59</sup>, while P. Matthews indicates, that it ought to be nominated as a “dedicated fund”<sup>60</sup>. We think, that “*patrimoine d’affectation*” must be translated as “estate by appropriation”, because, terminologically, the English word “*appropriation*” corresponds to the French term “*affectation*”.

Therefore, nowadays, “*fiducie*” can be regarded as a contract by which a natural person or a legal entity transfers assets to “*fiduciaire*”, who holds and manages it for the benefit of one or more beneficiaries. This process can be called “a transfer for purpose”, which causes losing of *constituant*’s ownership rights and acquisition of a contractual right. Specific emphasis must be put on the fact, that “*fiducie*” stipulates the emergence of several important changes in the French legal reality:

1. it brings to the end the idea established by the Revolution of 1789, which indicates, that the ownership of property cannot be divided into various rights.
2. it facilitates the isolation of assets in an autonomous entity, which is kept separately from the estate of “*constituant*” i.e. the segregation of assets takes place;
3. it stipulates a temporary transfer of the property.

It’s worth mentioning, that the French legal reality presents three types of “*fiducie*”: “*fiducie-sûreté*”, “*fiducie-gestion*” (management fiducie) and “*fiducie-libéralité*”. “The first one is applied for purpose of securing the performance of an obligation. The second one is an instrument of syndicated loans management”<sup>61</sup>, while “in the *fiducie-libéralité* [fiduciary gift], the transfer of ownership is driven by the will of the settler to grant rights to a third-party by the intermediary of the fiduciary, who, in turn, will transfer to the third-party, donor

<sup>56</sup> Watanabe, H. “Trusts without Equity” and Prospects for the Introduction of Trusts into European Civil Law Systems. Retrieved from <http://www.win-cls.sakura.ne.jp/pdf/23/20.pdf>

<sup>57</sup> Watanabe, H. “Trusts without Equity” and Prospects for the Introduction of Trusts into European Civil Law Systems. Retrieved from <http://www.win-cls.sakura.ne.jp/pdf/23/20.pdf>

<sup>58</sup> Matthews, P. The French Fiducie: And Now for Something Completely Different? *Trust Law International*, Vol. 21, No. 1, 2007.

<sup>59</sup> Koessler, J. (2012). Is there room for the trust in a Civil law system? The French and Italian perspectives. Retrieved from [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2132074](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2132074)

<sup>60</sup> Matthews, P. The French Fiducie: And Now for Something Completely Different? *Trust Law International*, Vol. 21, No. 1, 2007.

<sup>61</sup> Lyczkowska, K. (2010). The New Regime of Fiducie in French Law, in the Light of the Last Reforms. *InDret*, 1. Retrieved from [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1565553](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1565553)

or legatee, the assets which he shall have received”<sup>62</sup>. It's worth mentioning, that in case of a “*fiducie-gestion*” “the wealth remains with the settler; in case of the *fiducie-libéralité*, it passes to the beneficiary; in case of the *fiducie-sûreté*, it is the beneficiary who is enriched by its amount, and not the fiduciary ownership which of course helps to ensure the payment of the debt but without adding any supplemental wealth”<sup>63</sup>.

Therefore, the innovative French institution “*fiducie*” can be treated as a trust-like device, which shares some characteristics of Anglo-American “trust”, but differs from it. Moreover, the terminological study of the word “*fiducie*” enables us to suppose, that it derived from the Latin word “*fiducia*”, which means “an act based on trust”<sup>64</sup>.

### The Russian “Доверительное управление имуществом”

In 1993 Russia faced an attempt of implementation of the Anglo-American “trust” in its legal system. However, this attempt failed. The “trust” seemed alien to the civil law jurisdiction. Hence, it facilitated the formation of the “estate trust management” (“*доверительное управление имуществом*”) – a new institution of the Russian law.

Similarly to Common law “trust”, the contract of the “estate trust management” is created by two parties: an owner of the property and a manager of the property. Under this contract “one party (“*учредитель управления*”) entrusts the administration of ownership to the other party (“*доверительный управляющий*”) for a definite period of time, while the other party undertakes a commitment to administer it in the interest of “*учредитель управления*” or the person indicated by him/her (“*выгодоприобретатель*”)”<sup>65</sup>. The main elements of trusted relationships can be presented in the following way:

- “*Учредитель управления*” – an owner of the property or another person specified by Article 1026 of the Civil Code of the Russian Federation.
- “*Доверительный управляющий*” – an individual entrepreneur (*индивидуальный предприниматель*) or a commercial organization (*коммерческая организация*) (excluding an unitary enterprise). “In cases, when the entrustment is exercised on the statutory grounds, an administrator can be presented by a citizen (who is not an entrepreneur) or by a nonprofit organization, with the exception of an institution”<sup>66</sup>.
- “*Выгодоприобретатель*” – can be presented by “*учредитель управления*” or a person indicated by him/her. A trusted administrator cannot function as a “*выгодоприобретатель*”.

The contract of the “estate trust management” must be concluded for a term, which does not exceed five years. If at the end of the term, the parties do not make the statement of termination of a contract, it will be deemed to be prolonged for the same period of time (for 5 years). In cases of the entrustment of certain types of ownership, the law may provide for other maximum terms of the conclusion of a contract.

Generally, the contract of the “estate trust management” must be created in a written form. It's worth mentioning, that “the transfer of ownership in trust does not involve the assignment of the right of ownership to the trusted administrator”<sup>67</sup>. All the transactions of

<sup>62</sup> Grimaldi, M. Introduction of the Trust into French Law. *Henri Capitant Law Review*, 2. Retrieved from <http://www.henricapitantlawreview.org/article.php?lg=en&id=309>

<sup>63</sup> Grimaldi, M. Introduction of the Trust into French Law. *Henri Capitant Law Review*, 2. Retrieved from <http://www.henricapitantlawreview.org/article.php?lg=en&id=309>

<sup>64</sup> Fiducia. (n.d.) In *Electronic Dictionary ABBYY Lingvo*. Retrieved from <http://www.lingvo-online.ru/Translate/la-ru/fiducia>

<sup>65</sup> *The Civil Code of the Russian Federation*. Retrieved from <http://lawtoday.ru/razdel/codex/graj-kod/index.php>

<sup>66</sup> *The Civil Code of the Russian Federation*. Retrieved from <http://lawtoday.ru/razdel/codex/graj-kod/index.php>

<sup>67</sup> *The Civil Code of the Russian Federation*. Retrieved from <http://lawtoday.ru/razdel/codex/graj-kod/index.php>

entrusted property are made by “*учредитель управления*”, who acts as a principal, but specifies, that performs the functions of an administrator. In cases of written transactions, the abbreviation “Д.У.” (an abbreviated form of the word-combination “*доверительный управляющий*”) must be written after the administrator’s name. Therefore, in contrast to the institution of “trust”, “the contract of the estate trust management” (“*Договор доверительного управления имуществом*”) does not present the right of ownership in a “split” form. It considers a mere delegation of authorities. Contractual actions are carried out by “*учредитель управления*”, who has no legal rights of property. It’s worth mentioning, that the principles of the “estate trust management” have recently emerged even in Russia’s banking activities and are regulated by the contemporary Russian Law on functioning of banks.

Therefore, the innovative Russian institution “*доверительное управление имуществом*” can be treated as a trust-like device, which shares some characteristics of Anglo-American “trust”, but significantly differs from it. Moreover, the terminological study of the word-combination “*доверительное управление*” reveals its direct connection with the institution of “trust” - it derived from the word “*доверие*” (the Russian equivalent of the term “trust”).

## Conclusion

All the above mentioned enables us to draw the following conclusions:

- Similarly to the Anglo-American “trust”, the Russian “*доверительное управление имуществом*” and French “*fiducie*” are based on “confidence”. The word-combination “*доверительное управление*” derived from the word “*доверие*” (the Russian equivalent of the term “trust”), while the word “*fiducie*” can be a derivative of the Latin word “*fiducia*”, which means “an act based on trust”;
- Similarly to the Anglo-American “trust”, the Russian “estate trust management” consists of three major elements: the owner of the property (“*учредитель управления*”), the administrator (“*доверительный управляющий*”) and the beneficial owner of the property (“*выгодоприобретатель*”). The same can be said about the French “*fiducie*”. However, in contrast to the “estate trust management”, “*fiducie*” is null and void if it is created with the sole intention of benefiting the beneficiary;
- The creation of the Anglo-American “trust” requires a trustor’s intent presented orally or in a written form, while during the creation of “*fiducie*” or “*доверительное управление имуществом*”, an owner of the property enters into a written contract with a trusted person or legal entity. Therefore, the oral forms are excluded by the French and Russian legislations;
- The Anglo-American “trust” is based on the separation between the trustee’s common-law power and the beneficiary’s equity power, while the French “*fiducie*” facilitates the isolation of assets in an autonomous entity, which is kept separately from the estate of “*constituant*”. The given autonomous entity is denoted by the phrase “*patrimoine d’affectation*”/“*patrimoine d’affectation autonome*”, which indicates to the segregation of assets. The Russian law does not present the equivalent of “*patrimoine d’affectation autonome*”. “*Доверительное управление имуществом*” does not involve the assignment of the right of ownership to the trusted administrator. It considers a mere delegation of authorities.
- The contemporary French law recognizes the following types of “*fiducie*”: “*fiducie-gestion*”, “*fiducie-libéralité*” and “*fiducie-sûreté*”. The Russian law is not familiar with such categorization of “trust-like” devices.

Therefore, the French and Russian laws have already indirectly allowed mechanisms similar to the Anglo-American “trust”. However, it’s obvious, that the resulting instruments

do not present a faithful reflection of the original model. Further researches in the field of the development of “trust-like” mechanisms throughout Europe will fulfill the picture of the expansion of the utilization of “trust” and vividly depict the impact of ongoing processes on the legal spheres of different countries of the globe. Therefore, the given study may play an important role in the solution of one of the most urgent problems of today’s world.

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# STUDYING THE “LEGAL FLOWS” AS A MULTIDISCIPLINARY METHOD TO PROMOTE CONSTITUTIONALISM AS A COMMON PROPERTY OF MANKIND

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## Abstract

This paper tackles the problems concerned the constitutional comparison, paying special attention to the “legal flows” in the Era of globalization of information and legal practices. With “legal flows” we mean the communicative interactions that occur between the legal operators from different parts of the world. These “flows” produce “imitations”, judicial dialogue, migrations of constitutional ideas, constitutional borrowing between various legal orders. The analysis of these dynamic phenomena requires two methodological needs: the transdisciplinarity opening to social history, to sociolinguistics and anthropology of communication; and the knowledge of the ideological dimensions of geopolitics and geography in the globalized Era. The comparison of “legal flows” becomes a necessary tool for the contemporary education of each legal scholar, dealing him to be used to dialogue, to accept the “other”, to understand the difficulties of the comparison and the respect of the complexity of cultures. This is the only way to promote constitutionalism as common property of mankind.

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**Keywords:** “Legal flows”, imitations, judicial dialogue, multidisciplinary, sociolinguistics

## Introduction

The relationship between geography and comparative constitutional law is totally neglected by most of the contemporary scholars. We do not refer to the cartography of the concepts and constitutional classifications, but to the (political, economic, social and human) geography itself, as a representation and understanding of spaces within their own historical and material complexity. Furthermore, we also refer to geopolitics as a narrative “building” and related (political) action, useful to reach specific goals and interests among spaces. When the world was separated in two opposing systemic blocks and hardly communicating, the mentioned concepts could be understood through shared assumptions. But today those blocks do not exist anymore. Today the globalization put us in the face of a never ending communications among spaces, where historical and material complexities do not disappear; today, ignoring geography and geopolitics means to fall into a cognitive trap. It is a trap because we are not aware to be conditioned by the space of observation and judgment about the world; then, we forget to take into account that, constitutional comparison must face the heuristic of “legal flows” between all those subjects that communicate in different ways between spaces that are no more imitable by the legal orders.

In fact, today it is easy to talk about a “dialogue” between the Courts, about a “cosmopolitical constitutional law”, about Legal Networks and “variegated and conflicting archipelago” of global rules, or about *Constitutional Borrowings* and “*Migrations of Constitutional Ideas*” or about phenomena of “imitations”.

### **What kind of education can we manage to study the “legal flows”?**

How can we study these phenomena? And how do we teach their analysis and understanding to the legal operators? These questions are important in order to put different legal traditions and cultures in the perspective to know and to communicate one each other, with a mutual respect. But they are much more important in order to spread the constitutionalism as a common property on human rights, to develop the civilized cohabitation, the limits of power, always as a property of mankind. In the contemporary world, this spread is realized through various dynamics of communication and development of legal ideas and solutions for common problems. This spreading describes the “legal flows”.

In fact, what are the “legal flows”? With “legal flows” we mean communicative interactions between the legal operators from different parts of the world. These “flows” produce “imitations”, judicial dialogue, migrations of constitutional ideas, constitutional borrowing between legal orders and various practical operators. But these “flows” also determine informative asymmetries, ambiguities, misunderstanding of the problems at hand and other realities. Furthermore, the “legal flows” produced emancipations and claims of rights (e.g. “cultural” rights of indigenous people).

Indeed, their analysis it is important to verify the effective making up of a common property of the constitutionalism as property of mankind. Günter Frankenberg develops some interesting observations on these themes. In accordance with this Author, with the end of the Soviet communism and the collapse of the conflicting blocks, some phenomena of “communication” are modified; this event activated a logic of consumption of “words”, ideas and constitutional solutions of others by “constitutional clients” that were looking for new identities to “talk about”, trying to forget or to overcome the past, for not remaining within separated spaces. Frankenberg calls this phenomenon: *Constitutional Transfer*. But this kind of communication risks developing an “IKEA constitutionalism”; and it is not sure that it can support thoughts and actions able to accept the real heat of each global constitutionalism: that it is to say the political and social integration of a community. In other words, the “IKEA constitutionalism” does not permit to build a global constitutionalism based on the integration of the differences. It represents just a “collage” of “constitutional fragments”, but does not grant to build a common property. What are the necessary steps to build a new “pedagogy” of constitutional comparison in order to promote a constitutional culture as a property of mankind?

Here, we can refer to four steps.

1. “*legal flows*” are *socio-linguistic phenomena*. As any other human action, law is based on communication and its implications: from the capability to understand and interpret correctly a message, to the cultural aspects that affect the reception of it. In the sociolinguistic studies, this complexity is defined as a “communicative competence”. It embraces the linguistic and grammatical ability, but also other extra-linguistic abilities, like the social and semiotic abilities, that are much more complex. Kjolseth proposes to put them in five ambits: the *Background Knowledge*, based on the universal conversational concepts and information about the effective building of a common cultural property; the *Foreground Knowledge*, made up of the communicative styles, conformed to the conversational context; the *Emergent Grounds*, that is the necessary knowledge to deeply understand the communicative exchanges; the *Trascendent Grounds*, constituted by the knowledge accepted by the

participants as “useful” to the communicative moment; finally, the socio-situational knowledge that is part of the context. Sometimes happens that the useful knowledge does not always correspond to the “necessary” one in order to understand reality. And here there is the separation between semantics and interpretation. The complexity is reduced to what is useful: when decisions must be taken, reality will not be understood because it has to be interpreted. In fact, as underlined by the techniques of comparison developed by judges, judicial dialogue works this way: it is based on “utilizations” of information, useful to the decision; “utilizations” that are not tools to deeply analyze the knowledge of different global realities. For this reason, a distinction between the “useful” “legal flows” and the “necessary” ones is fundamental to build up a common property of constitutionalism.

2. *The “legal flows” modify the culture of the subjects.* Appadurai explains how the complexity of the global cultural flows shape the local subjectivities. Apart from the context, they become tools of decision from certain subjects towards other subjects. In this way, they produce a “separation” with the complex aspects of reality. In other words, the ideas emerge as “legal flows”; while the understanding of historical and material situations that produced those ideas remain in the shadow. In fact, this kind of “spreading” involves, above all, the constitutional matters with a moral content, because in this case it is much easier to make abstraction from the related context: e.g. bioethics, new rights, sexual orientations, .... To build up political and institutional systems of action, the interaction between the flows it is less efficacious, as demonstrated by several studies on the so called *policy transfer*. This point is very important because allow us to understand that the “legal flows” can also manipulate the identities of the subjects and their historical conscience.

3. *The “legal flows” are useful to give informative materials to solve concrete problems but they can create relationships of cultural dependence.* In this sense, the “legal flows” plot the legal field characterized by the experiences of “imitations” and “dialogue” between different legal operators. Furthermore, the Frankenberg’s thesis that there is a market of constitutional ideas for “clients” that look for identities, it is not totally different from the concept of “economy of linguistic exchanges” proposed by Bourdieu. The “legal flows” plot an “economy of linguistic exchanges”. For example, they define the direction of origin and direction of “imitations” and “dialogues”. For this reason, when Frankenberg talks about the “IKEA constitutionalism” observes as it produces new forms of “allowed constitutional law” (from one place to another one). But can an allowed constitutional law be the premise of a global constitutionalism as a property of mankind? Therefore, in order to verify if the allowed effect does exist, a process of historicization is necessary, taking into account that comparatist scholars not always do that: it is necessary to organize the history of law that will not start from the internal dynamic of law, such as an internal history of its proper concepts and methods, but from its social conditions of efficacy, from its power relations between social fields and from those situations included in the fields involved by the “flows”.

4. *The “legal flows” produce phenomena of linguistic and semiotic interaction.* The linguistic and semiotic studies by J.M. Lotman and A. Popovič highlight the importance of this approach. For these Authors, comparison does not mean to compare “models” or “places” of rules. Lotman talks about a “semiotic sphere” to indicate the semiotic border constituted by the sum of the interpretative and translating filters, together with the communicative and imitative flows that are produced between various places. Popovič distinguishes the dynamics between linguistic “systems” and the concepts of “prototext” and “metatext”, as a way to describe and classify the directions of the “flows” of linguistic-conceptual transmission between places.

Neither of these approaches identifies forms, but “subjects of inter textual continuity” between producers and receptors of the “flow”. Popovič explains that “the cultural system can be understood as a continuous turmoil of inter textual relationships, generated by the

impulses of a social system". Consequently, the "meta text" is characterized by the fact that various cultural developments are partially overlapping, without any exact and symmetric relation between the places involved by the "flows". For this reason, the "meta texts" generated by the contact, that are different and embedded within the "semio-spheres" of the different places, do not produce the original idea but they spread an idea partially modified that generates the change of the change until the effective functioning of the "semio-spheres".

The methodology of the compared history proposed by Quentin Skinner follows similar paths. He tries to put the forms of the historical phenomena (starting from the texts) within their intellectual contexts, in order to clarify what, through the production of forms, their authors, understood as "subjects", were going to realize. In fact, in the field of comparison (we mean, the diachronic comparison of ideas in the Skinner's thought), often it is taken into account, in an uncritical way, the existence of ideas or fundamental concepts that are substantially unchangeable and that the scholars of different historical periods decided to interpret in different ways.

In this approach there is a fundamental mistake of perspective that is a projection to the past of the actual conceptual paradigms; or the projection of paradigms to a wrong place, establishing what legal scholarship must be studied.

Against an "unconscious abuse proposed by a viewpoint to describe the sense of an opera", Skinner elaborates the following methodological rule: for a right analysis of a text, it is necessary to overcome it, trying to re-build also the intentions of the author and his relationships with other subjects and places.

Textual and contextual analysis are totally complementary: those words that define an idea can be used with different intentions and with intentions mutually inconsistent.

The "conceptual change" becomes a determinant element of the comparative paradigms, reducing any pursued "*praesumptio similitudinis*". It is something like that "epistemology of absences" proposed by Boaventura de Sousa Santos and that indicates the necessary consideration about how the supposed universal categories produce themselves ignorance and exclusion if understood as objective (categories) beyond space and time. These multidisciplinary approaches develop the humility of the legal scholar when he manages realities that does not know. Until European people understood the world as the earth of their conquest, legal scholars developed a comparison with a world that was not able to make them questions, so, quoting Sloterdijk, it was "scarcely dense" because that world did not communicate with the "civilization" and for this reason it was subjugated, both on the moral and on the political viewpoint by the unilateral actions of the West.

But today this philosophic and political culture of time and concepts "without space" reveals its own partial nature in comparison with the new "problems of density" of the human interactions within the globalization. According to Sloterdijk, the characteristic of the "density" of the contemporary world is to find in the impossibility to ignore the consequences of the actions on all subjects of the world; the effect is a radical change of a normative culture that dominated the observation of spaces and the comparison between places. This "density" started up communicative and informative circuits no more unilaterally "governed" by the center of the West and, for this reason, not totally understandable or classifiable just through the Western paradigms.

Can the comparatist scholar ignore this "geopolitical" data? Can he ignore how this geopolitics influence the "legal flows" of the world? This is probably the most sensitive step.

On which basis does the researcher establish the real meaning of the discourses that he analyzes in comparison with the texts? Does he work in accordance with the "geopolitical" option that takes as a *tertium comparationis* the Western part of the World? Can the researcher check the discord between his temporal and spatial conditions of interpretation and those of the subjects and the spaces of which he observes the "flows"?

The problem is extremely complex and faraway from a satisfactory solution. The ethnographic perspective often solves it declaring that the observer must be embedded, as “insider”, within the context of the “flows”. In accordance with other authors, the interpretations proposed by an external interpreter/scholar must be submitted to a “member validation” (a validation made by those who receive and manage the flows). Both of these perspectives imply a kind of “transaction” where the use of the flow seems to be much more important than its meaning. In accordance with other authors, the interpretations proposed by an external interpreter/scholar must be submitted to a “member validation” (a validation made by those who receive and manage the flows). Both of these perspectives imply a kind of “transaction” where the use of the flow seems to be much more important than its meaning. But it is necessary to get used to this complexity as a good antidote to not fall in the cognitive traps toward the “IKEA constitutionalism” and to recoup the critical conscience of the social history of law as a necessary tool of the constitutional comparison.

In the comparative law, as precociously affirmed by Constantinesco: it would be good if this admonition will not be lost.

## Conclusion

Some examples confirm the importance of the multidisciplinary perspectives.

*The “legal flows” are socio-linguistic phenomena.* An example is given by the “collective singulars” that have a European origin (like “State”, “Nation” “Sovereignty”) but were imposed, through the colonialist process, to the rest of the world through different histories and languages. The German concept of *Organschaft* is a clear example: this word originated the dictionary about the dynamics of the institutional branches and functions in the public law.

*The “legal flows” modify the culture of the subjects.* For example, the concept of “common constitutional traditions” in the judicial decisions of the ECJ has been definitely recognized as a new juridical category by the art. 6 of the Lisbon Treaty.

*The “legal flows” provide “informative materials” to solve concrete problems – but they can also create relationships of cultural dependence.* The example is proposed by the studies of López Medina. According to this Author, the “other Latin-American West”, reduced to a group of «*tradiciones débiles*» because of events related to the “conquest”, evolved as a «*sitio de recepción*» of the «*producción iusteórica*» of the Northern World (Europe in primis); this happened through several operations of translation that were not promoted by abstract goals of a mere erudition, not by imitation or faithful reproduction of the foreign imprinting, but by the making, in an autochthonous place, of a «*jurisprudencia pop*» that has to be adapted to and transformed conforming to the context and the contingent use.

*The “legal flows” produce phenomena of linguistic and semiotic interaction.* This example is given by the system of *Cross Fertilization* that have been developed within the European Union between different legal operators (judges and legislators) about the vocabulary of the European criminal law.

Furthermore, the linguistic interactions can produce “cognitive traps” (e.g. the phenomenon of the “false friends” in the translations and, on this point, the example of the term “dignity”) but they allow to re-build the ethnographies of the juridical communication (D. Hymes).

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# **SUBJECT OF A PROCEDURAL SETTLEMENT SUBJECT (ITS TERMS) IN CIVIL PROCEDURE LAW OF THE REPUBLIC OF LATVIA**

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## **Abstract**

The present article analyzes a subject of a settlement in civil procedural law, inspecting judicial regulation of a procedural settlement (further in the text – settlement) in the Republic of Latvia in connection with a statutory regulation of other countries, jurisprudence, and judicature. The aim of this article is to analyze a subject (its terms) of settlement, bringing into light basic features of a settlement and its legal character.

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**Keywords:** Civil procedural law, settlement, a subject of a settlement

## **Introduction**

Since courts in the Republic of Latvia are overloaded, reasonable time frame of proceedings frequently do not comply with the European Convention for the Protection of Human Rights and Fundamental Freedom timeliness criteria. Therefore, settlement as one of the major instruments for discontinuance or withdrawal of proceeding plays a vital role in any stage of the proceeding.

Paragraph 1881 of the Civil Law of the Republic of Latvia sets forth that settlement takes the form of an agreement by which its participants due to disputable or otherwise questionable legal relation converse it unquestionable and indubitable by mutual concession<sup>68</sup>. The Civil Law of the Republic of Latvia does not provide exact definition of a settlement; however, the Civil Proceeding Law of the Republic of Latvia provides mandatory elements of the settlement in: subject of a settlement, participants, its form, and validity. Since the aim of this article is to inspect a subject of a settlement<sup>69</sup>, thus, when inspecting this act, both preconditions of substantive legal rules and national procedural law will be taken into consideration.

### **1. A major feature of a settlement subject-discontinuance of proceeding**

In classical Civilian Roman law, settlement has been admitted as multiplicity of terms in civil transaction when settlement is unexamined merely as an independent agreement type. Settlement embodied various liabilities, for example, property or any other benefit assignment could serve as liability law termination or alteration basis<sup>70</sup>. Thus, settlement from its very origins has been acknowledged as mixed and multiform transaction, namely, such transaction that entails various liabilities and may serve as a basis for various transactions. For example, settlement may enforce a contract of purchase as well as it may

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68 *The Civil Law of the Republic of Latvia. LR likums. Ziņotājs*, 14.01.1993., No. 1.

69 The subject of a settlement – activity or inactivity with a certain aim that characterizes an essence of transaction. Besides, this transaction may have an aim to transfer things or reach another aim, that possesses any financial value.

70 Hвostov V. M. (1996). *Система римского права (The Roman Legla System)*. Учебник. М.: Спарк, p. 210.

discontinue one legal relation and establish another or exclusively discharge from any other liabilities. It may also exclude emergency of civil liabilities, rights etc<sup>71</sup>.

The subject of a substantive settlement may be targeted at discontinuance of mutually impugned or otherwise doubted legal relationship (establishing new liability<sup>72</sup>), confirmation, correction or alteration,<sup>73</sup> as well as based on mutual agreement that doubted or impugned liability has not been in existence and therefore parties have no subject to termination<sup>74</sup>. In legal literature, it has been stated that settlement may also entail such regulations that do not establish new legal liabilities but merely confirm the rights and responsibilities already into existence<sup>75</sup>. Professor V. Sinaiski has pointed out that substantive settlement may be directed towards discontinuance of a disputable legal relationship as well as establishing undisputable legal relationship, thus, separating the concept of settlement in two types: 1] such a settlement which makes questioned relationships unquestionable (by mutual concession); 2] such a settlement which implements and exercises rights (even undisputable) by mutual concession, though being under doubt<sup>76</sup>.

In contradistinction to a substantive settlement, the terms of which proceeding parties may be established at their own discretion, a procedural settlement may be concluded exclusively within a certain civil dispute. Such a provision stems from paragraph 227. part 2. item 3, the Civil Law of the Republic of Latvia, which sets forth that procedural settlement must entail a subject of disputation. Moreover, an aforementioned Law paragraph 226. part 3. provides such civil disputes, of which a settlement is inadmissible<sup>77</sup>. Thus, in contradistinction to a substantive settlement, a procedural settlement may be concluded only concerning such relations, of which a claim has been pursued, because a procedural settlement is to eliminate disputable relationship between the parties and must exist in a definite inter-relationship.

Similarly to the Civil Proceeding Law of the Republic of Latvia, also legislation of other countries acknowledges discontinuance of a specific dispute as a major feature of a procedural settlement subject. For instance, in the German Code of Civil Procedure (*Zivilprozessordnung*), it is specifically emphasized that procedural settlement is concluded within a specific dispute<sup>78</sup>. Further, the Dutch Code of Civil Procedure provides that reconciliation amounts to the claim<sup>79</sup>. In Finnish procedural rules, it has been expressly stated that parties may reach a settlement (whether all or part of the proceedings<sup>80</sup>). In the French Code of Civil Procedure, the major feature is to be established in accordance with its legal

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71 Rozkov M.A., et al. (2008) *Договорное право (Contract Law)*. М.: Статут, p.224.

72 Čakste K. (1940) *Civiltiesības (Civil Rights)*. (B.v.). (b.i.), p.82.

73 Sinaiski V. I. (1940) *Saistību tiesības (Contract Law)*. Rīga: L.U. Studentu padomes grāmatnīca, p.46.

74 Torgāns K. (2006) *Saistību tiesības I.daļa (Contract Law. Part I)*. Rīga: Tiesu nama aģentūra, p.274.

75 Rozkov M. A. (2004). *Мировое соглашение в арбитражном суде: проблемы теории и практики (Settlement in Court of Arbitration: problems, theory, and practice)*. М.: Статут, p. 158

76 Sinaiski V. I. (1912) *Русское гражданское право (Russian Civil Code)*. Киев: Типография А.М. Пономарева, p. 365.

77 In accordance with the Civil Law of the Republic of Latvia it is forbidden to conclude settlement within disputes, related to amendments in civil protocol register, linked with economic rights of dependent persons, disputes as to real estate property, if there are persons among participants which rights to acquire a property in the legitimate possession are limited by statutes; if rules of a settlement affect rights of another people or their interests protected by law, furthermore, in cases as to marriage dissolution or non-existence it has been stated that settlement is admissible merely in such disputes concerning legal relation of a family.

78 *The German Code of Civil Procedure (Zivilprozessordnung)*. Available at : <http://www.gesetze-im-internet.de/zpo/index.html> Last accessed on 11, June, 2013.

79 *The Dutch Code of Civil Procedure (Code of Civil Procedure)*. Available at: <http://www.wipo.int/wipolex/en/details.jsp?id=7420> Last accessed on 12 July, 2013.

80 *The Code of Judicial Procedure of Finland*. Available at: [http://www.finlex.fi/en/laki/kaannokset/.](http://www.finlex.fi/en/laki/kaannokset/) Last accessed on 2, June, 2013.

regulation setting forth that consequence of litigation is discontinuance of proceeding<sup>81</sup>. The aim of the settlement is to resolve a dispute by acquiescence of both parties<sup>82</sup>. Also the Civil Code of the Russian Federation sets forth similar provisions, namely, both parties may dismiss a case by mutual settlement<sup>83</sup>.

The aim of the procedural settlement is to end litigation and questioned legal relation, which has come under adjudication, as indisputable<sup>84</sup>. The procedural settlement is mutual dispute resolution<sup>85</sup>, thus, legal uncertainty of dispute brought before a court is limited within a dispute in a specific court, namely, settlement in a proceeding is possible exclusively in the event a claim has been filed to the court and settlement limitations may be set accordingly<sup>86</sup>. Settlement must contain only those provisions which are necessary to resolve a specific dispute and fulfill a contract. Settlement is possible exclusively in relation to a specific dispute or a specific legal uncertainty.

Furthermore, a court settlement cannot entail provisions unrelated to dispute resolution; otherwise court, in contrary to its competency, would deal with confirmation of mutual transaction carried out by various parties. For example, in the event there has been reviewed dispute in a course of proceeding, a basis of which is a claim involving tenant eviction from an apartment and tenant's counterclaim as to a lease agreement prolongation, then parties cannot conclude such a mutual procedural settlement, which may be acknowledged as a new lease agreement on the merits. Thus, parties may resolve a dispute exclusively within its scope by concluding the procedural settlement. For example, parties conclude a settlement in which they mutually come to the terms stipulating a tenant to continue using a leased apartment until a certain date, after which this apartment shall be left. In this regard, the Supreme Court of the Republic of Latvia has pointed out that such procedural settlement is admissible, because no other new agreement is concluded between the parties, but merely a dispute has been resolved by setting a certain date to terminate existing agreement<sup>87</sup>.

Also such procedural settlements are inadmissible which provisions exceed limitations of a dispute, for example, admitting other claims being out of scope of a case to be adjudicated or not conforming to a subject of a claim. In the event the procedural settlement regulates relationships that do not apply to a subject of a dispute, such a procedural settlement does not conform to substance of a settlement<sup>88</sup>. Thus, if settlement entails issues that are

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81 *The French Code of Civil Procedure*. Available at: <http://www.legifrance.gouv.fr/>. Last accessed on 2 June, 2013.

82 Alternatīva strīdu izšķiršana – Francija. Available at: <http://webcache.googleusercontent.com/search?q=cache:Mm6bfB4aSYEJ:ec.europa.eu/> Last accessed on 14, March, June, 2013. [civiljustice/adr/adr\\_fra\\_lv.htm+samierin%C4%81%C5%A1an%C4%81s+francijas+civilproces%C4%81&cd=3&hl=lv&ct=clnk&gl=lv&client=firefox](http://civiljustice/adr/adr_fra_lv.htm+samierin%C4%81%C5%A1an%C4%81s+francijas+civilproces%C4%81&cd=3&hl=lv&ct=clnk&gl=lv&client=firefox)

83 *Гражданский процессуальный кодекс* (The Civil Code of the Russian Federation). Available at: <http://www.interlaw.ru/law/docs/10005807/>. Last accessed on 22 December, 2012.

84 Bukovski V. (1933) *Civīlprocesa mācības grāmata* (Civil Proceeding). Riga: E. Pīpiņš un J. Upmanis Publishing house, p.580.

85 Tore Wiwen-Nilsson (2007). *Commercial dispute settlement: issues for the future*. Modern Law for Global Commerce. Vienna, Available at: <http://www.uncitral.org/pdf/english/congress/Wiwen-Nilsson.pdf>. Last accessed on 3 June, 2013.

86 Carl Baar, *The Myth of settlement* (paper prepared for delivery at the Annual meeting of the Law and Society Association, Chicago, Illinois), May 28, 1999, p. 3

87 The Judgment of the Civil Department of the Senate of the Supreme Court of Latvia No. SKC-791/2009 (December 2, 2009).

88 The court decision of the FAS Regional Office for Moscow, August 8, 2005, case No. N KG- A41/6997-05. Available at: <http://base.consultant.ru/cons/cgi/online.cgi?req=doc;base=AMS;n=53081>. Last accessed on 10, April, 2013.

beside the point, a court has no jurisdiction to render a judgment that confirms a settlement<sup>89</sup>. Thus, for example, court did not confirm such a settlement, of which these parties have come to agreement and ended all disputes between the parties, including mutual disputes within a case filed to another court. They also undertake not to take an action against each other henceforth. As court has it rightly pointed out in its decision, both parties have a right to admit all claims and objections in relation to a particular claim already filed to a court. However, settlement can not adjudicate other disputes being under review in other courts. Moreover, settlement can not limit one's rights to a court protection in future, if person's rights and interests are impaired relating to any type of disputes that may arise<sup>90</sup>. Prior resolution of a potential dispute in settlement may be regarded as renunciation of one's rights protection, which is inadmissible.

### 3. Main feature of procedural settlement subject-matter-mutual concessions

In compliance with substantive rights, settlement subject is of the essence in mutual concession<sup>91</sup>. Prof. V. Sinaiski has acknowledged that mutual concession is „part and parcel of a settlement”<sup>92</sup>. In accordance with civil rights regulation, a major feature of a settlement is mutual concession, as also regarded in civil proceeding. Settlement as a type of dispute resolution may be reached upon mutual concession<sup>93</sup>, namely, parties independently settle dispute by mutually acceptable terms. Mutual concession in civil proceeding is defined as settlement<sup>94</sup>. The essence of mutual concession in procedural settlement is as following: parties waive a claim fully, partially, or merely alter it. Parties come to an agreement<sup>95</sup>, which results in disclaimer of a court judgment on its merits<sup>96</sup>.

It should be noted that also contrary opinions exists, namely, mutual concession serves as an obligatory element of a settlement but do not reflect settlement on its merits and the essence, because mutual concession, as a rule, acts within settlement while being an optional element<sup>97</sup>. However, aforementioned opinion is fallacious because mutual concession is acknowledged as an essential feature of a procedural settlement. Further discussion will explain why this is regarded as an essential feature as to renunciation or allowance of a claim.

Both renunciation and allowance of a claim is unilateral deed by a party, where no necessity exists for other party assent (will). Allowance of a claim is claimants unilateral unconditioned abandonment of a court protection (claim has been waived). Whereas

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89 Tore Wiwen-Nilsson (2007). *Commercial dispute settlement: issues for the future. Modern Law for Global Commerce*. Vienna, Available at: <http://www.uncitral.org/pdf/english/congress/Wiwen-Nilsson.pdf>. Last accessed on 12 August, 2013.

90 Riga District Court decision, March 2, 2007, Case No. C33165206. Available at: [www.lursoft.lv](http://www.lursoft.lv) Last accessed on 27 June, 2013.

91 *The Civil Law of the Republic of Latvia. LR likums. Ziņotājs*, 14.01.1993., No. 1.

92 Sinaiski V. I. (1912) *Русское гражданское прав (Russian Civil Code)*. Kiev: A.M. Пономарев Publishing house, p. 365.

93 Lazarev S. V. (2006). *Мировое Соглашение в гражданском судопроизводстве (Settlement in Civil Proceeding)*. Ekaterinburg, Available at: <http://www.dissercat.com/content/mirovloe-soglashenie-v-grazhdanskom-sudoproizvodstve>. Last accessed on 27 February, 2013.

94 Sklansky D. A., Yeazell S.C. (2005). *Comparative Law without leaving home: what civil procedure can teach criminal procedure and Vice versa*. The Georgetown Law Journal (Vol.94:683), p. 696.

95 Torgans et al. (2006). *Civilprocesa likuma komentāri. Trešais papildinātais izdevums (Commentaries on Civil Law. Edition III.)*. Prof. K.Torgāna vispārīgā zinātniskā redakcijā. Rīga: Tiesu nama aģentūra, p.340.

96 Lazarev S. V. (2006). *Мировое Соглашение в гражданском судопроизводстве (Settlement in Civil Proceeding)*. Ekaterinburg, Available at: <http://www.dissercat.com/content/mirovloe-soglashenie-v-grazhdanskom-sudoproizvodstve>. Last accessed on 27 February, 2013.

97 Pylehin E.V. (2001). *Мировое соглашение в практике арбитражного суда и суда общей юрисдикции (Settlement in Practice of Arbitration Court and Common Law Courts)*. Saint Petersburg, Available at: <http://www.lawlibrary.ru/dissert2006224.html>. Last accessed on 24 April, 2013.

allowance of a claim is respondent's unilateral unconditioned consent to satisfy a claim (a favorable judgment is rendered). When a claim is waived, proceeding is terminated without rendering a judgment on its merits, but allowance of claim may cause consequences – a judgment is rendered on its merits in behalf of a claimant<sup>98</sup>. By renunciation of a claim a claimant acts at discretion with substantive rights in behalf of respondent, and allowance of a claim is considered as respondent's voluntary renunciation of his or her subjective rights in behalf of a claimant<sup>99</sup>. Thus, renunciation of a claim or allowance of a claim may be characterized as unilateral party act in proceeding that has non-compensatory feature and which does not impact substantive rights and responsibilities of both parties<sup>100</sup>.

Since settlement is bilateral (multilateral) agreement, a settlement can not confine itself merely by renunciation or allowance of a claim by one party only. Thus, if settlement causes only unilateral party to act – renunciation of a claim, court shall render its decision as to termination of proceeding due to renunciation of a claim. However, if settlement confines itself merely to respondent's admission of a claim, a document, notwithstanding on its title and form, establishes a fact as to allowance of a claim and court then must review a case on its merits. To be specific, settlement can entail provision of renunciation or allowance of a claim. It is essential to take into account that alike renunciation or allowance (which is unilateral), settlement (in accordance of which is claimed renunciation or allowance of a claim) is bilateral (multilateral) transaction that is mutually rewarding agreement. Settlement as a transaction is characterized by mutual concession and settlement as a transaction is of a specific (compromise) character<sup>101</sup>. If renunciation or allowance of a claim has been admitted by parties' transaction and on its bilateral and rewarding grounds, it is disregarded as unilateral procedural action but rather as a procedural subject of settlement. Thus, renunciation or allowance of a claim may be one of settlement provisions, but can not be the only settlement provision. Thus for example, settlement is such an agreement both parties have agreed upon, besides, agreed not only upon the fact that respondent acknowledges a claim, but also undertakes certain liabilities, for example, liability within mutually agreed terms extinguish debts or transmit any material benefit in a specific date indicated in settlement.

Also in Anglo-Saxon rights settlement is defined as mutual compromise when both parties end their legal dispute that entails renunciation of rights or potential gain or benefit by each party, contrasting it to other types of settlement, for example, unilateral procedural action of a party by renunciation, as well as such a specific Anglo-Saxon contract type as so called release agreement (only one party waives its benefit or rights)<sup>102</sup>.

It is important to take into consideration that "remuneration" does not imply that it must of equal amount for each party of a settlement. For example, in relation to money collection, when concluding settlement, a claimant most frequently receives less than initially desired or would have received in case of litigation<sup>103</sup>. Concession amount of each party has been set at parties' discretion. It is essential to reach mutual concession as such; when each of the parties is willing to concede on overall gains to assign or transfer anything to the other

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98 Shakarjan M.S. (1998). *Гражданское процессуальное право России (Civil Proceeding Rights in Russia)*. М.: Былина, р. 167.

99 Ibid. p. 167.

100 Rozkov M.A. (2004). *Мировое соглашение в арбитражном суде: проблемы теории и практики (Settlement in Court of Arbitration: problems, theory, and practice)*. М.: Статут, р. 77.

101 Hvostov V.M. (1996). *Система римского права. Учебник*. М.: Спарк, pp. 210, 211.

102 Neil Andrews (1994). *Principles of civil procedure*. „Sweet & Maxwele”, p. 399.

103 Jules Coleman, Charles Silver (1986; published online: 13 January 2009). *Justice in settlements. Social Philosophy & Policy*, Vol.4 Issue 1 ISBN 0265-0525. Available at: <http://journals.cambridge.org/action/displayAbstract?fromPage=online&aid=3093168>. Last accessed on 21 January, 2013

party (otherwise a dispute resolution by mutual concession is impossible). Alike other indemnity contracts, settlement requires that one of the parties fulfills its obligations and receives back the same action from the other party.

Indemnity contract may manifest in various ways, for example, 1) responsibilities arising from settlement may set forth mutually opposite fulfillment of liabilities (for example, it may appear as one party responsibility to transfer concrete property, while a responsibility of the other party is to pay certain amount of money); 2) settlement will be regarded as compensation, if responsibility of one party depends on the other party's action (for example, in accordance with settlement one party does not lay a claim for a certain property, if the other party pays exact amount of money); 3) indemnification contract applies to other cases, when responsibility relies merely on debtor (for example, in cases when a creditor has fulfilled responsibility or liability, of which dispute resulting later is unilateral (most frequently those are liabilities that results from credit or tort)<sup>104</sup>. In the USA, settlements sometimes entail not only authorization of financial benefit, but also such unaccustomed undertaking of liability which impose that parties will not disclose certain information to any third party; coordination and alteration of parties further activities; admission of responsibility etc<sup>105</sup>. It should be pointed out here that settlement may entail also so called no-fault provision, namely, to expressly point out that to state a guilty person or "identify guilt" in a settlement agreement is unnecessary<sup>106</sup>.

On the whole, it may be concluded that settlement as a major feature of compensation or a multilateral transaction that distinguish it from similar procedures, such as allowance and renunciation of a claim, is mutual concession within a particular dispute that manifests bilateral (or multilateral) procedures – conclusion of a settlement and a seeking court to affirm it. When mutual concession is absent settlement is impossible, however, in the same time renunciation or allowance of a claim is possible<sup>107</sup>. In the event of unilateral renunciation or allowance of a claim, a specific dispute is discontinued notwithstanding whether the other party gives assent or not.

#### 4. Legal characteristics of settlement

Since subject (terms) results from an essence of each particular transaction, also issue as to legal characteristics about settlement will be regarded further, specifying settlement subject in particular.

In legal doctrine, various viewpoints exist as to legal characteristics of settlement. Proponents of procedural character of a settlement point out that settlement always manifests as a legal fact of civil proceeding rights<sup>108</sup>; settlement is a procedural provision, which is

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104 Rozkov M. A. et al. (2008). *Договорное право. Соглашения о подсудности, международной подсудности, примирительной процедуре, арбитражное (третейское) и мировое соглашения (Contract Law. Agreement on jurisdiction, international jurisdiction, dispute resolution procedure, arbitration and settlement)*. М.: Статут, p.254.

105 Robert H. Gertner and Geoffrey P. Miller.(1995.). Settlement Escrows. JOHN M. OLIN LAW & ECONOMICS WORKING PAPER NO.25. THE LAW SCHOOL THE UNIVERSITY OF CHICAGO, p. 35.

106 Daniel Beebe (2011). *Settlement Agreements 101 – Practice Tips for Every Lawyer*. Orange County Lawyer Magazine, Vol.53 No.10, p. 30.

107 Lazarev S. V. (2006). *Мировое Соглашение в гражданском судопроизводстве (Settlement in Civil Proceeding)*. Ekaterinburg, Available at: <http://www.dissercat.com/content/mirovov-soglashenie-v-grazhdanskom-sudoproizvodstve>. Last accessed on 27 April, 2013.

108 In his book. *Мировое соглашение в конкурсном производстве*, 2004, Jarkov V.V. quotes such authors as Chechot D. M. (*Участники гражданского процесса*. М., 1960. p. 10); Schelov V.N (*Гражданское процессуальное правоотношение*. М., 1966. p. 78); Gurvich M.A. (*Гражданские процессуальные правоотношения и процессуальные действия // Вопросы гражданского процессуального, гражданского и трудового права*. Труды ВЮЗИ. Том III. М., 1965. p. 94).

regarded as contract of a procedural type<sup>109</sup>; and merely in certain cases when settlement impacts substantive relationships of civil proceeding, it “acts” as a legal fact of a substantive law<sup>110</sup>. However, proponents of a procedural character (of settlement) point out that settlement is, at first, civil transaction<sup>111</sup>. Settlement has been regarded as a type of civil novation<sup>112</sup> and may be deemed as a procedural and substantive ordinance<sup>113</sup>. Settlement is a contractual phenomenon in which court takes part merely as a potential facilitator of private agreement. Terms of settlement (with some exclusion) depend on will of involved parties; court remains indifferent, when parties decide to conclude a settlement<sup>114</sup>. In civil settlement, only private interests are involved and court in such situations merely assures whether its decision may be enforceable<sup>115</sup>.

Taking into consideration such different viewpoints, it may be concluded that procedural settlement possesses miscellaneous legal character. It shows that settlement possesses both substantive and procedural character, because it results from substantive and procedural law. From a substantive aspect, settlement is civil transaction (consequences of establishing rights), however, from aspect of procedural law, settlement terminates proceeding (consequences of rights termination). Settlement as a civil transaction is concluded at discretion of party, while taking into consideration procedural limitations relating to settlement subject and procedure. Thus, both substantive and procedural law may be applied to a settlement.

Conclusion emphasizing that upon conclusion of an agreement parties attempt to merely reach procedural consequences – termination of a court proceeding is not substantiated. It is necessary to regulate issue as to their legal relationships. Once their legal relationships are successfully regulated, parties lose their interest in continuation of a legal proceeding<sup>116</sup>. One of the scholars of jurisprudence, M.Telyukin, rightly points it out that settlement is characterized as a unilateral contract and procedural transaction<sup>117</sup>. Professor V. Jarkov states that settlement possesses not only procedural character but also serves as a procedural instrument<sup>118</sup>. This statement can not be fully agreeable, though. Settlement affirmed by court is not procedural settlement but it is more complicated in legal terms. It

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109 In his book *Мировое соглашение в конкурсном производстве*, 2004, Jarkov V.V. quotes Gukasjan R.E. (1970) *Проблема интереса в советском гражданском процессуальном праве*. Saratov, p. 129 - 132.

110 Ibid.

111 Suslov T.M. (2001). *Несостоятельность (банкротство) граждан, не являющихся индивидуальными предпринимателями (Insolvency (bankruptcy) of citizens who appear not to be sole traders)*. Екатеринбург, p. 22. Available at: <http://lawtheses.com/nesostoyatelnost-bankrotstvo-grazhdan-ne-yavlyayuschisya-individualnymi-predprinimatelnyami>. Last accessed on 22 April, 2013.

112 In his book *Мировое соглашение в конкурсном производстве*, 2004, Jarkov V.V. quotes a book *Советское гражданское процессуальное право*. (1957) М.: ВЮЗИ, p. 276.

113 In his book *Мировое соглашение в конкурсном производстве*, 2004, Jarkov V.V. quotes Kurilev S.V. (1956). *Объяснение сторон как доказательство в советском гражданском процессе.*, 1956. p. 157.

114 Sklansky, D A., Yeazell.S.C. (2005). *Comparative Law without leaving home: what civil procedure can teach criminal procedure and Vice versa*. The Georgetown Law Journal (Vol. 94:683), p.697.

115 Ibid. p. 697.

116 Rozkov et al. (2008). *Договорное право. Соглашения о подсудности, международной подсудности, примирительной процедуре, арбитражное (третейское) и мировое соглашения (Contract Law. Agreement on jurisdiction, international jurisdiction, dispute resolution procedure, arbitration and settlement)* М.: Статут, p.256.

117 In his book *Мировое соглашение в конкурсном производств*, 2004, Jarkov V.V. quotes Telyukin M. V. (1998). *Комментарий к ФЗОНБ*. М.: Бек, pp. 213, 214.

118 Jarkov V.V. (2004). *Мировое соглашение в конкурсном производстве (Settlement in Competition Law)*. М.:Юрист, Available at: <http://www.lawlibrary.ru/article1161710.html>. Last accessed on 2 April, 2013.

entails civil agreement and a list of elements of procedural importance<sup>119</sup>. Court settlement – it is “fusion” of both civil transaction and procedural elements of statutes<sup>120</sup>.

### 5. Settlement in comparison to court judgment

In legal doctrine settlement, namely, its terms are sometimes compared to court judgments. Thus, for example, it has been stated that terms of settlement entails agreement as to dispute resolution within the court, which later upon court confirmation acquires validity of judicial decision; that settlement is a protocol of judicial authority<sup>121</sup>; that confirmation of a settlement authorize its judicial status of protocol<sup>122</sup>, additionally granting it coercive measures of law enforcement<sup>123</sup>; it also has been stated that settlement is not only a contractual protocol, but a protocol that results from judicial activities<sup>124</sup>.

To ensure accuracy of a particular viewpoint, it is necessary to compare major features of court judgment and settlement:

1] court has the only authority rights to render judgment while settlement is concluded by parties involved in a proceeding;

2] court responsibility is to rule on its merits, namely, it is application of provisions of the law<sup>125</sup>, however, settlement is a result of mutual concession, which aim is dispute resolution on mutually satisfactory resolution (i.e. mutual renunciation of procedural rights which would provide ruling on its merits by court judgment in accordance with statutory norms);

3] if court decision on its merits is made in a form of judgment, in result of which it takes form of judicial protocol<sup>126</sup>, then procedural settlement is civil transaction (consequences of establishing rights) with procedural consequences (settlement terminates proceeding). Judicial decision serves as a protective element, while upon settlement parties waive from court protection, thus case is not adjudicated on its merits.

In the light of the above, both court decisions and procedural settlements are such legal facts that impact civil rights and responsibilities of proceeding parties, in result, they may be mutually comparable to such legal phenomena which have legal consequences, but taking into consideration subjects and objects of this legal fact, they are miscellaneous legal facts, because settlements and court decisions can not be replaced or identified with each other.

Parties, which have appealed to a court in order to reach mutual dispute resolution, are by no means endued with rights to fulfill court functions – to rule a case on its merits that only court is entitled to implement. Settlement is a result of mutual dispute resolution, but not

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119 Rozkov M. A. (2004). *Мировое соглашение в арбитражном суде: проблемы теории и практики* (*Settlement in Court of Arbitration: problems, theory, and practice*). М.: Статут, р. 32

120 Ibid.p. 32.

121 Rozkov M.A. et al. (2008). *Договорное право. Соглашения о подсудности, международной подсудности, примирительной процедуре, арбитражное (третейское) и мировое соглашения* (*Contract Law. Agreement on jurisdiction, international jurisdiction, dispute resolution procedure, arbitration and settlement*) М.: Статут, р. 234 quotes Serdukov N.V. and Knaziev D.V. Указ. соч. р. 47.

122 Yurchenko S.V. (1999). *К вопросу о юридической природе мирового соглашения* (*As to Legal Character of Settlement*). Юридический вестник. Ростов н/Д. N 1., р. 81.

123 Yaicev E. (2003). *Общие условия действительности мирового соглашения по делу о банкротстве должника* // Арбитражный и гражданский процесс (*General Regulations in Settlement as to Bankruptcy of Debtor*) No. 10, р. 26.

124 Ruhtin S. A. (2001). *Мировое соглашение: проблемы заключения и исполнения при банкротстве* (*Settlement: Issues in Conclusion and Execusion of Bankruptcy*). Журнал российского права N 7. р. 109.

124 Torgāns et al. (2000). *Civillikuma komentāri* (*Commentaries of Civil Law*), ( Prof. K.Torgāna vispārīgā zinātniskā redakcijā), Rīga: Mans īpašums, p.264.

125 Ibid. p.264.

126 Ibid. p.264.

dispute resolution on its merits. Settlement is definite „legal fiction”, that initially is not directed at seeking justice; it is rather a compromise settlement which parties conclude themselves<sup>127</sup>. Settlement replaces adjudication on its merits and delegates it to the parties involved in a dispute<sup>128</sup>. In the event court responsibility is to render a judgment on its merits that must be lawful and sound<sup>129</sup>. However, upon conclusion of a settlement, the principle of just is not always reached. Moreover, absolute justice is not reached because settlement is transaction without court case analysis on its merits. Settlement must be regarded as a highly problematic document rationalization technique<sup>130</sup>. However, as some authors have pointed out, that settlement always is shadow of law<sup>131</sup>, because court is the only authority that confirms regulations of settlement.

## Conclusion

1. A major feature of settlement subject – dispute resolution within a specific proceeding. Alike substantive settlement, which terms parties may set rather freely, procedural settlement may be concluded only within certain dispute. It signifies that such procedural settlements cannot be admitted which rules go beyond limitation of proceeding or are not connected to dispute resolution.

2. A major feature of settlement subject is mutual concession of litigants. Since settlement is bilateral (multilateral) contract, settlement subject-matter cannot be limited merely by renunciation or allowance of a claim by one of the parties. Settlement as a transaction has particular character of compromise that entails each party renunciation of rights, gain or benefit.

3. Settlement terms possess both substantive and procedural character. From a substantive aspect, settlement is civil transaction (consequences of establishing rights), but from procedural aspect it is a feature of proceeding termination (consequences of rights termination).

4. Court judgments and settlements have miscellaneous legal facts, because settlement and court decision cannot be replaced or cannot be identified with each other. Settlement is a result of dispute resolution by mutual concession of proceeding parties rather than dispute adjudication on its merits implementing principles of justice.

5. Consequences of settlement are of socially statutory character in result of which both dispute resolution at issue (a legal phenomenon), and dispute (conflict) discontinuation in result of mutual concession (a social phenomenon).

6. In the light of the above, it may be concluded that a subject of settlement is action which aim is to establish undisputable and unquestioned legal relationship (which civil proceeding parties doubt) in place of mutual legal relationship by mutual concession of litigants, thus, discontinuing civil dispute at court.

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127 Seryogin N. M. (2001). *Основания к отмене определений об утверждении мирового соглашения (Grounds for Cancellation of Confirmed Settlement)*. Российский судья № 1. М.; Юрист, p. 17.

128 Sklansky, D. A., Yeazell S. C. (2005). *Comparative Law without leaving home: what civil procedure can teach criminal procedure and Vice versa*. The Georgetown Law Journal (Vol. 94:683), p. 702.

129 *Civil Proceeding Law of the Republic of Latvia*. Latvijas Vēstnesis, November 3, 1998, Nr.326/330.

130 M. O.Fiss. (1984). *Against Settlement*. The Yale Law Journal, Vol. 93, Number 6, p. 1075.

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## **НАСИЛИЕ И ХУЛИГАНСКОЕ ПОВЕДЕНИЕ ЗРИТЕЛЕЙ ВО ВРЕМЯ ПРОВЕДЕНИЯ СПОРТИВНЫХ СОРЕВНОВАНИЙ: ПОЛИТИКО-ПРАВОВЫЕ АСПЕКТЫ**

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### **Abstract**

The article is devoted to the political and legal aspects of international cooperation against spectator violence and misbehavior at sports. The measures taken by the states and international intergovernmental and non-governmental organizations to maintain public order to prevent the acts of violence and misbehavior at sports is reviewed, as well as cooperation coordination problem on these issues at the national (the level of ministries, governmental agencies and sports organizations) and international levels .

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**Keywords:** Olympic Games, sport, violence in sport, UEFA, European Convention on Spectator Violence and Misbehavior at Sports and in particular at Football Matches, Council of the European Union, European Parliament

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### **Аннотация содержания статьи**

В статье рассматриваются политико-правовые аспекты международного сотрудничества в борьбе с актами насилия и хулиганским поведением в спорте. Анализируются меры, принимаемые государствами и международными межправительственными и неправительственными организациями по поддержанию порядка для противодействия актам насилия и хулиганским действиям во время проведения спортивных состязаний, а также проблема координации сотрудничества по этим вопросам на национальном (уровень министерств, правительственных агентств и спортивных организаций) и международном уровнях.

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**Ключевые слова:** Олимпийские игры, спорт; насилие в спорте, УЕФА, Европейская конвенция о предотвращении насилия и хулиганского поведения зрителей и, в частности футбольных матчей, Совет Европейского Союза, Европейский Парламент

Спорт является неотъемлемой частью физической культуры общества, организованной в соответствии с определенными правилами. Уровень физической культуры в государстве также является имиджевым фактором, отражающим состояние экономики, образования, культуры в обществе, степень его привлекательности. Вместе с тем, спорт, который всегда рассматривался как универсальная ценность с глубоким миротворческим началом столкнулся с таким феноменом в современном обществе как эскалация насилия и хулиганского поведения зрителей во время проведения

спортивных мероприятий. Это явление вызывает особую озабоченность руководителей спорта и спортивных обществ, спортсменов, представителей гражданского общества, некоммерческих общественных организаций, международных межправительственных и неправительственных организаций и требует объединения усилий на национальном и международном уровнях для возвращения спорту его первоначального назначения.

Цели и задачи спорта нашли свое точное воплощение в целях и задачах олимпизма. Олимпийские игры древности, насчитывающие 12 столетий, стали одним из важнейших факторов развития и существования великой античной цивилизации. Они оказали большое влияние на античную культуру, религию, зодчество, скульптуру, литературу, философию. Олимпийские празднества оказывали благотворное влияние на атмосферу общественной жизни античного общества, на его существование, в самой структуре Олимпийских игр было заложено глубокое миротворческое начало [3].

Цели и задачи спорта вообще очень близки целям и задачи олимпизма. Их можно свести к следующим основным положениям:

- Спорт – это философия жизни, возвышающая и объединяющая в сбалансированное целое достоинство тела, воли и разума. Спорт с культурой и образованием, стремится к созданию образа жизни, основывающегося на радости от усилия, на воспитательной ценности хорошего примера и на уважении к всеобщим основным этическим принципам.
- Основная цель спорта – это пример содействие гармоничному развитию человека с тем, чтобы способствовать созданию мирного общества, заботящегося о сохранении человеческого достоинства и укреплении мира.
- Спорт способствует построению лучшего мира посредством воспитания молодежи без какой-либо дискриминации в духе взаимопонимания, дружбы и атмосферы солидарности.
- Заниматься спортом - одно из прав человека. Каждый должен иметь возможность заниматься спортом в соответствии с его или ее потребностями.

Выше отмечалось, что в Олимпийских играх содержится глубокое миротворческое начало. Миротворческие принципы античного олимпизма реализовывались в разных формах: они органически включались в теологию и философскую концепцию праздника, воплощались в его общем художественном оформлении, были задействованы в процедуре его организации. Олимпийские игры в древности не были спортивными состязаниями как таковыми. Это было религиозное общеэллинское празднество, торжественное собрание представителей всех греческих городов-государств, демонстрация национального единства, глобальной идеи панэллинизма [7].

Спорт – общечеловеческая ценность, явление вне политики. Основатель современного олимпийского движения Пьер де Кубертен видел спорт вне политики, исключал всякое влияние политики на спорт. В тоже самое время, отмечая его автономность, он не исключал возможность использования спорта для решения важных политических проблем.

Таким образом, призванный возвышать и объединять народы, воспитывать уважение к человеку и его достоинству, заботиться об укреплении мира, - современный спорт столкнулся с набором вызовов, среди которых насилие в спорте и хулиганское поведение занимают далеко не последнее место, оказывая, в том числе, влияние на состояние межгосударственных отношений. Это обстоятельство требует повышения эффективности сотрудничества государств в борьбе с насилием и хулиганским поведением в спорте.

Начало такому сотрудничеству было положено в 1985 году. Связано это было с событием, послужившим мощным стимулом для разработки международно-правового документа, нацеленного на предотвращение и подавление насилия и хулиганского поведения зрителей во время спортивных мероприятий. Речь идет о финальном матче Кубка европейских чемпионов между итальянским «Ювентусом» и английским «Ливерпулем», который проходил на стадионе бельгийского города Хейзел 29 мая 1985 г. Ещё до начала игры между итальянскими тиффози и английскими фанатами произошло столкновение, переросшее в кровавую трагедию.

Беспорядки начались ещё перед матчем. Их причиной стали многочисленные локальные стычки между английскими и итальянскими фанатами, в том числе между теми из них, которые расположились в «нейтральном секторе». Кто именно начал первым драку осталось невыясненным, и обе стороны того конфликта до сих пор винят друг друга. Организаторы матча не учли эти столкновения и не отделили болельщиков соперничающих команд. Полиция бездействовала. Среди итальянцев началась паника, они побежали. Толпа надавила на разделяющий сектора кирпичный барьер, и он обрушился, не выдержав людского напора [5]. В результате трагедии погибли 39 человек, 32 из которых были итальянцами, 4 — бельгийцами, 2 — французами и 1 — ирландцем. Около 600 человек получили ранения. Ответственность за кровавую драму лежит не только на болельщиках, но и УЕФА, разрешившем проводить матчи на обветшавшей арене. «Хейзел» не отвечал требованиям безопасности. Не была готова и бельгийская полиция, но наказали исключительно англичан. УЕФА наложил запрет на выступление в турнирах, организуемых УЕФА, всех клубов Англии в течение пяти лет (на сборную это не распространялось).

Это далеко не единственный случай массовой гибели болельщиков в результате беспорядков. Так, 16 октября 1996 года в Гватемале состоялся матч отборочного турнира чемпионата мира-98 Гватемала — Коста-Рика. В беспорядках, сопутствовавших матчу, погибло 82 человека. 14 сентября 2008 года в Бутембо (Демократическая Республика Конго) во время матча внутреннего чемпионата Демократической Республики Конго, между клубами «Сокозаки» и «Ниуки», голкипер клуба «Ниуки» начал колдовать во время матча. Голкипер (его имя не называется) выбежал на поле и попытался наложить на соперников из команды «Сокозаки» чары, которые должны были помочь «Ниуки» одержать победу. В результате его действий между футболистами началась драка, которая спровоцировала беспорядки среди болельщиков. Полицейские применили против болельщиков слезоточивый газ. В результате беспорядков 11 человек погибли, еще несколько получили ранения. 1 февраля 2012 года в Порт-Саид, матч между клубами «Аль-Масри» и «Аль-Ахли», в котором хозяева одерживали победу со счётом 3:1 завершился массовым нападением зрителей на группу поддержки соперников, а затем — на тренерский штаб и игроков проигравшей команды. Драка началась в конце матча, выбежавших на поле болельщиков попытались сдержать силы полиции. В результате инцидента 73 человека погибли, ранения получили более тысячи человек. Футбольная федерация Египта заявила, что откладывает на неопределенный срок матчи египетской премьер-лиги [4].

Насилие в спорте является серьезной социальной проблемой наших дней, причины которой в основном находятся за пределами спорта. Именно события в Хейзеле, - насилие и хулиганские действия зрителей во время спортивных мероприятий, а также вытекающие из этого последствия, побудили Совет Европы разработать первую Европейскую конвенцию о предотвращении насилия и хулиганского поведения зрителей и, в частности футбольных матчей, которая вступила в силу с 1 ноября 1985 года.

В конвенции отмечается важность вклада, который вносит спорт в международное взаимопонимание; во взаимодополняемость ответственности государственной власти и независимых спортивных организаций в борьбе против насилия и хулиганского поведения зрителей, поскольку спортивные организации имеют также обязательства в вопросах безопасности и, в более широком плане, должны обеспечивать нормальное проведение организуемых ими мероприятий.

В соответствии со ст. 1 целью Конвенции является предотвращение и подавление насилия и хулиганского поведения зрителей во время футбольных матчей и других спортивных соревнований по другим видам спорта, с учетом особых требований последних, в отношении которых существуют опасения насилия или хулиганского поведения. Государства-участники Конвенции обязаны предпринимать все необходимые меры для имплементации своих международных обязательств в национальное законодательство. Определяющим в данном случае является принцип *pacta sunt servanda* (договоры должны соблюдаться).

Успех борьбы с насилием и хулиганским поведением в спорте в значительной степени зависит от координации сотрудничества по этим вопросам на национальном (уровень министерств, правительственных агентств и спортивных организаций) и международном уровнях. Это положение отражено в ст. 2 Конвенции, которая гласит: «Стороны координируют политику и действия, предпринимаемые их министерствами и другими государственными органами, по борьбе с насилием и хулиганским поведением зрителей посредством создания, в случае необходимости, органов по координации».

Борьба с актами насилия и хулиганским поведением в спорте требует координации усилий государств-участников Конвенции в принимаемых мерах, которые имеют своей целью: обеспечение мобилизации в достаточном объеме сил по поддержанию порядка для противодействия актам насилия и хулиганским действиям как на стадионах, так и в непосредственной близости от них, а также вдоль путей следования зрителей; содействие тесному сотрудничеству и обмену соответствующей информацией между задействованными силами полиции различных населенных пунктов или теми силами, которые могут быть задействованы; применение или, в случае необходимости, принятия законодательства, предусматривающего соответствующие наказания или, в случае необходимости, соответствующие административные меры для лиц, признанных виновными в совершении правонарушений, связанных с насилием или хулиганскими действиями зрителей.

Особое внимание в Конвенции уделяется роли клубов болельщиков в обеспечении общественного порядка во время проведения спортивных мероприятий. В связи с этим, государства-участники Конвенции взяли на себя обязательства поощрять организованность и хорошее поведение клубов болельщиков и назначать из их числа представителей, призванных содействовать контролю и информированию зрителей по случаю матчей и сопровождать группы болельщиков, выезжающих на матчи, проходящие в других местах.

В Конвенции, с определенной оговоркой, делается акцент на желательность, при наличии юридических возможностей, на координацию в вопросах организации поездок при сотрудничестве клубов организованных болельщиков и бюро путешествий в местах выезда зрителей, с тем, чтобы не допустить выезда и присутствия на матчах потенциальных зачинщиков беспорядков.

Борьба с насилием и хулиганским поведением должна быть системной. Для придания этой борьбе системности требуется разработка и принятие нормативно-правовых актов разных уровней, регламентирующих спортивно-правовые отношения и включающие санкции за их несоблюдение или другие надлежащие меры. Такая

совокупность нормативно-правовых актов необходима для того, чтобы спортивные организации и клубы, а также, в случае необходимости, хозяева стадионов и государственные власти на основе полномочий, установленных внутренним законодательством, могли предпринимать конкретные действия вокруг стадионов и на стадионах для предупреждения или подавления насилия или хулиганских поступков.

Системность такой борьбы предполагает также решение технических вопросов. К их числу относятся: проектирование и планирование стадионов таким образом, чтобы они гарантировали безопасность зрителей, не способствовали насилию среди них, позволяли обеспечивать эффективный контроль за толпой; установка соответствующих ограждений или перекрытий, которые позволяют обеспечить вмешательство служб безопасности и сил правопорядка.

Для групп приезжающих болельщиков должны выделяться отдельные трибуны, отделенные от групп болельщиков команд противников. Такое разделение должно в обязательном порядке обеспечиваться, в том числе и за счет строгого контроля за продажей билетов и особых мер предосторожности в период, непосредственно предшествующий матчу.

В среде болельщиков всегда есть известные и потенциальные зачинщики беспорядков. В значительной степени безопасность спортивных мероприятий зависит от доступности и достоверности информации о таких лицах. Безопасность на спортивных мероприятиях должна являться приоритетом, поэтому государства-участники Конвенции должны формировать правовые основы, достаточные для того, чтобы выводить со стадионов и с матчей или не пропускать на них таких лиц, а также лиц находящихся в состоянии алкогольного опьянения или наркотического воздействия.

Серьезную озабоченность вызывают случаи применения болельщиками предметов, которые представляют опасность не только для здоровья, но и для жизни зрителей и спортсменов. В Конвенции содержится однозначно понимаемое требование обеспечивать контроль за соблюдением зрителями запрета проносить на стадионы предметы, которые можно использовать для актов насилия, а также пиротехнических средств или других подобных предметов.

Неверным было бы понимать борьбу с насилием и хулиганским поведением на спортивных мероприятиях как некую техническую работу. Проектирование и планирование, логистические решения, контрольные мероприятия должны обеспечиваться надлежащими мерами в социальной области и области образования. Бесспорную важность для предупреждения насилия в спорте или во время спортивных мероприятий имеют средства массовой информации, которые могут содействовать утверждению спортивных идеалов путем проведения образовательных и других кампаний, закреплению понятий честной игры, в особенности среди молодежи, в целях содействия взаимному уважению как среди зрителей, так и среди спортсменов, а также поощрению более широкого активного участия в спортивной деятельности.

Проблема насилия и хулиганского поведения на спортивных мероприятиях вышла за пределы национальных границ, но по содержанию, набору средств и методов, которые должны применяться для борьбы с ней она является универсальной и фактор международного сотрудничества играет здесь очень важную роль.

Ст. 4 Конвенции обязывает государства-участников осуществлять тесное сотрудничество в областях, охватываемых Конвенцией, и поощрять аналогичное сотрудничество, в случае его целесообразности, между заинтересованными национальными спортивными властями.

Важным условием предупреждения актов насилия и хулиганства во время подготовки и проведения спортивных мероприятий является обмен информацией

между заинтересованными сторонами. Ст. 4 Конвенции предписывает заинтересованным сторонам перед началом международных матчей или соревнований между представителями клубов или командами предлагать своим компетентным властям, в частности спортивным организациям, указывать матчи, в связи с которыми следует опасаться актов насилия или хулиганского поведения зрителей.

Обмен информацией должен носить заблаговременный характер, и он предполагает проведение консультаций, выработку мер предосторожности и издание распоряжений, которые необходимо принять до и после матча, в том числе тех, которые не предусмотрены в Конвенции.

Важной является проблема установления личностей нарушителей и обращения с ними. Стороны, соблюдая существующие правовые процедуры и принципы независимости судебной власти, должны стремиться обеспечить, чтобы личность зрителей, совершающих акты насилия и другие наказуемые действия, была установлена и они преследовались в соответствии с законом. Речь идет, прежде всего, о праве на справедливое судебное разбирательство, которое включает в себя:

- право на справедливое судебное разбирательство включает в себя соблюдение принципов презумпции невиновности;
- право обвиняемого знать, в чем он обвиняется и быть подробнейшим образом уведомленным о том, в чем он обвиняется;
- иметь достаточное время и возможности для своей защиты;
- право допрашивать свидетелей и выбирать себе защитника или защищать себя лично;
- соблюдение во время судебного разбирательства принципа равенства сторон в процессе, сторон, имеется в виду, обвинения и защиты.

Конвенция предписывает в надлежащем случае, в том, что касается присутствующих зрителей, с соблюдением международных обязательств, государствам-участникам предусматривать [1. Ст. 5]:

- передачу судебного разбирательства, начатого в отношении лиц, задержанных в связи с актами насилия и другими наказуемыми действиями, совершенными во время спортивных мероприятий, стране, в которой проживают эти лица;
- требование о выдаче лиц, подозреваемых в совершении актов насилия или других наказуемых действий, совершенных в ходе спортивных мероприятий;
- передачу лиц, признанных виновными в насильственных действиях или других наказуемых актах, совершенных в ходе спортивных мероприятий, соответствующей стране для отбытия там наказания.

Конвенция предусматривает создание органа для реализации ее целей - Постоянного комитета (ст.8). В его состав входят представители государств-участников Конвенции от одного до нескольких человек, но с правом одного голоса. В состав Постоянного комитета могут входить также по одному представителю в качестве наблюдателя любого государства-члена Совета Европы или участника Европейской конвенции по вопросам культуры, не являющегося участником Конвенции о предотвращении насилия и хулиганского поведения.

Постоянный комитет созывается на заседания Генеральным секретарем Совета Европы не реже одного раза в год, а также по просьбе большинства государств-участников в случае необходимости. Постоянный комитет устанавливает свои внутренние правила и принимает их путем консенсуса. Кворум для проведения заседаний составляет простое большинство.

Европейская конвенция 1985 г. о предотвращении насилия и хулиганского поведения зрителей во время спортивных мероприятий, в частности футбольных матчей, способствовала сокращению случаев насилия среди зрителей - особенно на

стадионах - и продолжает служить ориентиром для сотрудничества в этой области в Европе.

Поиски решения проблемы насилия и хулиганского поведения на спортивных мероприятиях является следствием социальных проблем, решение которых не может быть найдено исключительно в области спорта.

В 2012 году в российском футболе произошла серия скандалов, связанных с насилием и хулиганскими действиями, и срывами матчей. Один из последних и известных случаев имел место во время матча команд Динамо (Москва) и Zenit (Санкт-Петербург), во время которого серьезную физическую и психологическую травму получил голкипер команды Динамо.

Этот скандал был последним побудительным толчком к внесению в Государственную Думу РФ проекта федерального закона «О внесении изменений в отдельные законодательные акты Российской Федерации в связи с обеспечением общественного порядка и общественной безопасности при проведении официальных спортивных соревнований», который получил неофициальное название «Закон о болельщиках». По существу он является актом имплементации международных обязательств России как государства-участника Европейской конвенции 1985 г. о предотвращении насилия и хулиганского поведения зрителей во время спортивных мероприятий, в частности футбольных матчей.

В проекте закона определяется понятие «зрители», их права и обязанности, регламентируются меры безопасности во время массовых спортивных мероприятий, в том числе проверку болельщиков при входе на стадионы, предусматривается наказание за нарушение общественного порядка во время соревнований в виде 100-200 часов общественных работ. За срыв матча фанатов предусматривается штраф от 1 до 2 тысяч рублей или арест на 15 суток. С принятием проекта закона может быть установлен административный запрет на посещение соревнований на срок до одного года. Следить за безопасностью на матчах могут обязать собственников спортивных объектов.

В Пояснительной записке к проекту Федерального закона «О внесении изменений в Федеральный закон «О физической культуре и спорте в Российской Федерации»» его авторы отметили, что основной целью законопроекта является обеспечение общественного порядка и общественной безопасности на стадионах, которую можно достичь только выстроив четкую, понятную, открытую систему взаимоотношений между всем сторонами, в том или ином качестве участвующими в спортивном соревновании [6].

Законопроект также ставит цель определения механизмов взаимодействия, разграничения ответственности и создания атмосферы взаимного уважения и доверия, способности к компромиссным решениям при строгом соблюдении законодательства спортивными ассоциациями, спортивными клубами, организаторами спортивных соревнований, зрителями, спортивными болельщиками и сотрудниками полиции.

По мнению авторов законопроекта, система обеспечения общественного порядка и общественной безопасности на спортивных соревнованиях должны иметь два уровня. Первый уровень – стратегический: воспитание культуры поведения болельщиков и зрителей. Данную работу должны проводить спортивные клубы. Они должны стать местом работы со зрителями и болельщиками.

Второй уровень – тактический: обеспечение порядка и безопасности на конкретном спортивном соревновании, на определенном объекте спорта. Указанная функция возлагается на организаторов спортивного соревнования. Для этих целей законопроект закрепляет обязанности организатора спортивного соревнования, в том числе определять порядок организации и правила проведения спортивного соревнования в соответствии с законодательством Российской Федерации,

разрабатывать совместно с сотрудниками полиции, представителями спортивных клубов и клубов болельщиков план обеспечения общественного порядка и общественной безопасности на спортивном соревновании, организовывать координационный штаб по обеспечению общественного порядка и общественной безопасности на спортивном соревновании с участием стюардов, представителей спортивных клубов, клубов болельщиков, поддерживающих разные спортивные команды [6].

Борьба с насилием и хулиганским поведением в спорте требует объединения усилий всех заинтересованных сторон. На Международной конференции, состоявшейся в Брюсселе в ноябре 2007 года по инициативе Европейской комиссии, Совета Европейского Союза, Европейского Парламента и УЕФА под лозунгом: «Навстречу стратегии ЕС по борьбе с насилием в спорте», вице-президент Еврокомиссии Фраттини отметил: «Очевидно, что насилие в спорте не приносит ничего, кроме ущерба. Мы должны сделать все возможное, чтобы искоренить насилие. Но, действуя своими силами, ни одна из стран не сумеет найти наилучшее решение по борьбе с хулиганством и насилием в спорте. Еврокомиссия может объединить усилия органов правопорядка, судебной власти, спортивных федераций и организаций болельщиков. Таким образом, мы сможем мирно наслаждаться спортом" [2].

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# **COSMOPOLITANISM AND DEMOCRACY BEYOND STATES: THE COSMOPOLITAN DEMOCRACY PROJECT**

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## **Abstract**

Today we are facing a period of profound social and political transformation on a global scale, under the inevitable process of globalization. This brings an important debate about how to properly organize the international society in order to contribute to the resolution of global problems.

Among these global problems we can highlight the crisis of the nation state in a world where states by themselves can no longer provide security for citizens who call for greater representation and democratic participation, meanwhile telecommunications technology allows a human interconnectedness that has no precedents in history. The fact is that international society is changing into a new world order that is not clearly defined yet.

To face this reality, the cosmopolitan democracy project proposes updating the Kantian cosmopolitanism through a broad legal and political program that includes not only the democratic reform of governance institutions but the peaceful transformation of the world order as well.

However, political realism considers illusory this project, as any other that tries to organize the international society according to regulative ideals.

In response to this criticism, I consider extremely important the promotion of an appropriate education that enables to subvert the realism and help us to recognize our sense of belonging to a plural and diverse world, allowing this way the empowerment of the world citizenship and making possible a genuine cosmopolitan democracy in the twenty-first century.

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**Keywords:** Cosmopolitanism, democracy, peace, education

## **Introduction**

Today we are facing a period of profound social and political transformation on a global scale, under the inevitable process of globalization. This brings an important debate about how to properly organize the international society in order to contribute to the resolution of global problems.

Among these global problems we can highlight the crisis of the nation state in a world where states by themselves can no longer provide security for citizens who call for greater representation and democratic participation, meanwhile telecommunications technology allows a human interconnectedness that has no precedents in history. The fact is that international society is changing into a new world order that is not clearly defined yet.

To face this reality, the cosmopolitan democracy project proposes updating the Kantian cosmopolitanism through a broad legal and political program that includes not only the democratic reform of governance institutions but the peaceful transformation of the world order as well.

However, political realism considers illusory this project, as any other that tries to organize the international society according to regulative ideals.

In response to this criticism, this article foregrounds the promotion of peace education as a means not only to subvert the realism but also to help us to recognize our sense of belonging to a plural and diverse world, allowing the empowerment of the world citizenship and making possible a genuine cosmopolitan democracy in the twenty-first century.

### **Antiquity and contemporaneity in the idea of universal citizenship**

The origin of the term cosmopolitanism goes back to the fourth century of our common era and is associated with the cynic philosopher Diogenes Laertius, who seems to have been the first to use it to claim that he was a world citizen. Then the Stoic thinkers —both in its first historical stage in Greece and later in Rome—, proclaimed his belonging to a city as vast as the universe itself, justifying philosophically this idea of *kosmou politês* or world citizen.

Indeed, these ideas were first formulated in a time when the Hellenic world was witnessing a profound social and political change, once the conquest of Greece by Philip II of Macedonia determined a change that would forever alter the course of history of the Greek city-states. As explained by the British historian Arnold Toynbee, the abolition of the sovereignty of the city-state made by the Macedonians held as a relief for the individual, in a time when being a citizen of the *pólis* rather than being a stimulus had become a burden, after the incessant fratricidal strife coupled with the loss to the invading enemy will end up exhausting the energies of the citizens, obliged to provide a service and loyalty that ended up decimating their spirit (Toynbee, 1960: 131-132).

This important change caused a deep crisis in the soul of men those days, so that inspired a number of thinkers and philosophers to develop ideas that allowed them to formulate a new sense of belonging, once the Hellenic citizens were released to fulfill the usual civic obligations the *pólis* compelled them to do. Therefore, within this historical context, arised new currents of philosophical thought as the Stoic school, that tried to give not only relief to the woes of men but also to show a way forward in order to aspire to a good and virtuous life. According to the Stoics, reasoning ability was a quality shared by all human beings, an innate capacity that, coupled with the fact that the laws of nature are universal, led them to propose the equality of all people and the unity of all mankind, beyond any distinction related with culture, geographic origin or social position. Thus, in the famous work *Politeía*, Zeno of Citium will propose the oneness of humankind organized not around cities and *demos* with different laws, but within a single *cosmópolis*, having for fellow brothers and sisters all men and women, all of them considered as members of the same *demos*. As we can appreciate, the stoic emphasis was placed on what united the humankind, not what divided it. The latter allows us to prove that stoicism was part of Greek political traditions, rejecting the centralization of power which is the origin of kingdoms and empires and favoring that the world may function like a large city (Daraki and Romeyer-Dherbey, 1996: 52).

While the efforts of these thinkers to preach cosmopolitanism was itself a novelty in the ancient world, there was a feature not less innovative regarding the participation of citizens in public life, because the *cosmópolis* differed from the *pólis* in the sense that it no longer supposed political action. For this reason, the Stoics seemed to consider humankind as a group of citizens finally abandoned to their fate (Daraki and Romeyer-Dherbey, 1996: 52). They felt part of a universal city that did not require from them any commitment to exercise political action as in the *pólis*, an aspect that was not addressed by the Stoics.

This task will be developed tens of centuries later by Immanuel Kant, whose philosophy of law and political thought are directed to regulate and guide human action with a universal scope. Kant, as heritor to the ancient Stoicism, understands that the man is inserted into a universal community of rational beings, where their rights must be respected without distinction (Nussbaum, 1997: 36). But Kant goes further and tries to set the legal principles that can lead to a lasting universal peace. By incorporating the notion of cosmopolitan law as

ultimate condition for achieving perpetual peace, Kant introduces into the *corpus juris* the ancient Stoic idea of *kosmou politês*, which he asserts under the legal right to hospitality. Unlike the Stoics, Kant with no doubt will provide legal and political ties to the universal community (Kant, 1989: 192).

Undoubtedly, the contemporary political world has drawn heavily on the thought of Kant, which inspired the creation of the League of Nations in 1919, then expanded in 1945 in the form of the current United Nations, a body that has taken concrete steps toward creating a more just and solidary world. Nevertheless, we still live in an insecure world, no doubt! But we are not resigned to this state of things nor believe the solution is to establish a global state, a Leviathan provided with global capabilities to impose order. Instead, we believe that we must think of new options on how to organize and deepen our bonds of unity among peoples and among ordinary citizens. An union that arises, not through fear but out of deep respect for our shared humanity. We think this is a valid alternative that can be implemented through updating Kantian cosmopolitanism.

Today, our increasing interconnectedness as human beings is biased by political and legal structures that are necessary to reformulate in order to adapt them to the present time we are living. It seems that the configuration of the nation state has become obsolete to respond to the changes that are taking place in society as a result of the globalization process, which has accelerated particularly after the end of the Cold War.

Globalization involves the expansion, intensification, acceleration and increasing impact of our global human interconnectedness (Held, 2012: 38-39). As a result of the development of such interconnection, there have been international regimes and organizations that have expanded to manage entire areas of transnational activities in commercial, financial, environmental risk management, etc., changing this way the political organization at different levels.

As a consequence, the state is crossed by several instances of decision-making situated beyond its borders, involving many issues out of their control. Therefore, globalization and changes in the nature and form of global governance raised questions related to the scope of democracy, when the relationship between decision makers and those affected by them are no longer symmetrical or congruent in respect to the territory (Held, 2012: 45).

What is the democratic legitimacy within the current structure of governance at multiple levels? Representative democracy has been hailed as the key institutional innovation to ensure peace, social cohesion and satisfaction of rights under the sovereign nation-state, but when state sovereignty is violated by transferring important powers of government to transnational governance institutions is not clear at all the real degree of democratic legitimacy and accountability between those institutions and the public, whether it be local, national, regional or global. Both the expectations of the people for greater autonomy to local governments as ethnic, cultural or religious claims from different communities, can be interpreted as strong indications of a regression to nationalism (Habermas, 1997 : 130 ). As Habermas points out, we could say that we are facing a moment of international order transition where there are two opposing forces.

On the one hand, an integrationist force that due to globalization connects humankind through a cosmopolitan scenario where economics, finance, communications and cultural exchanges produce political aggregation spaces that span large areas (as in the case of the European Union). On the other, a disaggregation force that drives autonomy movements that aspire to recognition of their national, ethnic or religious identity.

The common element in these two realities is the crisis of the nation state, an artificial political entity that in the twenty first century is on decline and fall, because of the massive transfer of many of its functions to supranational venues but also for its growing inability to carry out the main functions that were part of its original reason for being: to produce

national unification as well as the internal pacification. As Luigi Ferrajoli noted, this is a time where the state has become too big for the small things and too small for the big things. Not only national but also transnational government structures need to be reformulated, if what is sought is to ensure that this period of transition leads to a truly democratic world order, thus establishing the realization of the Kantian dream of a society and a cosmopolitan law guarantor of peace and human rights (Ferrajoli, 2004: 92).

In the days when the Greek city-states crumbled, a group of philosophers proposed a sense of universal belonging that would allow citizens to live under one law of equality. Perhaps the idea of those ancient Stoic thinkers, that we are inhabitants of a *cosmópolis*, really does not belong to a past age. On the contrary, it seems to embody a contemporaneity that reminds us Kant's reflection that the violation of human rights in one place affects every place on earth.

### **The Cosmopolitan Democracy and the actualization of Kantian cosmopolitanism**

There is an important bibliography which delves into the idea of democratizing governance institutions and empowering global citizenship in order to ensure justice and global peace, in times when it is urgent to expand democracy beyond the States. To do this, it is proposed that the international society actors be involved in a common political structure, according to a model of cosmopolitan democracy that benefits from the prevailing conditions of the current international context (Held, 1995: 174).

As we well know, with the creation of the United Nations it was laid the foundation of a supranational legal system based on the prohibition of war and the universal protection of human rights, which would overcome the system of interstate relations based solely on strength and that would lead to the tragic experiences of the wars that ravaged the world in the first half of the twentieth century. This new system was delineated from specific instruments, namely the UN Charter (1945), the Universal Declaration of Human Rights (1948) and the two Covenants on Civil, Political, Economic, Social and Cultural Rights (1966).

The above instruments, which all together make up a world constitution embryo, determined the end of the era of absolute sovereignty of states in the external sphere, since the new international legal framework established by the UN Charter would serve to hold all States as *pactum subiectionis* and not just *associationis*, so that they would remain subjected to a common authority coated with coercive powers (Ferrajoli, 2011: 479; Bobbio, 1995: 28-29).

Albeit this *pactum* means an extraordinary progress by itself, unfortunately it has been thwarted by the lack of political will of the most powerful states to submit to the new legal framework, as well as by major transnational economic and financial powers which every day evade effective control of the global public sphere. Whereupon the development of global constitutionalism is imprisoned by the powers that precisely was meant to control, with the risk that this entails: setting up an uncivil international society characterized by a neo absolutist regression to the law of the strongest, dictated in this case by the most militarily powerful states and the major transnational economic groups (Ferrajoli, 2011: 484).

Against this background, the cosmopolitan democracy project seeks to expand democracy beyond states to develop a global public sphere that would put limits on those wild powers: we refer to the most powerful states, large economic powers that prey on weaker nations and transnational criminal networks operating with impunity. According to Ferrajoli the *formal democracy* currently faces a crisis in its political and civil dimension that involves the loss of sovereignty of States and the weakening of the correspondence between rulers and ruled, while the *substantial democracy* crisis, in its liberal and social dimension

implies the absence of boundaries to the new powers, which in the current context of globalization act without an adequate juridical frame (Ferrajoli, 2011: 485).

Therefore, cosmopolitan democracy in its *political dimension*, entails interpreting the cosmopolitan right as the right to liberty and equal form of government based on the deliberation and consent of the citizens (Held, 2012: 96). From this point of view, the actualization of the Kantian cosmopolitanism allow us to argue for a legal framework in which citizens could participate actively beyond the borders of their states, pursuant to the exercise of cosmopolitan law understood as the right to democratic public participation on common issues affecting the citizens of different political communities. In the *civil dimension*, it is proposed to restore the government's role in the public sphere, understanding public sphere as the scope of the functions and institutions for the protection of the general interests such as peace, security and fundamental rights (Ferrajoli, 2011: 516). The *liberal dimension* of cosmopolitan democracy proposes legal recognition of universal citizenship, which implies the transformation of the political rights of citizenship into residency rights and the recognition of the same fundamental rights to all human beings (Ferrajoli, 2011: 569), this means the legal formalization of the idea of belonging to the universal human community. In fact, the cosmopolitan law advocated by Immanuel Kant over two hundred years ago and updated in terms of this global context should admit that citizenship rights can no longer grant or deny privileges within a given territory. On the contrary, they would have to be incorporated as fundamental rights of individuals as human beings, which implies to enshrine as a subject of these rights, the global citizen or citizen without borders .

Regarding the *social dimension* it is proposed the urgent reform of those institutions of government of the United Nations dealing with fixing the economic, financial and trade on a global scale, such as the International Monetary Fund, the World Bank Group and the World Trade Organization, to act on the original meaning for which they were created: moving towards economic development of poor countries and employment growth. Moreover, it would have to strengthen the functioning of institutions that do not have sufficient resources to act effectively like the UN Food and Agriculture Organization (FAO), the World Health Organization (WHO) and the International Labour Organization (ILO). Finally, provides for the creation of new institutions in health, provisioning water and prevention of natural calamities and disasters (Ferrajoli, 2011: 573).

Thinking about democracy in times of globalization and crisis of the nation state, means to put democracy in a historical moment of transition of the world order. The mirror of the state crisis and globalization brings back the image of a world pierced by hunger, poverty, dubious humanitarian interventions, endless war on terror...the fact is that in this time of uncertainty we should seek and deepen on alternative ideas that can ensure the transition to a more peaceful and just world. The democracy project we advocate in this article set the general guidelines of an organizational model that involves all actors in international society, which we now recognize endowed with a truly cosmopolitan character when it legally admits the existence of a universal *demos*, so each citizen carries inalienable rights as a citizen of the world. This political model should not be confused with a world government, that assumes the existence of a government body acting with universal executive powers. On the contrary, the cosmopolitan democracy favors the maximum possible government of local communities and the appropriate democratic representation of the citizens in governance institutions at multiple levels .

For Thomas Hobbes, the state was the way to get out of the state of nature and to establish civil peace: the logical consequence of this reasoning will provide the Leviathan (the nation state) of the greatest possible power to ensure its survival, against the stalking of the other Leviathans, always threatening in the field of the anarchic international society.

Because that is the place where would continue prevailing the state of nature, that idea of *homo homini lupus...*

Unlike those authors who defend the idea of a world state with well-defined governance institutions (Marchetti, 2012: 40), we believe that foster a government of such features would nullify any claim to ensure the transition to a more peaceful and just world order. Instead, the global federation model that promotes cosmopolitan democracy project involves a network of federated arrangements with adequate separation and division of powers at its different levels. Moreover, there is no admission for supreme powers because federal institutions would only retain the strictly necessary functions of government and guarantee, with forms of parliamentary government (instead of presidential) and collegiate governing bodies (instead of mono-cratic).

Therefore, this model is completely different from the pyramidal federation model that distinguishes federal states, so it would bring more democracy within states, but fundamentally more democracy beyond states. Otherwise, how could be possible to ensure justice, understood in terms of the right to speak freely for all citizens? Besides, this figure could resolve the so called *circulus vitiosus*, term used by Norberto Bobbio to describe the necessary conditions to realize a global democracy (Bobbio, 1995: 39).

It is true that the process towards a fully democratic world society is full of obstacles: the political will of the powers that comprise the aristocratic Security Council of the UN, along with the interests of large economic groups emerge as some of the more difficult pitfalls to overcome. But we are not pessimistic, however, we assume long-term realism grounded in our belief that we can choose new ways for making peace (s), giving us the legitimacy to ask for making things differently (Martínez Guzmán, 2009: 279). The global context of the twenty-first century determines a level of interconnection as never before experienced by humankind, this provides the conditions to assume the legitimate right to ask each other for making things in a different way: in our approach this would result in the aspiration to organize the world society in accordance with the principles of cosmopolitanism .

### **Education for making peace(s) in our diverse world**

There are not a few objections to the feasibility of the cosmopolitan democracy project, which seeks to democratize the governance institutions and involves the creation of a truly global public sphere that can give curb to the great powers who act in a world of globalization without rules. Danilo Zolo, one of the harshest critics of this project, believes that cosmopolitan democracy is part of a legal globalism which attempts to impose a hegemony of Western values that masks the wars and atrocities that have been perpetrated in recent years on behalf of the human rights and democracy. Based on the arguments of the *political realism* that has dominated the study of international relations since the mid-twentieth century, he considers illusory to think that law can act on the underlying reasons of our aggressive human nature and can be capable of ensuring peace and security globally (Zolo, 2002: 200-201).

In response to this criticism of Zolo, in the sense that the law is ineffective to regulate conflicts, it comes to our mind the struggle of civil movements which led to the recognition of many rights through history, thanks to which it was possible to cap many abuses of power: the limited-hour workdays (against working without time limit), the female vote (against the ban on women's vote), the right to public education (versus restricted access to education for the wealthier classes). Each of these rights was the result of conquests that were born as social conflicts, all of them now corrected and regulated by the rule of law. So why not to ask for the democratic organization of the political affairs and the global economy in order to respond to our demand for a more peaceful and just world?

Beyond any legal arguments, we believe it is essential to implement a peace education that allows us to subvert our understanding of what we call "real". Those who call themselves realists defend a notion of human beings violent by nature, where the *animus dominandi* governing our conduct is an unchangeable truth (Morgenthau, 1986: 11-12). However, we believe that *the real* is that the human condition involves a number of skills that we have to make us things in different ways (Martínez Guzmán, 2009: 247). This perspective allows us to argue for new ways of organizing, new ways to regulate our society. We can not accept the march of global affairs just as they are because certain scholars or schools of thought justify that there is nothing we can do to change human nature, based on supposed objective laws. Not by chance those schools and theories come from the same power centers that refuse to be controlled, a curious coincidence!

From our point of view, we believe that those determinisms rooted in allegedly objective laws only serve to encapsulate our infinite human capacity to make things differently, we mean the possibility to conduct our lives respecting and enforcing fundamental rights. The eminent scientist and humanist Rita Levi-Montalcini, asserted that human behavior is not genetic but epigenetic and she gave education an unavoidable role in the task of rooting out violence and hatred (Levi-Montalcini, 2009). Therefore, based on the premise that education means ways of behaving (Martínez Guzmán, 2005: 100) it is possible to think of an education that subvert the realism and promotes harmony in the context of new forms of political organization regulated by the law instead of violence or force. We understand that within this period of transition that experiments the international society in which we live today, this means promoting a cosmopolitan order endowed with democratic institutions, in order to allow the full participation of citizens, within and beyond the States.

Within the multicultural societies in which we live, where it is verified a mixture of peoples and cultures that do not recognize pause, the fact to take on the challenge of educating as a means to forge new ways of behaving also supposes nurturing with strong philosophical fundamentals the basis for an education for conviviality. The idea of cosmopolitanism understood as our belonging to the entire world, not only is an important part of the traditional rationalism cultivated by the Greek philosophers, also is present in the universal messages transmitted by other traditions, Western (Judaism, Christianity) and not Western (Buddhism, Confucianism, Hinduism). For example, in Buddhist cosmology there is a wonderful parable that explains the intimate interdependence and reciprocity of all living beings and phenomena of the universe, it is the story of the net of Indra—a Buddhist deity representing the protective and nurturing forces of life—, at each node of the net that hangs over the palace of Indra, there is a brilliant precious gem that contains and reflects the brightness of the other jewels that hold the net, as a whole they all exhibit a beam of magnificent beauty and splendor: the infinite connection that constitutes the weft of life itself (Ikeda, 1999: 83).

From the conceptual framework that allows us to incorporate other knowledge to rebuild our capacity to make peace(s) through education, we can appreciate the value of this beautiful parable in all its expression. It encourages us to cultivate the kind of wisdom that allows us to appreciate the infinite connections that sustain our own existence and that each of us also help to sustain. Thus, we may be able to feel the pain and suffering of those who are even far from us, as if they were our own.

Danilo Zolo criticizes any reference to the moral or spiritual unity of the human race, because he finds those ideas lacking of any practical value (Zolo, 2002: 24-25) and notes that any attempt to apply universal rules appealing to cosmopolitanism would be almost a Western imposition covered under the form of juridical globalism. Furthermore, he identifies the normative body inherited by Kant and other authors of the legal pacifism within the Jewish and Christian tradition (Zolo, 2002: 217).

Nevertheless and beyond any relevant reply that can be done from the legal field, here we wish to emphasize that the famous philosopher of Königsberg never travelled through the world nor had the opportunity to cross long distances. Even so, and although he followed the Christian religious tradition —Kant was pietistic—, his own intuitive understanding perhaps led him to feel that kind of deep empathy with the cosmos —the weft of the net of Indra—, necessary to defend the right to hospitality, the right to speak freely, promoting this way the union of mankind for the sake of peace. We do believe that it has an inestimable practical value to update these principles and knowledges, many of them have been there for centuries as part of the *acquis* and the common cultural heritage of humankind and now, in the globalized and interconnected world we live in, we could apply them to nurture epistemologically an education that promotes the practice of making peace(s) and help us to recognize our intimate connection with the diverse world. This way we will be able to build the foundations of a true cosmopolitan democracy.

### Conclusions

We know the Cynic philosophers and then the Stoics were the first to preach the cosmopolitanism in ancient Greece, at a time of profound social and political crisis. In our day, we also live in the midst of a deep crisis where the political structures that organize our life in society are undergoing a marked capsizing, the crisis of the nation state seems to be accentuated through the passage of globalization, a process that from the end of the Cold War does not recognize pause. Between the crisis of the nation state and the rise of governance institutions, ordinary citizens are becoming more connected to the world, but it seems every time we have less impact on what happens on it. In any case we have less ability to decide democratically our future compared with the wild powers that grow at pace of globalization.

Cosmopolitanism, as in ancient Greece, allows to insert ourselves conceptually within an unavoidable reality: our unity as human community. Before this reality, the possibility of recovering the illustrious indicators offered to us by Immanuel Kant would let outline the adequate political organization of the society in which we live, increasingly interconnected, increasingly cosmopolitan.

The development of democracy beyond the States through the actualization of cosmopolitan law, would let the appropriate political organization of the international society, so the current transitional process can lead to a world order where our right to peace and to live with dignity prevail over any other consideration. Here is the conceptual relevance of cosmopolitanism, an idea as ancient as contemporary.

Following the arguments of the *political realism* that has dominated the study of international relations since the mid-twentieth century, Danilo Zolo considers illusory that law can ensure peace and security worldwide. However, the evolution of the rule of law has made valuable contributions to the realization of peace as well as the promotion of human coexistence. Law will probably never be able to modify aggressiveness, but it can regulate our behavior, and to regulate normatively the action of the international society actors means start to build civility beyond States in defense of the weak, those men and women oppressed by the real powers that resist any control.

Beyond any legal consideration, what is proposed here is to subvert the realism appealing to an education that allows us to recognize our plurality of characteristics and skills to make things in a different way. What we just need is to organize our lives in another form, not only applying the law as a way of regulating our relationships but also empowering us through the discovering and putting into action of our innate capacities to make peace(s).

As a corollary, promote a peace education that can draw on the knowledge that pertains to the common cultural heritage of humankind would allow us to recognize our sense of

belonging and responsibility to the world that surrounds us, encouraging each of us as world citizens to build the foundations of a true cosmopolitan democracy and world peace.

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# **DIGITAL SCHOOL AS NEW ORGANIZATION BASED ON TECHNOLOGIES OF INFORMATION AND COMMUNICATION**

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## **Abstract**

As an organization the schools need to change focus and develop into a skills- and competence-based environment. At the same time both teachers and the school as such are met with demands of increased professionalism, internationalization, etc. The task of the school is to provide students with an opportunity to develop the skills necessary to become independent and active citizens in the network society. This requires rethinking the structure of the school, rethinking the organization of learning and the content of the learning process as well as the roles of teachers and students. The content and concepts of the school subjects are developed in the light of information technology and globalization. This work propose some visions for your school regarding the initiatives that are needed to disseminate the evaluation culture both with regard to tools and improvement of the colleagues' qualifications.

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**Keywords:** New School, ICT, Digital methods, Logbook

## **Introduction**

As an organization the school is under pressure – from politicians, "users" (both students and parents) and opinion makers. One demand that is being voiced regularly is that schools need to change focus and develop into a skills- and competence-based environment. At the same time both teachers and the school as such are met with demands of increased professionalism, internationalization, etc. One reason, but certainly not the only one, for this is the rapid development of information technology. We are faced with growing amounts of information, new sources such as the Internet, and new ways of accessing and exchanging information. However, no one can take it all in: Sorting, assessing and selecting are necessary skills in order to handle the ever-increasing amount of information.

## **An Environment Focused on the Development of Competences**

The task of the school is to provide students with an opportunity to develop the skills necessary to become independent and active citizens in the network society[1]. This requires rethinking the structure of the school, rethinking the organization of learning and the content of the learning process as well as the roles of teachers and students. The content and concepts of the school subjects are developed in the light of information technology and globalization. A school is a living organization where each teacher possesses a large amount of knowledge and experience that can benefit many if it is accessible[2]. In the past schools had little or no tradition of knowledge sharing – certainly not to the extent that is necessary to live up to the requirements of today. One of the reasons for this was probably the difficulties involved in

sharing knowledge: meetings and paper-based communication in the form of notices, distributed copies and local collections of educational courses, reports, etc.

### **Strategy of a net-based**

Now information and knowledge are shared between management, teachers, students, parents and the surrounding community via knowledge sharing platforms, Intranet and Internet. There are, however, a number of barriers to the dynamic development of the school as an organization. The traditions and habits dominating in many schools today can only be changed through an active and continuous effort. Our societies are characterized by swift information flow, knowledge sharing, network and cooperation. Thus the overall strategy of the school must be based on these very same features.

### **The changing school: School Development as Common Responsibility for Teachers and Management**

The school will not change just because each individual teacher changes his or her way of teaching. And the principal cannot start the development alone[3]. In that way the collective knowledge of the whole team can be utilized – a sharing of knowledge has taken place. By building networks and sharing the knowledge that each of us possess, the total competence of the school is developed. The students should develop ICT competencies that include:

- Ability to use the computer and the programs
- Ability to use the computer in relevant situations
- Knowledge about how and when it is practical to use a computer.

At the same time the students' ICT competencies should enable them to function in an ICT work environment with digital information communication and network structure.

### **ICT action plan and strategy plan of the school**

It is not practical to isolate the ICT area and make a development plan for this area only[4]. The plan should be based on general educational goals. Here it is important to make clear how ICT can be integrated in the educational environment, and how teachers and students can use ICT to provide the students with an opportunity to develop up-to-date competencies. The principal plays a central role in the process that can change the school. If the management of the school adheres to a traditional organization, a traditional management style and a traditional view of education, it will be difficult to change the organization[5]. The management must take full responsibility for the change, but at the same time acknowledge that it will not be possible to make the change alone.

### **Where ICT makes a difference**

Information technology should not be integrated in education at any price[6]. ICT can support teaching and learning when the integration of the different ICT tools is based on qualified pedagogical and organizational considerations.

By now most students are familiar with information search and retrieval via the Internet. The Web is often their first choice instead of using library books or other sources of information. When it comes to topical issues the Internet is often the best – or even the only – source of information. But students have seldom learnt how to carefully assess the information they find on the Web, and they often have problems grasping all the possibilities if there are many hits on a certain topic. The subsequent processing of the large amount of material may also cause problems.

When students present the results of their work on a project, they often do so in the form of reports, posters, or classroom presentations. With ICT, students have new

possibilities when creating their presentations. They may, for example, use a combination of text, images, sound and video in a presentation that is delivered either as a PowerPoint presentation or as part of a website. But students can also provide the more traditional written products with a look and feel that makes them both more aesthetically satisfying to the students themselves and more readable to the recipients. But ICT also makes communication possible in connection with the work process. Using the computer one can set up collaborative learning environments where students communicate with classmates or teachers via e-mail, conferences or chat.

In the next paragraphs we describe some of the areas where ICT can make a difference and where ICT has changed the existing practice in several ways[7]. ICT-based learning material can contribute towards the development of some of the competencies that are required of students in the Network Society: for example the ability to cooperate in a network, enter into process-oriented work processes and assess the constant flow of information of the Information Society critically and independently.

In addition, working with ICT-based media is often inspirational for the students, and at the same time the school's use of ICT-based tools is a natural continuation of activities that by now are part of everyday life of most of the students at home and in their spare time.

Finally, ICT-based tools may contribute towards changing the focus from teacher-directed instruction to student learning. In this way ICT supports modern educational tendencies which, for example, recommend that students should take responsibility for their own learning and learn in communities of practice.

### **Extension of the Concept of Written Assignments**

Written assignments are no longer merely traditional essays and reports. Today students also submit websites, multimedia productions, sound montages and PowerPoint presentations as written assignments. Evaluation of these new electronic products differs from the evaluation of a traditional written product, so teachers must be conscious of how such products can be evaluated, just as students must be told how form, content and functionality are assessed. Presentations, multimedia products or websites will in many cases become the preferred products at the end of courses and projects. Thus new and different demands face the teachers who evaluate the products and also the students who have to understand the evaluation! Therefore, it is important to set up clear goals for the end products and then follow up with systematic evaluation when the students have submitted or presented their work. The goals may be in the form of check lists, which the students can refer to when creating their products.

### **ICT in project work**

Project work without the application of ICT is increasingly rare. Numerous evaluations show that virtual learning environments, use of the Internet and electronic product forms are natural elements in the project work. Evaluation of project-based teaching does not differ from other kinds of education evaluation in terms of method, but perhaps a thorough evaluation of all aspects of the project work is especially important here so that both teachers and students get a satisfactory impression of work method as well as progress.

### **Evaluation with ICT**

Evaluation is a keyword in today's educational debate. In the systematic work with evaluation it is very natural to use ICT both as a tool in connection with data collection and in connection with the processing and presentation of the results of the evaluations. It is important to consider both the form and the content of the evaluation process once you have

decided upon the objectives of a series of lessons, i.e. once you have decided what the students are expected to master when they have completed the lessons[8].

### **Evaluation methods: Formative = goal realization**

Formative evaluation is an evaluation method where the evaluation is done with the primary goal to enable the student and the teacher to consider whether the goals set in connection with a course are being achieved[9].

Formative evaluation is pointing forward and gives a current picture of a student's strengths and progress and can form the basis of an adjustment of the way teaching or the learning episodes.

Examples of formative evaluation are:

- Talks with students
- Portfolio
- Logbook.

### **Evaluation methods: Summative =learning outcome**

Summative evaluation is an evaluation method where the results of the learning episodes are in focus. The evaluation is facing backward and does not immediately make reflection possible[10].

Examples of summative evaluation are:

- All forms of end evaluation
- Examination
- Final marks for the year's work.

We must develop methods of evaluating of the students' general skills, i.e. skills that are not subject-specific, but rather skills that are essential to the educational process as a whole and to their personal development.

The evaluation may focus on a number of different things:

- The subject-specific content
- The level of the lessons
- Presentation (students' oral and written presentations)
- The dialogue in the classroom, for example student activity
- Work methods
- Environment, for example physical environment and available computers
- Social manners
- Student participation, for instance student preparation
- Learning outcomes

### **ICT application**

ICT can be used for evaluation in all areas. The use of electronic questionnaires has become quite a popular way of gathering information and thus an important step in the evaluation process. Whether we communicate electronically or face to face, questions and replies form the basis for the ongoing dialogue about all aspects of the teaching process and for any adjustment of the content or method of teaching.

### **Tools: the Quality Star**

There are a number of different tools that one can use when developing the objectives of a series lessons and when planning and evaluating the lessons. The Quality Star is a graphic version of different aspects that one should consider when developing a plan for a

series of lessons or project of some duration[11]. The Quality Star can be used in various ways and at various level both with and without ICT integration:

1. Status: The teacher undertakes an evaluation of relevant prerequisites for the project in relation to previous teaching and the students' level.
2. Quality criteria: Together teachers and students formulate the competence goals to be set for the project, and what is required to consider it a success.
3. Objectives: What's the teacher wants to achieve.
4. Action plan: The action plan outlines the steps that are needed in order to achieve the objectives.
5. Evaluation plan: As mentioned earlier it is a good idea to decide how and when to evaluate the process.[12]

### **Test and screening**

Evaluation in the form of testing is, however, applied in several subjects. By testing we understand an assessment of the students' learning outcome, typically the learning benefit or their competence level after a completed series of lessons. The testing can result in marks or may have a certain impact on the marks.

Screening plays an important role in many subjects - for example in mathematics and languages [13]. By screening we understand evaluation of the students' qualifications, i.e. a formative evaluation form. For screening the same tools are used as for self-evaluation and testing – the aim, however, is different. A good example of an area where electronic screening can be used advantageously is the students' ICT skills. Through appropriate screening the teachers can plan the teaching based on the requirements of the syllabus. A screening in electronic form will be easy to keep, reuse and revise so as to match the changed prerequisites. Self-evaluation, testing and screening form a natural point of departure for evaluation interviews about the students' subject-related skills and competencies. Electronic tools can, however, also be used in connection with the evaluation of other skills.

### **Questionnaires & Test results**

The test results and other self-evaluations can be kept in the students' portfolios for later use so that the student – and the teacher – can make comparisons between evaluations made at different times during the school period[14]. The student can at any time find previous evaluations in the portfolio and use them in his/her future work. In connection with the guidance of the student the teacher can focus on the student's strengths and weaknesses documented in the portfolio. An obvious area for self-evaluation is the student's work with language skills, for example in connection with grammar and sentence analysis. In other subjects like mathematics, scientific and technical subjects you can use electronic types of quizzes in connection with factual learning.

### **Portfolio**

Gathering and presenting work in folders/portfolios is not a new invention. It has always been a tradition for both artists and craftsmen. They select examples of their work and present them to demonstrate their accomplishments and skills. In schools the use of portfolios has spread concurrently with a changed view of learning and with the new ways of organizing the learning process. Most learning management systems today include a portfolio module. Whether you build your portfolios on the school server or use existing functions in the school LMS, using an electronically stored portfolio is easier and more natural than working with physical folders and paper. However, it is important that the reflective part of the work does not become toned down or even disappears completely in the process of

archiving and systematizing the many different types of material. The summary of the dialogue is kept in the portfolio together with other evaluation material.[15]

### **Logbook**

Logbook writing, too, can be used in many subjects and in many different situations. A logbook may be used by the student as a way:

- to give reflective responses to the teacher
- to reflect on and specify the steps involved in connection with a work process[15].

Many people who have worked with logbooks and portfolios find, as an additional benefit, that through the effort of formulating your thoughts and describing the work process you are going through, you develop a deeper understanding of the things learnt: You become more conscious both of the process and of what you learned, and you also remember better what you learned.

The individual logbook typically contains the student's own reflections on the learning process, which is why it is an important part of a process evaluation and therefore should be kept in the portfolio and thus in a collective evaluation of the students' competencies.

### **Differentiation of teaching**

Differentiation of teaching is yet another of the many buzz words in the educational arena of the past few years, and most people will probably agree that the adaptation of teaching to the needs of the individual student is a big challenge.

And when that challenge also includes the use of ICT, many people feel that they are on uncertain ground:

- Is it at all possible to keep the overview of the many different processes that the students are involved in simultaneously?
- Can we be sure that the students learn what they have to learn?
- What if the students merely chat, surf the Internet or write e-mails?
- Are the students utilizing all the possibilities that exist?
- Does the computer contribute positively by allowing students to take control – or does it do the opposite?

It is difficult to answer these questions clearly and exhaustively. The answers most often begin with "It depends on ...".

It is our opinion that it is worth the bother and the time it takes to immerse oneself in the jungle of offers and possibilities to estimate what ICT tools can contribute with that will make the students' daily life easier.

### **Can use of ICT be unrewarding?**

The learning outcome is reduced when ICT is used to support traditional teaching methods. The learning outcome, however, seems to increase when ICT is combined with problem-oriented and student-activating work forms. Irrespective of the tools applied, learning requires initiative, concentration and effort. Content and planning of the instruction are the most important factors, not technology. The challenge for the teacher is to plan the instruction in such a way that ICT is a functional aid. Computer and software do not replace other tools; they constitute a supplement.

### **A school for everyone?**

Nine years of compulsory education seems a good offer to some, whereas others think it is a curse. Some students experience school as extremely academic, and some students

actually leave school without getting an exam. At the same time there are students that are not challenged sufficiently in school.

- How do we motivate students so that they benefit as much as possible from going to school?
- How do we help them develop the skills and competencies that are necessary in a modern society?

It is the task of the teacher to contribute to the learning process in such a way that it matches the needs and qualifications of the students.

Important questions in this connection are:

- How do I plan the instruction according to the objectives and intentions of the curriculum?
- Which adjustments do my students need?
- Which tests and evaluation forms do I use?
- Which follow-up of the courses does the individual student need?
- Which work forms are best suited for class instruction?
- Which tools and educational materials are available?
- Upon all these questions yet another question follows naturally:
- How can ICT tools support and contribute in these contexts?

Even though teachers have a common task, i.e. implementation of the curricula, the approach is different. Some people thrive in the role of presenting information. They are enthusiastic when it comes to imparting knowledge, and they are confident that the students welcome the information that is presented. Other teachers thrive on the fact that the students are active. They plan their instruction so that the students are expected to learn as much as possible on their own initiative, and they have an unshakable faith in the students' independent will to learn.

Considering the variations in any group of students it is beyond question that teachers need to master the discipline of differentiated teaching. The students must learn to plan, implement and estimate their own work. They must learn how to learn, and this requires a high degree of activity – and it will differ from one student to the other.

## Conclusions

Student-centered work methods and the use of ICT have been presented as one of the means of facilitating the individual student's learning. So the question is how to motivate the students and make them interested in learning. Here are some ideas:

- Study counseling about subject-related development
- Develop awareness of learning strategies
- Motivation to choose suitably difficult tasks
- Consciousness-raising of personal skills and qualifications
- Making plans in common.

In connection with several of these things, working with logbook and portfolios is central, but personal contact is also important.

By means of ICT tools such as mobile phone and mail, the student and the teacher can have daily, more or less spontaneous contact. More formal contact is possible in dedicated for on the Net or in learning management systems like Moodle, FirstClass, it's learning, or Blackboard.

When it comes to planning their own work, students should always be involved irrespective of age. The older the students are the more responsibility they should have. Here is a proposal for a work procedure for slightly older students where the use of a computer is required:

- The students find topical plans on the Net and print them out if necessary
- The class discusses what is going to be common material
- The teacher works out suggestions and sends them to the students
- Based on this, each student develops his individual plan based on common material and the material and the amount that the student finds natural
- The plan is discussed with the teacher and the finished result is saved as a basis for the work during the period.

The method can seem time- and work-consuming compared with going through chapters in a book. However, the method often leads to greater awareness of process and method and increased motivation for the students.

One of the consequences of using ICT tools is that the traditional classroom instruction is reduced. It is easy to communicate with and guide the students using a learning management system. The teacher can create work spaces and virtual class rooms that are always open. And students and teachers can enter whenever they have the time and wish to do so. The teachers can place assignments for the students. The assignments can be submitted by e-mail or through the LMS and can be returned with the teacher's comments and corrections via e-mail. Comments, particularly short ones, may also be given as text messages on the mobile phone (SMS).

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## PLANTING THE SCIENCE SEED: ENGAGING STUDENTS IN PLACE-BASED CIVIC ACTIONS

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### Abstract

As teacher educators, we are interested in examining the extent to which science education programs based on principles of place-based and experiential education engage students in the study of science and the application of science to issues of civic concern. A great deal of research confirms that science education programs have generally been ineffective in producing students who understand and successfully apply science concepts and knowledge to social issues. This research examines the extent to which public school programs incorporating place-based and experiential learning through extended field experiences and integrated coursework have led to engaging students in science and related civic actions.

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**Keywords:** Experiential Education, Place-based Learning, Student Engagement, Science Field Studies, Civic Actions

### Introduction

We write as two science educators with considerable experience teaching science in both K-12 public school contexts and also in preparing teachers in post-secondary science education. We share significant frustration and concerns about the fundamental conceptual framework that appears to be implicit in North American science education programs (Duschl et al., 2007; Michaels et al., 2007). We do not believe that there is, at present, a general consensus on a productive or successful model of science pedagogy that builds on student engagement and interests that ultimately leads to a personal and professional passion for the science field (Bayne, 2009; McGinnis & Roberts-Harris, 2009).

Some questions we propose to consider: *When do students become engaged in scientific thought and process? What pedagogical conditions promote transformative science learning?* and; *What public conditions support these thoughts and processes taking root and growing within young people?*

By the time a student reaches post-secondary education and enrolls in science courses, they demonstrate an interest and engagement that has been fostered at some earlier time (Klahr & Nigam, 2007; Moss, 2003; Wolffe & McMullen, 1995-1996). Universities may secure, focus and facilitate such knowledge and practical experience but students do not usually participate without earlier engagement. Our research investigates how place-based (Smith, 2007) experiential (Dewey, 1938) activities and critical pedagogy (Kincheloe, 2005) may foster such interest and engagement within public schools.

For more than twenty years, school approaches departing from traditional organizational and instructional patterns have been conducted and monitored in a number of Canadian school contexts. One major component of the research focus seeks to ascertain if such approaches lead to significant changes in career and citizenship choices later in

life. This paper describes the results of two studies examining the question of student engagement. It then outlines a number of conditions that appear to be an important contributing factor to the involvement of young people. The studies focusing on these programs include an academic dissertation (O'Connor, 2009), longitudinal analysis by educational administrations that have resulted in educational policy (Sharp, 2013; Yukon Territory Government [YTG], 2007) and teacher-driven curriculum and pedagogical analysis. This paper will summarize these analyses, outline the results and identify common reoccurring practices, principles and long term outcomes.

### **Context of the Study**

These studies are broadly rooted in a long tradition of experiential and place-based education, first articulated by Dewey (1938). In experiential learning, learners are first immersed in the experience of the targeted learning and then are asked to reflect on and analyze their experience in order to make sense of it. Experiential science education provides a purpose to the knowledge and reasoning taught in schools, provides a contextual framework for much of the curriculum (i.e., it gives meaning to school studies), and engages learners in the conditions of their own reality. Thus:

- Experiential education places major importance on the knowledge of learners derived from a good deal of experiential learning, a sort of practice-to-theory approach (Dewey, 1938).
- Experiential education is defined as the process of actively engaging learners in an experience that will have real consequences (Tyler, 1949).
- By immersing themselves in direct experience, learners make discoveries and experiment with knowledge themselves instead of exclusively hearing or reading about the experiences of others (Kolb & Lewis, 1986).
- Activities often use one subject as a means of understanding another subject. Wells (1986) states: "Knowledge cannot be transmitted. It has to be constructed afresh by each individual knower on the basis of what is already known, and by means of strategies developed over the whole of that individual's life, both outside and inside the classroom" (p. 218).
- Learners also reflect on their experiences, with the goal of developing new skills, new attitudes, and new theories or ways of thinking. They test and refine that knowledge in socio-constructivist interaction with each other and with mentors who accompany them in their learning (Kraft & Sakofs, 1988).
- This process of experiential learning is a continuous process alternating between action in experience and opportunities to reflect upon that experience to make sense of it, and then returning to action to further test out and modify emerging hypotheses, followed by further reflection upon the new experience, and so on (Dillon & O'Connor, 2010). In short, we see learning as a dialectic process between experiences on the one hand and concepts, observations, and action on the other.

Kolb (1984) offers a working definition of experiential learning: "Learning is the process by which knowledge is created through the transformation of experience" (p. 38). In this perspective, learning is viewed as a continuous process grounded in experience as opposed to content or outcomes, knowledge is seen as a continuous transformation process of creation and re-creation rather than an independent and objective entity to be acquired or transmitted, and ultimately learning is seen as a process that transforms experience.

Place-based education is an approach to teaching that is grounded in the context of community, both natural and social (Raffan, 1993; Theobald & Curtiss, 2000). It connects place with self and community (Woodhouse & Knapp, 2000). The design of the referenced science programming might be best characterized as the pedagogy of place (Gruenewald,

2003) as school science field experiences and the reinforcement of the essential links between students, their peers, and place (practice) are linked through targeted course work (theory). Through this integrated process, students make connections to their science curriculum through field-based courses that are focused on realistic, immediate, and important statutes (Kawagley & Barnhardt, 1999). The goal is to have the students see the relevance and importance of their science coursework since those studies have immediate causal effect on their present educational context as learners and, ultimately, the well-being of themselves and their community (Kincheloe, 2005).

### **Description of the Program**

The Yukon Experiential Science 11 program, initiated in 1994, is an integrated approach to chemistry, biology, forestry, and geography delivered through an applied studies course in field methods, a fine arts program and a career planning course. The program involves grade 11 students for a semester with about half the time spent in field studies and about a quarter of the time spent in lab settings.

The Yukon Experiential Science 11 program was developed around three basic principles:

- *Diverse Ways of Learning:* People learn in many different ways. For many, hands-on experiences are far more effective means of learning than lectures, readings, and visual presentations while for others engaging in problems as a social enterprise involving a give and take between peers resonate with the way they learn most effectively. This approach to science addresses curricular outcomes in many different ways, frequently incorporating experiential processes, collaborative processes and media technologies. This means of addressing different individual ways of learning allows many more to learn effectively.
- *Integration:* People learn more effectively when they are able to see things in relation to other things. This principle of integration of subjects is central to instructional processes used in this program. Such integration lends itself to the examination of real life scientific issues and the transmission of various forms of knowledge and epistemologies. Activities often use one subject as a means to understanding another subject.
- *Motivation:* People learn far more effectively when the importance of their studies is “authentic” and internalized. Participation in meaningful events, studies, or enterprises involving students in a wider scientific community is both exciting and motivating to students. Involving students in adventurous science-related enterprises captures their emotional commitment, as does the sense that their participation will make a difference to community decisions.

The Experiential Science 11 (ES11) program was designed to help students develop as critical learners and engaged members of their community by reflecting upon individual and group response(s) in a variety of settings. The program encourages each student to become a responsible citizen, with the self-confidence and skills needed to meet the many challenges facing a person in a changing society.

Activities are organized using a range of field studies and lab activities that focus on specific program objectives. The field studies and their corresponding technologies support all aspects of the program. Field studies are complemented by detailed observations and graphic illustration, increasing students' appreciation of the topic in a natural setting. The use of various forms of information technologies is often based on coordination with government and community organizations. These partnerships add interest to the science field studies and encourage students to develop skills they would often miss in the conventional programs. During the field activities, students meet and take part in studies with community members, professionals, Aboriginal Elders and other students. These encounters provide students with

in-depth discussions about many issues that relate to their specific science program but also with respect to local community interests, social justice and world affairs.

All the studies described below appear to embrace a combination of three fundamentals.

- They embrace diverse and personable instructional practices that led to diverse learning experiences. These involve students in experiential, social, relevant and reflective practices.
- They center about problems, puzzles, inquiries that are apparently relevant and important.
- They integrate a wide variety of subjects, demanding collaboration and imagination.

Twenty five to thirty days of these field experiences are given over to either one trip or many shorter trips depending on the year of the program. These trips have taken the students through Alberta, central British Columbia and along the British Columbia coast of Canada, U.S state of Alaska and into remote areas of the Yukon Territory of northern Canada. Some activities include forest and marine surveys, sailing, private company and government facility tours, SCUBA diving, marine and intertidal inventories, sea kayaking, water quality assessments, backcountry skiing, wildlife assessments, caving, assessments of human impacts, canoeing, culture camps, university and college visits. These outings often provide a contextual reference for the balance of the science taught throughout the program.

In the experiential programs students are responsible for undertaking a major science project and developing a comprehensive study for their fellow students. The major projects have touched upon topics such as: water quality analysis on a community lake, analysis of the effects of effluent released in a small stream, GPS/GIS mapping of community trails, long term thermal observations to determine appropriate northern gardening locations, traditional ecological knowledge practices in environmental assessments, fitness assessment of the entire class, development of a salt water aquarium with tidal movement, development of an alternative working model of a full suspension bike, raising populations of arctic char in a pothole lake, stream restoration and salmon population rehabilitation. This list goes on with literally more than one hundred examples. Students are encouraged to take responsibility for their learning and to work cooperatively. Information and Communication Technologies ICT become a basis for much of the students work as they are in contact with participants across the territory, country and world. Virtual communities evolve as the students are asked to work with others as a team and be flexible and adaptable. Students are also encouraged to create online journals and generate "blogs" that promote the educational objective of a "critically engaged learner" that the program strives to achieve.

The survey of the students who took part in the program between five and nineteen years ago (2008-1994) explored many aspects of their life following secondary school (grade 12). Information was collected through email responses, phone or in-person interviews and focus groups. The analysis of this program is ongoing. To date, the study has involved more than fifteen percent of the 640 ES11 students who took part in the program between 1994 and 2009. Participating students who were in the city of Whitehorse, Yukon Territory were asked if they would complete the survey (taking more than an hour to complete). All students approached said they would appreciate the opportunity and 75% of the emailed surveys have been completed. Four different teachers had taught the program over this time span and their input has been included in the study. The students surveyed described their subsequent education, employment, travel, shared reflections on the value of the educational activities and addressed the impact it had on their participation in a range of citizenship activities.

A number of preliminary outcomes addressing the larger research questions about engagement and civic responsibility have emerged. The following points are drawn from their responses.

- 90% of the students graduated from university and more than 60% of these in science fields.
- 70% have worked in a variety of employment fields linked with science.
- All students have traveled to two or more different countries.
- All students identify the Experiential Science 11 program as influential in their selection of science courses and professional careers.
- 90% of the students identify their high school science lab experiences facilitated their understanding of university or college labs.
- All students cite specific field studies as influencing their professional career and academic decisions.
- All students indicated they voted in elections.
- 90% of the students said they felt they could influence civic affairs.
- 80% of the students coached or volunteered their time in community affairs.

Each of these responses indicate an approach that engaged students. Taken collectively they provide compelling evidence that place-based and experiential learning through extended field experiences and integrated coursework realized the broader goals espoused by the experiential science education programs.

### **Factors Fostering Outcomes**

Our action research studies—utilizing anecdotal evidence, semi-structured interviews of a sub-set of students, teachers and administrators, and end-of-semester focus groups and anonymous surveys and questionnaires has revealed several key factors related to the concept of place that contributed to the positive outcomes of these alternatives:

- The longer time on field studies and in labs, which allowed students to approximate the work within a science field to a larger extent than is normally possible in regular classroom setting.
- Not just the occasion to step back from their learning, but primarily the self-reflective and socio-constructivist pedagogy employed in the inquiry-based science pedagogy that helped students make sense of their experience together and construct their emerging understandings.
- The supportive and trusting relationship between students and the teachers in the program, as well as the collaborative and supportive relationships that developed within the school groups, field groups and larger communities.
- The fact that the program was often held in the field rather than back on campus (as is for students in the regular school program), thus creating an entirely school/community-based semester.
- Finally, it is a multidisciplinary approach, which utilizes an integration of strategic science course curriculum that promotes a relational aspect to knowledge (i.e. Holistic Education).

### **Conclusion**

In summarizing the contribution that experiential and place-based processes have made to science education, four possible conclusions are suggested: First, the practical application of theoretical knowledge is a valuable contribution to the learning process. Second, an active participation developed by the immersion experience may provide student motivation for recognition of environmental and social variation and the need for new civic strategies for social change. Third, the students develop an understanding of the interrelationship between the field of science, the ecology of their community, and its social framework within a global context. Finally, experiential science learning provides the student

with the task of being conscious about and take responsibility for the reality of his or her own political and social awareness. It is in this very act that the central value is realized: the ability of all persons to know their potential for development and self-awareness (Denise & Harris, 1989).

A continuing and deep legacy running through this study has been that of John Dewey. It may be instructive at this point to recall that he wrote *Experience and Education* in 1938 in order to explain and clarify how progressive education was different from traditional schooling, as well as to clarify what it hoped to achieve that traditional schooling had generally not achieved. Our paper, in calling for a shift in the traditional figure/ground of science pedagogy by placing experiential and place-based learning at the center of science education programs, has essentially been a call for a "progressive" science education, a schooling of science that would ideally achieve much of what traditional science education has generally not succeeded in achieving.

Unfortunately, applications of such experiential, community-driven, and place-based initiatives are commonly labeled unscholarly and frivolous by some purportedly academic programs. These are typically those that are didactic in nature and follow the more characteristic organizational models that place students in rows of desks and ask them to be passive recipients of knowledge (Freire, 1970). The notion that students should be supported in their own science-based inquiries as student-researchers who explore their own civic responsibilities within a community and connect academic information with their own lived experience is foreign to many educational programs (Harris 2002; Kincheloe & Steinberg 1998). Our analysis indicates the time for change in science education is long overdue.

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## ANCIENT AND CONTEMPORARY EDUCATIONAL SYSTEMS (SIGNIFICANCE OF PAST IN THE FORMATION OF FUTURE)

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### Abstract

“The right of education is recognized as a human right and is understood to establish an entitlement to education”. During the centuries different communities of the world strove to rear future generations via equipping them with appropriate knowledge and skills. Knowledge acquisition acquired primary importance even in the ancient – Greek and Roman – societies. Education was regarded as an essential component of a person’s identity in ancient Greece and the type of education a person received was based strongly on one’s social class and the culture of one’s polis. In contrast to the ancient times, knowledge acquisition has become a market-determined process during the last decades. It has undergone a significant expansion. However, the traces of old traditions can be seen within the walls of contemporary enlightenment centers. The given paper draws parallel between the ancient and contemporary educational systems and outlines a significance of past in the formation of future.

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**Keywords:** Education, history, knowledge, university

### Introduction

“The right of education is recognized as a human right and is understood to establish an entitlement to education”<sup>132</sup>. At the world level it is generally guaranteed by the „United Nation’s International Covenant on Economic, Social and Cultural Rights” of 1966. According to the Covenant, education ought to be „directed to the full development of the human personality and the sense of its dignity, and shall strengthen the respect for human rights and fundamental freedoms... education shall enable all persons to participate effectively in a free society, promote understanding, tolerance and friendship among all nations and all racial, ethnic or religious groups”<sup>133</sup>.

Therefore, the „United Nation’s International Covenant” puts the greatest emphasizes on the importance of education in the context of the globalized world. Within the framework of globalizing activities, the knowledge acquisition becomes a market-determined process, which undergoes a tremendous expansion. However, scholarly activities and their outcomes have had the greatest significance since the ancient times. A variety of higher-education institutions were developed in many cultures of the ancient world to provide institutional frameworks of scholarly potential.

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<sup>132</sup> Educational rights. Retrieved from <http://educationalrights.weebly.com/>

<sup>133</sup> International Covenant on Economic, Social and Cultural Rights. Retrieved from <http://www.ohchr.org/EN/ProfessionalInterest/Pages/CESCR.aspx>

### **Ancient Greek and Roman Educational Systems**

“Education has taken place in most communities since earliest times as each generation has sought to pass on cultural and social values, traditions, morality, religion, knowledge and skills to the next generation”<sup>134</sup>. Perhaps, the Greeks were the first, who inspired the way the education is seen today. From its origins Greek education was democratized in the 5th century B.C., influenced by the Sophists, Plato and Isocrates.

Till the Hellenistic period, knowledge acquisition was considered as a prerequisite for the participation in the Greek culture. Moreover, there were four major levels of education:

1. Elementary;
2. Gymnazium;
3. Secondary;
4. Post-secondary.

Secondary level was regarded as the most significant one. It included the following subjects: natural science (biology and chemistry), rhetoric (the art of speaking or writing effectively), geometry, sophistry, astronomy and meteorology<sup>135</sup>. Secondary level was usually followed by the post-secondary one – the so-called *ephebic* training. Firstly, this training had a form of a military education followed by two years of a military service. However, after the 5<sup>th</sup> century B.C. it included an advanced academic schooling.

Teaching academic subjects was highly valued within the Athenian society. Athenians believed, that accomplishments in academics helped an individual to find an appropriate place in the society. Education was a key component of a person's identity. It stipulated an individual's reputation and guaranteed his/her worthy life.

However, besides four-level studies, ancient Greeks acknowledged two major forms of knowledge acquisition: formal and informal. Formal education was provided by a hired tutor or was attained through attendance to a public school. Informal education was provided in a non-public setting. According to the above mentioned, education was an essential component of a person's identity in ancient Greece and the type of education a person received was based strongly on one's social class, the culture of one's polis and the opinion of one's culture on what education should include.

The Greeks greatly influenced the Roman educational system (especially, after various military conquests in the Greek East). The Roman students were taught in the similar fashion to the Greek students, sometimes even by the Greek slaves. The Roman system was mainly focused on teaching speech, law and *gravitas* (usually defined as: “dignity, seriousness or solemnity of manner”<sup>136</sup>). Therefore, if the Roman students intended to pursue the highest tiers of education, they had to go to Greece for studying philosophy.

### **Georgian Educational System: History and Contemporaneousness**

It's worth mentioning, that the Roman education had the greatest influence on the development of educational systems throughout the Western civilization. The ancient traces can be vividly seen in the histories of different countries of the world. Among them is Georgia.

Georgians have emphasized the importance of education since ancient times. The school of Philosophy and Rhetoric of Phazisi in Colchis (the 4<sup>th</sup> century), Gelati and Ikalto Academies in Georgia (the 11<sup>th</sup>-12<sup>th</sup> centuries), the cultural-enlightenment centers in Palestine (the 5<sup>th</sup> century), Syria (the 6<sup>th</sup> century), Greece (the 10<sup>th</sup> -15<sup>th</sup> centuries) and Bulgaria (the

<sup>134</sup> Kendall D., Murray J., Linden R. Sociology in our times. Nelson education Ltd, 2004.

<sup>135</sup> Aristophanes. Lysistrata and Other Plays. London: Penguin Classics, 2002.

<sup>136</sup> Definition of gravitas in English. Oxford Dictionary. Retrieved from <http://oxforddictionaries.com/definition/english/gravitas>

11<sup>th</sup> century) – this is the list of the old Georgian educational centers, which were scattered throughout the world.

A special attention must be paid to the medieval times. “Medieval Georgia was distinguished by the high level of development in philosophy, historiography, poetics, arts (especially, handicraft and national architecture), theology, law and legislation, astronomy, geography, medicine, and other fields of science”<sup>137</sup>. The main cultural and intellectual centers of that period of time were Ikalto and Gelati Academies.

Ikalto Monastery was founded in the 6<sup>th</sup> century by one of the “Syrian Fathers”. It was one of the most significant cultural-scholastic centers of *Kakheti* (a region in Georgia). The Monastery consisted of an academy, which served as a high school for the Georgian population. Ikalto Academy “trained its students in theology, rhetoric, astronomy, philosophy, geography, geometry, chanting, etc. Besides the theoretical courses, the students were skilled in pottery making, metal work, pharmacology”<sup>138</sup>, viticulture, wine making, etc. Lectures were delivered by an outstanding Georgian philosopher Arsen Ikaltoeli. The academy played a significant role in the history of the Georgian enlightenment. However, it ceased to exist in 1616, when the Iranian invaders set it on fire.

Similarly to Ikalto educational center, Gelati Academy was one of the first institutions of the higher education founded in the Middle Ages. It was constructed by King David the Builder (1073 - 1125) as a grand tribute to his victory over the Turks. The academy employed some of the most celebrated Georgian scientists, theologians and philosophers. Many of them had previously been active at various orthodox monasteries abroad or in Constantinople, for instance: Ioane Petritsi, Arsen Ikaltoeli, etc. “Due to the extensive work carried out by the Gelati Academy, people of the time called it “a new Hellas” and “a second Athos”<sup>139</sup>. However, the academy ceased to function in the late Middle Ages. Afterwards, it was converted into a refectory.

The traces of the ancient Georgian enlightenment centers can be vividly seen in today's institutions of higher education. Among them is Ivane Javakhishvili Tbilisi State University, which was founded on 26 January of 1918 (the day of remembrance of the Georgian King David the Builder) via the leadership and a huge effort of a famous Georgian historian Ivane Javakhishvili (1876 -1940) and the group of his followers. It was the first educational body of this type not only in Georgia, but in the whole Caucasus region. Since its establishment Tbilisi State University has been promoting high-quality education – „all activities by which a human group transmits to its descendants a body of knowledge and skills and a moral code which enable the group to subsist”<sup>140</sup>.

Nowadays, the university determines the nation's conscience and facilitates the growth of intellectual and scholarly potential in Georgia. However, our epoch sets up new goals before it. On the one hand, Tbilisi State University shares the experience of advanced Western Universities. On the other hand, it maintains its „face” and its best teaching and scientific traditions.

According to the historical data, one of two faculties of the newly-established university was the Faculty of Philosophy, which reflected the traditions of ancient educational bodies: Ikalto and Gelati Academies. Nowadays, these traditions are implemented in the Faculty the Humanities (one of six faculties of the University), which

<sup>137</sup> Georgian Academy of Sciences. Retrieved from <http://www.nukri.org/index.php?name=CmodsWebLinks&file=index&req=viewlink&cid=56>

<sup>138</sup> Ikalto Monastery. Retrieved from <http://www.kakheti.net/ikalto/ikalto.html>

<sup>139</sup> Gelati Monastery. Retrieved from <http://tskaltuboresort.ge/index.php?page=1399&lang=eng>

<sup>140</sup> Hodgson D. Ch., The Role and Purpose of Public Schools and Religious Fundamentalism: An International Human Rights Law Perspective. Retrieved from <http://files.eric.ed.gov/fulltext/EJ979441.pdf>

consists of the following scientific directions: Philosophy, Philology, History, Archaeology, Ethnology, Cultural Sciences, Caucasian Studies, Oriental Studies, Art Studies, Visual Art, Educational Sciences, American Studies.

The faculty is developed according to the special strategic plan, which comprises several components, for instance:

#### **The mission of the faculty**

- **“the maintenance of national and universal spiritual values;**
- the accumulation and spread of humanitarian knowledge and information;
- the preparation of an intellectual elite of the society;
- the establishment of innovative attitudes in the humanitarian research;
- the integration of the results of scientific researches into the study processes”<sup>141</sup>.

#### **Major principles of a strategic planning:**

- facilitation of interdisciplinary researches;
- permanent connection between the science and education;
- **persistence of traditions;**
- **permanent connection of generations, etc.**

#### **Strategic objectives:**

- “facilitation of the development of an intellectual potential of Georgia;
- perfection of teaching-pedagogical processes via innovative attitudes and active usage of informational technologies;
- rearing a harmonious person and a specialist, which is oriented on the leadership in his/her working sphere...
- **a successful development of historically established scientific-pedagogical schools, which are recognized in the Georgian and international scientific-academic spheres”<sup>142</sup>.**

#### **Conclusions**

Therefore, a brief overview of the development of the Faculty of Humanities and its recent strategic planning shows the permanent connection between the present and the past. The faculty faces the challenges of the modern epoch and maintains the old traditions as well. The parallel can be drawn even between the Roman and contemporary Georgian educational systems. The Roman student could progress through schools just as a student today can go from a primary school to a secondary school, a college and a university. In the Roman Empire the progress greatly depended on the ability: “great emphasis being placed upon a student’s ingenious or inborn “gift” for learning”<sup>143</sup>. Less emphasis was put on a student’s ability to afford high-level education. Higher education in Rome was more of a status symbol than a practical concern: the elite received a complete formal education, while a tradesman or a farmer was expected to pick up most of his vocational skills on the job. In Georgia as well as in the whole modern world, a student generally pursues higher levels of education to gain the skills and certifications necessary for working in more prestigious fields. Moreover, knowledge acquisition has become a market-determined process, which has undergone a tremendous expansion in the recent past. Similarly to the Athenian period of

<sup>141</sup> Tvaltvaдзе D., The conception of a strategic development of the Faculty of Humanities at Ivane Javakhishvili Tbilisi State University. Retrieved from [http://www.tsu.edu.ge/data/file\\_db/academic\\_orders/hum%20danarti.pdf](http://www.tsu.edu.ge/data/file_db/academic_orders/hum%20danarti.pdf)

<sup>142</sup> Tvaltvaдзе D. The conception of a strategic development of the Faculty of Humanities at Ivane Javakhishvili Tbilisi State University. Retrieved from [http://www.tsu.edu.ge/data/file\\_db/academic\\_orders/hum%20danarti.pdf](http://www.tsu.edu.ge/data/file_db/academic_orders/hum%20danarti.pdf)

<sup>143</sup> Too Y. L. Education in Greek and Roman Antiquity. Boston: Brill, 2001.

time, teaching academic subjects is highly valued within the Georgian society. The accomplishments in academics help an individual to find an appropriate place in the society. Education is regarded as a key component of a person's identity and guarantees his/her worthy life not only within the boundaries of the native country, but beyond these borders as well.

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# **NATIONAL UNITY AT THE UNIVERSITY LEVEL: IMPORTANCE OF CIVILISATIONAL DIALOGUE AND WAY FORWARD**

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## **Abstract**

Malaysia is often described as a prime example of societies that are severely divided along ethnic lines. The country is also among the few pluralistic societies that have achieved some measure of success in managing ethnic conflict and enjoying relative political stability. Efforts toward integrating the diverse groups in the interest of national unity have been, and remain, at the heart of all Malaysian endeavours for peace (Suhana Saad 2012). Many changes have been introduced. There has been much discussion pointing to the education system as a key place where national unity may be nurtured. This paper however aims at examining the role played by the university in promoting national unity. Mixed mode method has been used to study the various stakeholders' perspectives in order to identify the current efforts and challenges of promoting national unity at the local universities in Malaysia. Results from the 420 surveys given to university students showed that effort of promoting national unity at the university level is very important and dialogue is said to have play the equal role in promoting national unity as well as to world peace. Results from interview also indicated that focusing on teaching and learning for example via the TITAS/Ethnic Relations Courses to promote national unity may just not suffice. A more interactive and proactive way of teaching and learning should be encouraged in all the university courses so that the good policies/concepts/ideology introduced towards promoting national unity could be fully reflected via practices.

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**Keywords:** National Unity, Dialogue, National Integration, Nation Building

## **Introduction**

National unity has been one of the fundamental themes for nation building since the independence of Malaya followed by the formation of Malaysia on September 16, 1963 (Denison Jayasuria 2010)<sup>144</sup>. The Prime Minister of Malaysia, Datuk Seri Mohd. Najib Razak in his delegation speech in conjunction with the Malaysia 52<sup>nd</sup> Independence Day in year 2009 stated that, to strengthen the linkages and relations while demolishing walls of segregation amongst the people of different races was the biggest challenge faced by Malaysians. What Malaysia has achieved today may not be necessarily last forever but instead, there might be risk of losing the peace and harmonious life if precautions and attentions to all races were not taken. This basic idea has been passed on from one and

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<sup>144</sup> Denison Jayasuria, National Unity Advisory Panel: Opportunities and challenge in a multi-ethnic society, In Ho Khok Hua, Sivamurugan Pandian, Hilal Hj. Othman and Ivanpal Singh Grewel (Eds.), Managing success in unity (pg.168-193), Putrajaya: Department of National Unity and Integration 2010.

another country's leaders whom believed that the sustainability of the country's development and peace is directly affected by the strength of unity amongst the Malaysians (Sivamurugan Pandian 2010)<sup>145</sup>.

In response to the ethnic disturbances in year 1969, the New Economic Policy (NEP) was introduced with its primary objectives were to reduce poverty irrespective of race, reduce inequalities in income distribution between races, and to reduce the identification of race with economic activities. Since then, ethnic dimensions has always remained as an important focus in most of the public policies in Malaysia. For instance, education has been identified as the most important medium to promote national unity. In order to foster national unity and to promote a common sense of identity, policies like National Language Policy (NLP) and National Education Policy (NEP) were enacted so that common curriculums could be promoted across the different types of schools in Malaysia (Maya Khemlani David & Wendy Yee Mei Tien 2009)<sup>146</sup>. Moreover, of late, there has been much discussion pointing to the school as important places where national unity may be nurtured. When a student attends school, it is not disputed that he/she gets to interact with others of different ethnic origins. This indeed provides ample opportunity for integration, particularly if the schools and their teachers are prepared to guide integrative activities proactively.

However, to focus on schools only, it would only be tinkering at the edges of the issue of national unity. When students left school, the surface 'unity training' received during school time is set to evaporate into oblivion when they confronted head-on with concrete realities on the ground. For example, as some news reports indicate, certain students may score straight A's in their examinations, yet, they are denied scholarships whereas others with lesser qualifications are successful. Public always relates it with racial and ethnic disparities in Malaysia. As a result, many Chinese youths felt alienated and are obliged to look and study abroad, or to private institutions for their professional training. At home, the parents may indulge in bitter banter with visitors about the inequalities in life for them and their kids as a non-favoured ethnic group in the country. In the face of these and other difficult realities, whatever values of unity minority students have imbibed at school are often rapidly undone. Thus, national unity activities at the school level could be greatly consolidated through a genuine revisiting of current policies, in which not just students at the school level, but students at institutions of higher learning should also been given the opportunity to better exposure and participate openly as Malaysians of all backgrounds in the activities aimed to strive together to create a more unified and a more equitable Malaysia.

### **What Is National Unity/National Integration?**

In Malaysia, the term nation unity is often used interchangeably with national integration, united nationality, loyalty, united community, nation building and building national identity. Although their evolution is intertwined, each of the concepts is different. The concept of national unity is used commonly in Malaysia, to describe the process of uniting people of various races with different culture under one form of national identity (Mohamed Yusoff Ismail 2003)<sup>147</sup>. In order to foster social harmony and national unity, the use of propaganda or major policy changes that suit the current scenario of the nation became a very important step to be taken cautiously. However, the term nation unity is a normative

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<sup>145</sup> Sivamurugan Pandian, Managing diversity: From independence to 1 Malaysia, In Ho Khok Hua, Sivamurugan Pandian, Hilal Hj. Othman and Ivanpal Singh Grewel (Eds.), Managing success in unity (pp. 210-244), Putrajaya: Department of National Unity and Integration 2010

<sup>146</sup> Maya Khemlani David & Wendy Yee Mei Tien, 'Conceptualization of Nationalism through Language - An Analysis of Malaysian Situation', *Language in India*, Vol. 9: 1 January 2009 pg. 303 – 316

<sup>147</sup> Mohamed Yusoff Ismail, 'Pendahuluan: Perpaduan Negara dan Pembentukan Bangsa Malaysia', *Membina Bangsa Malaysia*, Jilid 1. Jabatan Perpaduan Negara 2003.

concept that may carry different meanings to different people. The latest meaning of national unity could fundamentally be conceptualised as "a state in which all citizens from various groups (ethnic, religion, regions) live in peace as one united nation, giving full commitment to national identity based upon the Federal Constitution and the National Ideology (*Rukun Negara*)".

“National unity is a social situation wherein the citizens consisting of diverse ethnic groups, religious beliefs and regions co-exist peacefully as one united Malaysian Nation in accordance with our National Ideology (*Rukun Negara*) and Federal Constitution.”

(Source: National Unity Advisory Panel 1992)

There are so far many different definitions for national unity, yet most of its basic concepts are more or less inter-related. Shamsul Amri (2007)<sup>148</sup> stated that integration is a process that creates a national identity among a separate group in terms of cultural, social and political position. While unity can be defined as processes that unite the whole community and country to create a sharing value and identity of oneness in order to love and be proud of the country. Mohd. Ridhuan Tee Abdullah (2010)<sup>149</sup> combined the word – integration & unity and defining it as a process to unite a community under one national identity. Co-operation and unity can be promoted via the integration of the federal, economic, culture, social, education and politic. In the Malaysian context, integration and unity in Malaysia do not show much on assimilation elements, but they are more to multiculturalism – integration, accommodation and acculturation.

Mohamed Yusoff Ismail (2003)<sup>150</sup> stated that in order for Malaysia to move towards becoming a united nation, besides looking at the similarities on the cultural elements that can be shared together, efforts to reduce the gap of socio-cultural among the different ethnic groups is also important. The process moving towards promoting national unity is a very tough matter to achieve due to the socio-cultural differences among the various ethnic groups as in generally, conflicts will still occur directly or indirectly. Ideally, it is said that the best way to promote national unity is to find a national symbol or ideology as the basis for the national identity that is accepted by all the ethnic groups.

The national unity concept is often used simultaneously with the term national integration which covers a vast extent of human relationships as well as attitudes ranging from the development of the sense of national identity to the integration of diverse and discrete cultural traditions which include beliefs, values, religion, culture, language, race, gender and etc.. Since national unity touches much on the root of people's attitudes and beliefs in regard to sustain peace and harmonious life in the nation, then it is said that the character of a society's culture is directly affecting the process of promoting national unity significantly by which education is said to be the most important and suitable medium to influence the mind-set of the people on the character of others culture.

The approach to lead Malaysia to become a united nation practiced so far is more about the minimum value of consensus shared among the multiracial community in order to maintain the continuity of the social order. This approach is not assimilation and does not require dramatic elimination of certain ethnic or race as practiced by some other nations. As compared to the approach practiced in Malaysia, it is said to be more accommodating.

In this context, a nation is said to have achieved a minimum level of unity only when it has an effective administrative and governance system that allow its citizens to live in

<sup>148</sup> Shamsul Amri Baharuddi, Modul Hubungan Etnik. Putrajaya: Ministry of Higher Education 2007.

<sup>149</sup> Mohd. Ridhuan Tee Abdullah, ‘*Cabaran Integrasi Antara Kaum Di Malaysia: Perspektif Sejarah, Keluarga dan Pendidikan*’, *Jurnal Hadhari*, Vol. 3, 2010, pg. 61–84. Bangi: Institute of Islam Hadhari, UKM

<sup>150</sup> Mohamed Yusoff Ismail, ‘*Pendahuluan: Perpaduan Negara dan Pembentukan Bangsa Malaysia*’, *Membina Bangsa Malaysia*. Jilid 1, 2003. Jabatan Perpaduan Negara.

peace and harmony, though the citizens' ethnicity or racial identity remain unchanged or forgotten (Mohamed Yusoff Ismail 2003)<sup>151</sup>.

### **National Unity and Integration Department Malaysia**

The Department of National Unity and Integration (JPNIN) under the Prime Minister's Department is the foremost agency responsible for the challenging task of managing unity and integration in Malaysia. JPNIN is established in year 1970 following the racial riot on May 13, 1969. The race riot May 13, 1969 has raised many concerns on the importance of dealing with issues related to race, culture and religion. Under The National Operations Council (NOC) ruled in year 1969, a specific body known as National Goodwill Council, was established as a secretariat for the coordination of activities related to national unity and goodwill among the different races. On July 1, 1969, the National Unity Department was established under the governance of NOC to manage and strengthen the unity among races at that time (Annual Report JPNIN pg IX 2006)<sup>152</sup>.

On February 22, 1971, the National Unity Council was formed and gazetted under the Essential Regulations 1971. The council was later transformed to National Unity Advisory Council, chaired by the Prime Minister and made up of fifty one (51) representatives of various ethnic groups and those experienced in matters of nationhood. On January 1, 1972, the National Unity Advisory Council merged with the National Goodwill Office and transformed to the Ministry of National Unity. The Ministry is responsible for coordinating the duties of National Unity Advisory Council and National Goodwill Council at the national level as well as the duties of all other National Goodwill Council's Committees.

Following the General Elections 1974, the status of the Ministry of National Unity was shifted to that of the National Unity Board under the Prime Minister's Department. Subsequently, the National Unity Board merged with *Rukun Tetangga* Secretariat to form the *Rukun Tetangga* and National Unity Secretariat in February 1980. The Secretariat was then renamed as the National Unity Department under the Prime Minister's Department in January 1983.

The department was then placed under the Ministry of National Unity and Social Development on October 27, 1990 and later on once again placed under the Prime Minister's Department on March 27, 2004 after it renamed as Department of National Unity and Integration (JPNIN).

The Vision of the JPNIN is to be an excellent government agency in the efforts to develop a united, farsighted and competent *Bangsa Malaysia*. Its Mission is to nurture tolerance and goodwill through social network and social interaction towards the formation of a united *Bangsa Malaysia* with national identity. In the year 2011, the objectives for JPNIN are: 1) to nurture, strengthen and enhance social unity and national integration; 2) to instil, nurture and strengthen the spirit of patriotism and noble values amongst the community; 3) to implement unity programmes and activities and national integrity in line with the objectives of Concept 1Malaysia; and 4) to monitor and coordinate the implementation of programmes and activities under the Ministry's policies which spur unity and national integrity.

With more than four (4) decades in managing issues related to social and ethnic diversity in Malaysia, the experience gained and the creation of peaceful and harmonious Malaysian society are now recognized as a successful model amongst the international communities or Asian countries nearby. The model of managing social and ethnic diversity is presented according to the phases of development covering from the year 1970 till year 2012 consisting of Confidence Building (1970 – 2007), strengthening Community Cohesion (1982

<sup>151</sup> Mohamed Yusoff Ismail, '*Pendahuluan: Perpaduan Negara dan Pembentukan Bangsa Malaysia*', *Membina Bangsa Malaysia*. Jilid 1, 2003. Jabatan Perpaduan Negara.

<sup>152</sup> Annual Report, Department of National Unity and Integration, 2006.

– 2004) and Conflict Management (2005 onwards) as well as outline of the issues and challenges of conflict management (Azman Amin Hassan 2009)<sup>153</sup>.

### **National Policies towards Nurturing National Unity**

Besides JPNIN as the foremost agency responsible for managing unity and integration in Malaysia, in the efforts to create positive attitude towards promoting the importance of national unity and national identity, other government policies were introduced. Among them were the New Economic Policy (NEP) which was first announced in year 1970, National Culture Policy (NCP) which was introduced in August 1971, and National Ideology (*Rukun Negara*).

Malaysians have been striving hard to integrate the multi-ethnic society through various visions, ideologies, concepts and activities, yet, it is not easy to achieve the ideal state as ethnocentrism occurs at everywhere and everyday. Ethnocentrism divides the different ethnicities, races, and religious groups in society and this practice always caused racism and prejudice. History, vision, ideologies, concepts and efforts proposed and introduced by the country's leaders is said to have simply rhetorical in nature due to the favour to preserve one's traditions. The forth Prime Minister of Malaysia, Tun Dr Mahathir Mohamad was once commented that the major challenges for Malaysia to move towards Vision 2020 is to create a united nation that has similar aspirations and united ethnic groups based on justice, rights and equality.

The Vision 2020 not only focuses on development on economics, social, politics, psychology, science and technology but it is also a comprehensive and rounded agenda for the nation. One of the challenges set out by Vision 2020 is the challenge of building a united Malaysian nation (*Bangsa Malaysia*) with sense of common and shared values, aspirations and destiny. A united Malaysian nation is a nation with its citizens that able to live in peace and harmony, territorially and ethnically integrated in full and fair partnership.

Tun Dr Mahathir Mohamad is confidence that this ambition can be achieved not by following or copying the ways done by any of the developed country, but instead to form our own mould as a developed country. In his words:

“Malaysia should not be developed only in the economic sense. It must be a nation that is fully developed along all the dimensions: economically, politically, socially, spiritually, psychologically and culturally. We must be fully developed in terms of national unity and social cohesion, in terms of our economy, in terms of social justice, political stability and the system of government, quality of life, social and spiritual values, national pride and confidence.

(Tun Dr Mahathir Mohamad, “Working Paper – The Way Forward” presented to the Malaysian Business Council, 28 February 1991)”<sup>154</sup>.

Despite leadership change, activities that help in promoting and nurturing national unity in Malaysia are still on-going. After Vision 2020, in order to nurture national unity, The current Prime Minister of Malaysia, Datuk Seri Najib Tun Abdul Razak had introduced the concept of 1Malaysia (Najib Tun Abdul Razak 2008)<sup>155</sup>. It is an idea that aspires to promote

<sup>153</sup> Azman Amin Hassan, Three Decades of Managing Social and Ethnic Diversity in Malaysia: The Experience of the Department of National Unity and Integration, Prime Minister's Department. Membina Bangsa Malaysia. Jil. 4, 2009: Integrasi Nasional (pg. 500–511). Putrajaya: Department of National Unity and Integration.

<sup>154</sup> Mahathir Mohamad, Working Paper – The Way Forward. Presented to the Malaysian Business Council, 28 February 1991, Retrieved Nov 26, 2011, from

<http://unpan1.un.org/intradoc/groups/public/documents/apcity/unpan003223.pdf>

<sup>155</sup> Najib Tun Abdul Razak, 1 Malaysia. Bahagian Penerbitan Dasar Negara 2008.

the integration of the multi-ethnic society as one functioning nation without assimilate or eliminating their background of diverse cultures and traditions.

In the education policies, the important of common cultural value in the education system of Malaysia should be stressed on to promote national identity and nationhood. (Sandra Khor Manickam 2004)<sup>156</sup>. When the education challenges become ethnic or political issues, the efforts to promote national unity in education become harder. For example, the project on Vision Schools mooted on February 19, 1997 which aimed to produce generations that are highly tolerant thus to realize the dream to build a united nation. However, in general, Malaysians are not supporting the idea of Vision Schools due to the perpetuation of vernacular schools based on mother tongue education (Shakila Yacob 2006)<sup>157</sup>. The education and language issues become very sensitive in Malaysia because public worry that they might lose their ethnic identity and culture.

### **The Role of Higher Education Institution in Promoting National Unity**

According to Chandra Muzaffar (2010)<sup>158</sup>, Chandra has identified the training in the higher education is a ready passport for entry into the elite society and the stupendous increase in opportunities for the community has meant a greater influx into the upper echelons of the professions, commerce and industry apart from , of course, the civil service.

Julian Betts et. al. (2007)<sup>159</sup> explained that to prepare their students for success and be compatible in the labour market after they graduate is always been set as the major role of universities around the world. However, most of people know very little about how universities' educational policies influence the success of their students. From a policy perspective, the role of field of study and university characteristics in determining labour market success of graduates is a compelling issue. Education feeds indirectly into both public and private budgets through productivity gains, earnings power and the tax base.

Universities have always been regarded highly by society as knowledge generators. John Henry Newman (1909)<sup>160</sup> refers university as the 'School of Universal Learning' in which the university is a Knowledge Centre that drives scholars of all disciplines from all over the world to meet. It is a place where scholars and students exchange ideas and thoughts. Newman's definition of a university is not only limited to the institution itself, it also includes the learning process covering all areas of life and stresses on real situations and people as the basis to acquire knowledge.

Today, the idea of a university stretches far beyond knowledge acquisition or generator. The role of university has entailed many questions on the purpose of a university and its contribution to society and nation. Newman sees different institutions as some sort of universities or ideal places for learning and today's university plays the role of engaging these institutions to improve knowledge production which in turn serves to enhance social and national development.

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<sup>156</sup> Sandra Khor Manickam, Textbooks and nation construction in Malaysia, 2004. Retrieved November 1, 2011, from [http://www.rchss.sinica.edu.tw/capas/publication/newsletter/N28/28\\_01\\_04.pdf](http://www.rchss.sinica.edu.tw/capas/publication/newsletter/N28/28_01_04.pdf)

<sup>157</sup> Shakila Yacob, 'Political culture and nation building: whither Bangsa Malaysia?', *Malaysian Journal of Social Policy and Society*, 3, 2006, 22-42.

<sup>158</sup> Chandra Muzaffar, Widening income inequality: A challenge to 1 Malaysia, 2010. Retrieved October 3, 2011, from <http://www.Malaysianinsider.com>

<sup>159</sup> Julian Betts, Christopher Ferrall & Ross Finnie, The Role of University Characteristics in Determining Post-graduation Outcomes: Panel Evidence from Three Recent Canadian Cohorts. Analytical Studies Branch Research Paper Series. Statistics Canada – Catalogue No. 11F0019MIE, No. 292, 2007. Retrieved September 25, 2012, from [www.statcan.gc.ca/pub/11f0019m/11f0019m2007292-eng.pdf](http://www.statcan.gc.ca/pub/11f0019m/11f0019m2007292-eng.pdf)

<sup>160</sup> John Henry Newman, Essays: English and American. The Harvard Classics, 1909. Retrieved March 26, 2010, from <http://www.bartleby.com/28/1002.html>

However, emphasis on the role of universities over the period of time has changed especially in the case of a multiracial country like Malaysia. As stressed by Wilhelm von Humboldt in the Humboldtian ideal of a university, the social role of a university has been slowly losing its importance as the question of a university's contribution in other domains picks up attention (Ooi Poh Ling, et. al. 2010)<sup>161</sup>.

Robin Cowan (2005)<sup>162</sup> describes the social role of university as in the German case as being that of strengthening national identity. This was done by teaching the same tradition to all students to create unity with the objective of producing good citizens who could function well, be ambitious and lastly, contribute to the nation as a whole. According to the author, such traditions were based on literature in the respective language that speaks about a nation's culture. By that, a university's role was to instil such culture in each student to build a cohesive society.

On the July 18, 2004, Sunday Star reported the former Education Minister, Datuk Dr. Shafie Mohd. Salleh's proposal to introduce a subject tentatively called "Ethnic Relations in Malaysia" as part of the curriculum in public as well as private universities in Malaysia. This move is in line with the Malaysia government's effort to explore the polarization among undergraduates in campuses. Datuk Dr. Shafie surmised that although there are co-curricular activities and the sharing of rooms among different races on campus, inter-ethnic interaction is superficial. Hence, the effort to produce quality graduates must not neglect or leave out the issue of polarization.

However, the burning question is "After the introduction of such a course at the university level, does it really help in strengthening the inter-ethnic relationship and thus achieving national unity?" and "If so, how far does it help in promoting mutual understanding among the different ethnic groups in university?" Ethnic relations involve learning values like mutual understanding, sharing, empathy and kindness, and to have these values instilled in an individual's character from a very young age. *Melentur aur biarlah dari rebungnya*, as the Malay idiom goes and as Socrates had emphasized,

"The beginning is the most important of any work, especially in the case of a young and tender thing, for that is the time at which the character is being formed and the desired impression is more readily taken... Anything that he receives into his mind at that age is likely to become indelible and unalterable"

(as quoted by Plato in *The Republic*, ca. 375 B.C.E)

National Ideology (*Rukun Negara*) was introduced to guide the Malaysian. It presented in five principles; Belief in God, Loyalty to King and Country, Upholding the Constitution, Rule of Law and Good Behavior and Morality. In order to embrace the National Ideology, most of the public schools require all students to state their pledge by reading the National Ideology in the morning assembly. However, the importance of implementing these principles is no longer felt important by the young generations. Although most of the university has established *Rukun Negara* Secretariat or Club as an active voluntary body that is capable of strengthening relationships between students in their university, most of the *Rukun Negara* Secretariats are inactive.

University undergraduates are semi-adults who already have their own predispositions and set ways of thinking and doing things. To change their ways is a formidable task, albeit not impossible. Since the idea of promoting ethnic awareness and consciousness towards

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<sup>161</sup> Ooi Poh Ling, Sarjit Kaur & Morshidi Sirat, Revisiting the Role of University. No. 75 – 31 March 2010, National Higher Education Research Institute. Retrieved September 26, 2012, from [http://www.ipptn.usm.my/v2/index.php/publication/doc\\_download/32-no75-revisiting-the-role-of-university.html](http://www.ipptn.usm.my/v2/index.php/publication/doc_download/32-no75-revisiting-the-role-of-university.html)

<sup>162</sup> Robin Cowan, Universities and the knowledge economy, 2005. Retrieved March 27, 2010, from <http://edocs.ub.unimaas.nl/loader/file.asp?id=1097>

developing positive ethnic relations and achieving national unity are uncertain at young age among the Malaysians, hence if university is to promote healthy inter-ethnic interactions among the undergraduates, their understanding and acceptance of these values will be fortified.

In a micro study undertaken by Ong (2004)<sup>163</sup> to look into perceptual patterns of 265 undergraduates from a local private university, it was found that:

- Interactions and choice of friends were generally based along ethnic lines. When asked to name 10 best friends, 84% of the respondents gave mono-ethnic names. When asked to name 10 friends who were of different ethnic groups from them, 40% could not complete the list.

It is therefore not a fallacy to say that prevailing patterns of social interaction in workplaces, universities or schools are strong manifestations of the value system of the people. Hence, present efforts in addressing these issues at the early childhood or school level is just not enough. To make such efforts effective, policy makers must not under-estimate the influence at the university level. Continuity and synchronization must start from early childhood level and followed through primary and secondary school level and to university level. Effort at fostering national integration must not be done on an ad-hoc manner but rather, they have to be long-term, gradual and pain-staking at times.

### Methodology

Data collection for the present study utilizes both qualitative and quantitative data in order to better understand the research problem (Greswell & Plano Clark, 2007)<sup>164</sup>. This mixed method consists of merging, integrating, linking or embedding the two different methods. Simply said, the data are mixed in this research since it is believed that one type of method (quantitative or qualitative) is not sufficient to develop a complex picture of the current national unity scenario at the university level in Malaysia. Qualitative data was collected from the Ministry of Integration and National Unity to gain an understanding of what has been done by the government to promote unity among university students, and to identify challenges/factors that have led to the current neglecting of national unity activities in the university milieu. In the second phase, researchers utilize quantitative and qualitative approaches, collecting surveys from students and engaging in an open-ended interview with Dr. Farid Al-Attas, who is an expert on ethnic relations in the country. For incoming students, a total of 420 sets of surveys were distributed to at the University of Malaya intake session of 2012/2013, while the interview with Dr. Al-Attas was conducted concurrently. The purpose of the surveys was to understand perceptions on national unity held by students upon entering the University. The researchers divided the population of the undergraduate students of University of Malaya based on 12 faculties and 2 academies in the university. Snowball sampling was then used to collect a total of 420 samples from each sub-group of the population. The total number of the new student population for 2012/2013 is 3165, with students being asked to identify others who could become members of the sample. Meanwhile, the interview with the expert on ethnic relations explored his perceptions on national unity issues, paying particular attention to the challenges of promoting national unity at the university level. We further enquired about what he viewed as recommendations for increasing national unity.

<sup>163</sup> Ong Puay Tee, 'A Comparative Study of Malya-operated and Chinese-operated Childcare Centres in the State of Melaka, Malaysia', *Child Care in Practice*, 11(1), 2004, p. 23-38.

<sup>164</sup> Creswell, J. W. & Plano Clark, V. L., *Designing and Conducting Mixed Methods Research*. Thousand Oaks, CA: Sage 2007.

## Data and Findings

In this research, mixed mode method was used to collect the different perspectives on issues related to national unity. In the interview session with the Director for the Department of National Integration, Mdm. Suraya bt. Wen, it was clarified that there have been many activities or efforts being done by various parties aiming at promoting national unity at the different levels. The activities/programmes organized by JPNIN & MoHE aimed at promoting national unity are mostly referring to the basic principles to strengthen, understand & practice the National Ideology (*Rukun Negara*). The efforts of promoting the philosophy of the National Ideology are usually done at the university level via the Secretariat of *Rukun Negara* (SRN).

To date (December 2011), there are a total of 129 Higher Education Institutions (122 Public Higher Education Institutions and 7 Private Higher Education Institutions) have established the SRN. Various programmes have been planned and organized to instil the spirit of loyalty to the country and to foster the understanding of the National Ideology. In each of the programmes, various approaches have been taken to explain the principles/philosophy of the National Ideology in order to provide a clearer and better understanding to the participants involved. Since the establishment of the Public Higher Education Institutions' SRN, a total of 35 activities have been carried out aiming at strengthening national unity and integration among the university students of different races.

Based on the feedback/evaluation of the implemented programmes by the students, results showed that 80% of the organized activities/programmes achieved their objective, which is to promote and strengthen unity among the participated members. However, one of the most critical challenges in implementing the programmes is to get the involvement of various ethnic groups, especially students from the non-Malay group. In order to ensure the participation of students of various races, JPNIN will always has to set a condition in which there must be multi-ethnic participants such as in the Unity Debate Competition among the Higher Education Institutions (HEI).

A total of 420 surveys were collected from the undergraduate students of University of Malaya Kuala Lumpur with the respondents' age range of 18 and 24 years old. Most of the respondents (65.7%) are Malays, followed by Chinese (25.7%), Indians (1.9%) and others (6.7%). The data showed that there are more than 95% of respondents are comfortable when having their meals with other ethnic groups. However, they would be more comfortable if they live in the same room with the same ethnic group instead of with other ethnic groups. This have indicated that the students of the University of Malaya are able to mixed up with friends from other ethnics via activities like games, classes, having meals together and etc., however due to lack of empathy and understanding towards other ethnic groups besides them, they are more likely keen to worry that their living culture will be influenced/disturbed by other ethnic groups. There are more than 99% of the students are aware of the importance of national unity, however, there are still 17.1% of the students do not understand or do not even care the meaning and importance of national unity. This showed that the efforts of promoting the awareness on national unity are still not suffice.

The data from the survey also showed that more than 86% of the university students learned about national unity during their primary and secondary education. This is then followed by the voices/publicities by Malaysia mass media, efforts done at the university level and the teachings by their own parents. However, due to the culture of education system in university and the interest/attention of both the university students and lecturers are not on national unity but keen to focus more on academics performance, this resulted the university to be the least important medium to promote national unity. Individual/Self-awareness, Government and Childhood Education have been rated as the main key players/focus areas to promote national unity. This showed that in order to promote national unity, the awareness on

the importance of national unity need to be promoted to all the students/citizens. Government sectors which consist of government/political leaders and government servants whom have always been the role model or the main attention to the public should play an important role in promoting national unity. Last but not least, childhood education which is rated to be the third most important key focus area to promote national unity. This is due to pre-school students are at the fast learning period, thus, they could easily learn about the importance of national unity as quoted by Jerome Bruner, “young children can learn almost anything faster than adults do if it can be given to them in terms they can understand” (Jerome S. Bruner 1960)<sup>165</sup>.

There are more than 55% of students are not involved or even care about the activities/programmes organized aimed at strengthening the relationship amongst the multi-ethnics students or to promote national unity at the university level. This is attributable to the university's main focus to strive for higher international ranking and to produce marketable students, thus most of the students would rather spend more times on improving their academic performances and most of the lecturers would focus more on to prepare the students to be compatible in the labour market rather than strengthening the relationship amongst the students or to promote national unity. Students were also required to rate the impact of activities/programme/teaching & learning that aimed to nurture national unity at the university level. According to the results, the respondents feel that activities/programmes bring more impacts on students compared to teaching and learning. This also indicated that focusing on teaching and learning for example via the TITAS/Ethnic Relations Courses may just not suffice. Programmes/activities like charity works, seminar/forum/dialogue, competition and etc. involving various ethnic groups should be organized more often so that the chances/opportunities for university students of various ethnic groups to mix around would be higher.

Although most of the respondents are aware of the importance of national unity, more than 80% of students feel that there are still issues/students are not favour towards national unity at the university level. Most of the respondents claimed that it is mostly due to the lack of interest amongst the university students. This followed by the missions of university that do not cover or putting more attention in promoting the importance of national unity. The lack of interest in lectures and the lack of publicity on activities/programmes that promote national unity are also been identified as one of the issues that caused the importance of national unity been neglected. When respondents were being asked about the important and role of civilizational dialogue, most of the respondents (81%) claimed that civilizational dialogue is very important especially in the efforts of promoting national unity and promoting world peace. This followed by the role to avoid conflict and to promote the understanding on differences and sameness among one and other. Thus, it is showed that civilizational dialogue is very important and good mechanisms/tools for strengthening national unity that is more educational, systematic and suitable for a multi-cultural nation like Malaysia.

The interview with Dr. Syed Farid Al-Attas, expert on ethnic relations in the country mentioned that Malaysia government is trying to achieve a state with certain level of tolerance and mutual respect where people could retain their own culture perspective and practices and at the same time achieving harmonious. Although many good policies were introduced towards promoting national unity, the policies introduced were not reflected via the practices. For example, some of the universities in Malaysia restrict the entry of other races. Malaysia could have university that promotes Malay studies but restricting the entry of students from other races will only cause the negative impacts – polarization. Aside from

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<sup>165</sup> Jerome S. Bruner, *The Process of Education*. Cambridge, Massachusetts: Harvard University Press, 1960. Retrieved December 26, 2012, from <http://www.jstor.org/stable/pdfplus/999799.pdf?acceptTC=true>

that, some curriculums in the university are not a good exposure for students too especially when it relates to civilization and ethnic relations. Some curriculums tend to be more towards Islam. The education in university should emphasize on the perspectives of all the ethnic groups. Teaching in all courses should acknowledge all civilizations, for example, Malay, Chinese and Indian civilizations, so that students graduated from the Malaysia universities will at least understand the culture of all civilizations.

According to Dr. Al-Attas, the role of university is more than just to produce marketable students or to strive for higher international ranking, lecturers play an important role in strengthening the relationship among the different ethnic groups of student. More dialogue could be done between students and lecturers only if lecturers are proactive to discuss with their students in a neutral way. For example, lecturers should not only cover certain group of ideas/perspective, ideas/perspectives/contributions/values of all the different ethnic groups should also be stressed. These efforts encourage students to dialogue and give their opinions based on their own perspectives which align with their own cultural identity. University should organize and encourage students to participate in activities/programmes such as seminar, public lecture, dialogue, conference that are aimed at promoting the important of national unity. Dialogue plays an important role to promote the understanding of the different background/culture/value of the multi-ethnic society in Malaysia.

### **Civilizational Dialogue as a Way Forward**

The world has witnessed several incidents caused by misunderstandings or lack of communication, it is even more to be said as the conflict and tension between civilizations, for example the invasion of Babri Mosque in year 1992 in Delhi as the action of hatred and extremism against the minority Muslim community by Hindu extremists who allegedly killed thousands of human lives. Besides, it is also stated in the history of India that the Muslim army commander and destroying Hindu temples although of course these are prohibited by Islamic law itself. The same situation also occurred when Hindu kings kill people who believe in Islam. Before the advent of Islam in India, the Buddhists destroy Hindu temples and the Hindus revenge by doing the same, destroying Buddhist temples. These are all the examples of lessons that can be taken as a result of lack of understanding of other civilizations and positive interaction.

Nowadays, issue concerning the adoption and implementation of dialogue is an important topic in sustaining peace and harmony within the society and nation. Even the United Nations General Assembly in year 1998 announced year 2001 as the United Nations Year of Dialogue among Civilizations. This declaration signalled that any tension and conflict in the world should and could be reduced through dialogue. In general, the disunity and conflict around the world happened perhaps not just because of self-integrity but also the integrity of the leaders in civil society involving all sectors including economic, politic, social, religion and science and technology.

Indeed, the people of the world could not avoid themselves from the differences in biological, demographic, geographic and diversity of individuals in the society, but this kind of situation should be well-handled and managed. Serious attentions on various differences and diversity are also needed even in smaller community to prevent different cultural values and human civilizational from becoming the obstacles in strengthening the ethnic relations and to promote national unity. Therefore, the way to reduce the gap of misunderstanding and mutual understanding is through dialogue as it is to be said and highlighted as the most effective way compared to others.

By using dialogue, opinions are formed; questions are examined and the implications of discussion are concluded. Within the framework of national unity, dialogue can be used as a tool of correction, construction and self-evaluation. It is a tool of consultation, mutual

advice and cooperation in righteousness and piety. Errors can be corrected and deficiencies can be successfully addressed when the government welcomes dialogue and trains society to accept criticism and revision. When this happens, dialogues will be educational and systematic; deeply enriching unity within the nation. Until then, common consensus can, at best, be achieved only indirectly between the different ethnic groups.

Commitment and input from all the citizens, especially those who deem themselves as living in the civilized world are needed to support the efforts towards promoting national unity and sustaining the nation's peace and harmonious life. In order to nurture a common base/value for human existence, fruitful dialogue should be rooted deep in the hearts and minds of all the citizens. Importance of shared values, which not just giving meaning to life, but also to provide form and substance to identities should be focused in all the dialogue. Understanding, respect and tolerance for others are the core values that transcend civilisational differences. The heart of a true dialogue is to promote awareness and observance of universal values, ethical principles and moderate attitudes towards differences. Last but not least, respect for human rights and the important of inclusiveness and unity in diversity become particularly relevant in the context of globalization and rapid social transformations.

Free, independent and pluralistic universities should be more aware of its influence in promoting national unity using dialogue as its performance can either enhance or diminish the real meaning/use of dialogue. Discussions on such issues especially among the representatives from JPNIN, Ministry of Higher Education and local universities should be encouraged on how real dialogue could play its role as one of the important way to promote unity at the university level. The use of real dialogue in promoting national university will greatly influence the perception of the increasing numbers of people, especially among the growing – and often aware of the important of national unity – young generation in the university.

Dialogue at all levels – either through formal or informal approaches – has an inherent ability to nurture national unity. Both national unity for dialogue and dialogue for national unity are needed. Thus, the University of Malaya Centre for Civilisational Dialogue (UMCCD) – the first Centre of its kind in Malaysia – is tasked with conducting various dialogue sessions and act as a platform for reaching consensus and thus promoting peaceful and harmonious environment not just in the University of Malaya, but in the nation as well.

The University of Malaya Centre for Civilisational Dialogue (UMCCD) was established in 1996, just before Samuel P. Huntington published his thesis of the 'Clash of Civilisation'. The setting up of the centre was because of the fact that dialogue of civilisation was fast becoming a much needed mechanism for discoursing issues that arise from the inevitable encounter between nations, ethnic groups, faith systems, ideologies, worldviews and cultures. The expansion of globalisation spurred by the rapid developments of science and technology is one of the main forces behind this reality. Looking at civilisation not merely in the context of the past, the centre's main focus is on the articulation of values that may be the basis of a common platform for the solving of issues and problems universally encountered across and within cultures and civilisations. The centre has successfully organised a great number of workshops and conferences locally and internationally as well as run resident and visiting research fellowship programmes for scholars locally and internationally. The centre also acts as a reference point as well as serves on consultative basis in many government and non-government organisations locally and abroad. To date it has published widely on many topics pertaining to the dialogue of civilizations as well as provided supervision for scores of local and international postgraduates.

## Conclusion

Unity is the heart of political stability, economic development and social harmonious. The current peace and harmony life inspire the Malaysians to strengthen the relationships among the different ethnic groups and to ensure Malaysians understand the important of unity as enshrined in the National Ideology. The implementation of project especially via civilizational dialogue at the university level would definitely play an important major role in promoting national unity and unifying the different background of university students, thus, shaping the one of its kind culture in Malaysia conducive for nation building. The 1Malaysia Concept is also to remind us the importance of achieving national unity. Although the leadership in Malaysia change from time to time, the vision to achieve a peace and harmonious social cohesion is remain unchanged. Therefore, the role of university in Malaysia is no longer just to produce marketable graduates but also to produce graduates with the skill to conduct 'real' dialogue which assist in promoting national unity and sustaining peace among the different races in the country. Civilizational dialogue is also very important and good mechanisms/tools for strengthening national unity that is more educational, systematic and suitable for a multi-cultural nation like Malaysia.

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# IMPLEMENTATION OF DIGITAL SIGNATURE IN WEB TO IMPROVE THE QUALITY OF MANAGEMENT INFORMATION SYSTEMS IN EDUCATION SECTOR

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## Abstract

Information technology is becoming the world's most influential factors in everyday life. It has even large economic impact in family and state budget. Web software systems, due to their friendly network configuration and hardware independence properties are gaining more and more user acceptance. But, in web systems the authenticity of transmitted and stored data is still an open challenge. This paper aims to give the answer to these questions using digital certificates, as defined by ISO X.509 standard, for encrypting communication channel and digitally signing student data for archiving.

The implementation of digital signatures on the web has special challenges. Digital signature uses digital certificate of the current user, which certificate is stored in user's local store or file and it has restricted access. This paper presents an implementation web digital signature in two different platforms: (i) using Microsoft browser, and (ii) non-Microsoft browser and comparing their properties, functionality and efficiency. This paper, furthermore, describes in detail the implementation of the digital signature on the web starting from the definition of the problem up to the technical implementation, including as a case study the Student Management System installed at the Faculty of Electrical and Computer Engineering, University of Pristina

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**Keywords:** Digital signature, information technology, management information systems, ActiveX, Applet

## Introduction

The development of technology in general has increased the demand of individuals and institutions for various information services. This trend has affected the South East Europe countries in general and Kosovo in particular. The same goes for digital signatures. Compared to the world countries this trend is slightly delayed for this region. This is based on very concrete cases of implementation of digital signing and drafting of appropriate legislation that will precede technological development. As one of the cases to prove this it suffices to note that the former U.S. President Clinton signed in 2000 for the first time a bill in electronic form [2]. In addition to the U.S. in the period up to 2002 there were many other countries that have worked in drafting the legislation regulating digital signature [8], [9].

However, the academic institutions in Kosovo have expressed the need for the use of new technologies as a facilitator element in learning process and progress of activities. Therefore, different systems for managing the progress of student data in academic institutions or the so-called management systems for university were developed. In line with the new trends, in 2006 with an initiative of computer engineering department of Faculty of

Electrical and Computer Engineering, University of Pristina, a System of University Management as a win application was developed and deployed [3].

It was an innovation for the period of time when it was implemented, but the main problem was encountered in later stages when it was tried to transform it in a web platform even though referring to the [19] users are as twice slower when using web applications against desktop or win applications but the world trend every day is going toward this type of technology. The main issue raised with the generation of digital signature in web and the compatibility of browsers in terms of the usage of digital signature to sign the student grades, which are also the focus and the main problem of this paper. Furthermore, for each message  $m$  (seen only as ranges of bits) signatory may apply a specific algorithm using its private key  $sk$ ; consequently, this results in a signature that can be verified by anyone who has the corresponding public key  $pk$  using the specific algorithm for inspection outcome [1].

Digital signature of student grades in the system is necessary because the digital signature schemes contain the property of non-repudiation, thus signature  $S$  cannot be denied the signing which was made long time ago by himself (to a third party) [20].

The researchers in this paper have used different tools and operating systems in order to find out the solution of implementation of digital signatures in different browsers and platforms.

### Definition of the problem

In order to define a solution regarding a particular problem, it needs to base on fundamental issues on which the problem arises.

The key issues in this problem are:

- Current systems for implementation of digital signature,
- Analysis and study of the current system and its implementation in the Faculty of Electrical Engineering and Computer
- Analysis and definition of opportunities for the realization of the digital signature on the web
- Analysis and determination of other opportunities for improving the quality of technical solution and grading signing
- Testing and adjusting the system to the new changes.

There are various methods for implementation which are used to achieve the expected results or project work. Selected methods are oriented in respect of the rules in developing secure applications as well as de facto standards for ensuring the security condition. Methods are based on several pillars which are presented below:

- The proper use of cryptography
- Simplification of algorithms application
- Tracking algorithms schemes
- Compatibility with browsers
- Distribution Strategy

The proper use of cryptography is intended to be used in realizing the advantages offered and used in different systems, advantages which are expressed in form of various algorithms or schemes. As a part of solving the problem the researchers used the classes offered by .NET Framework and more specifically from the System.Security.Cryptography namespace [10].

To simplify the application and usage of such algorithms they should be better defined through various documents. If a certain programming language provides possibilities for certain desired properties, then there is no need to select a different way, which in the best case would complicate very little the entire implementation.



From Figure 1 it can be seen that the direct communication from the logic layer to local storage is impossible. It should be noted that client to server communication is done via the HTTP protocol. This protocol works in logic of request and response (request - response). Given that the digital certificate is inevitable there should be a solution to achieve access to digital certificates. To achieve the solution the researchers needs to find a way that is part of the code implemented on the client side.

The next problem that meets the general problem during the implementation of digital signature on the web is the problem of compatibility. This is a problem that often occurs in software systems in general and in particular in those in web. Therefore a question arises, on how we realize a system which does not depend on the platform, which in this case the system does not depend on web browser either?

The compatibility in dualistic terms, being independent from the platform of operating system and independent of the browser in which is running poses a significant danger element in software systems on the web. Various technologies exist that claim to be independent from the platform and also from the browser, nonetheless is hardly acceptable and difficult to be proved. There are technologies that run on certain systems or certain browsers (such as Flash) but this number is limited and eliminates compatibility of any sort of absolute form.

### **Implementation of the solution through the ActiveX control:**

ActiveX controls is an "OLE Object ", more specifically, a "Component Object Model (COM) object." In other words, it can be said that is a COM object that supports the IUnknown interface and also self - registration [15].

It was used Visual Studio 2010 IDE to build the ActiveX control for digital signature. ActiveX controls consist of two interfaces. In one of the interfaces are defined functions which are owned by ActiveX controls. This is similar to the header files of C ++ programming language in which initially the used functions which are part of the program are declared, and later become their defining class.

To realize the digital signature, there are defined two functions, which will be called depending on the particular case. Functions will be discussed in detail in the following paper. ActiveX controls have an advantage since they enable the implementation of graphical user interface within them. This facilitates the users and makes control more usable. In our case, the control has in itself an implemented graphical user interface for the user. Through this interface the user is given the signal that the signature is being generated until the entire process is carried out.

### **Functions of the ActiveX control**

Two functions were carried out in order to realize the digital signature in ActiveX control. Both functions have input parameters but differ in their number. Functions are named as Nënshkrimi and NënshkrimiSN. To realize the signature is used PKCS#7 standard (details of the standard [5]). Through this standard can be achieved compatibility with different systems in the future or in terms of advancing the current solution.

```

public string NenshkrimiSN(string SN,string txtTekstiPerNenshkrim)
{
    X509Store store = new X509Store(StoreName.My);
    store.Open(OpenFlags.ReadOnly);
    if (store.Certificates.Count > 0)
    {
        X509Certificate2 certSign=null;
        foreach (X509Certificate2 certSign1 in store.Certificates)
        {
            if (certSign1.Thumbprint == SN)
            {
                certSign = certSign1;
                break;
            }
        }
        string strPlain = txtTekstiPerNenshkrim;
        byte[] bytPlain = Encoding.UTF8.GetBytes(strPlain);
        byte[] rezultati;
        try
        {
            rezultati = SignMsg(bytPlain, certSign);
            store.Close();
            return Convert.ToBase64String(rezultati);
        }
        catch (Exception ex)
        {
            return ex.ToString();
        }
    }
    else
        return "0";
}

```

**Listing 1: Code of the function NenshkrimiSN.**

NenshkrimiSN is a function which returns a string in Base64 value of the digital signature. This function takes two string parameters. The first parameter named as SN means thumbprint certificate for signature. The second parameter txtTekstiPerNenshkrim means for signature or plain text Text for signature. The procedure here is thinking of signing a little different in order to meet the need for a valid signature on the web. The exchange of certificates is done in the beginning, then, the client and server handshake which has SSL protocol implemented. Precisely this is the starting point and basis of the use of certificates and their validation. The first step is to check if the user is using an encrypted secure channel to communicate with the server. This is done by checking whether the URL contains https requesting a reserved word that means this protocol, which is expressed in code below.

```

if (Request.ServerVariables["HTTPS"] == "off" || Request.ServerVariables["HTTPS"] == "")
{
    Response.Redirect(Request.Url.AbsoluteUri.Replace("http://", "https://"));
}

```

**Listing 2: Security checks if the user is using secure HTTPS channel**

In this way, if the https protocol is not used, the server then automatically redirects to this protocol. The example given earlier shows how this can be done in C# programming language.

Once the client has chosen the certificate to present to the client, the process goes on. It should be noted that the IIS server has the possibility of such configuration to require the certificates and to be mandatory for the client or can be left in the mode as an optional

feature. As a result, it is necessary to check if the client certificate is present. Such control is easy and accomplished as in Listing 3 below.

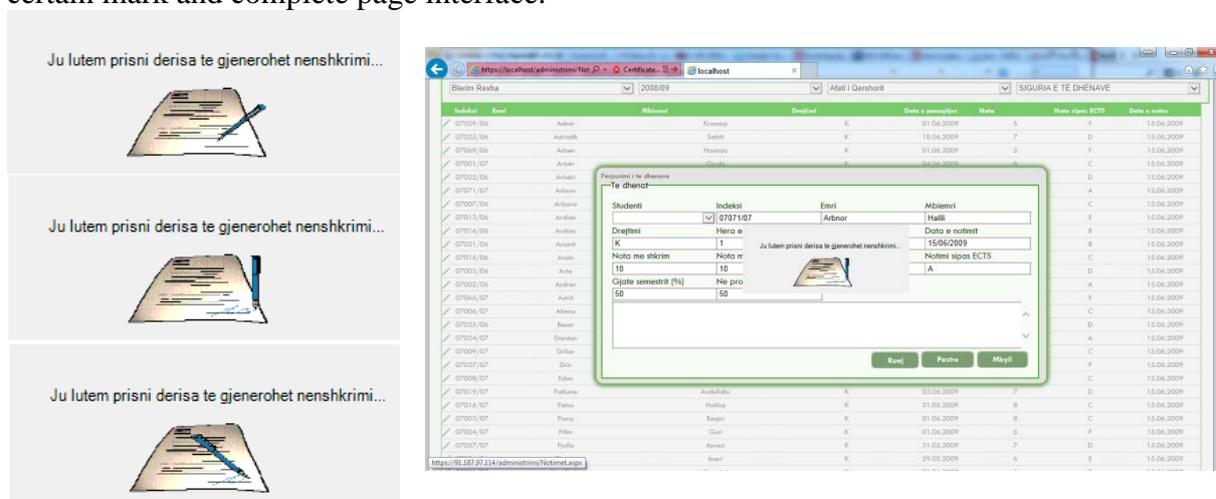
```

HttpClientCertificate cert = Request.ClientCertificate;
if (cert.IsPresent)
{
}

```

**Listing 3: Checking through the code if the user has provided a certificate**

The communication of browser with ActiveX control is done through JavaScript as a lightweight, interpreted, object-oriented language with first-class functions, most known as the scripting language for Web pages, but used in many non-browser environments as well such as node.js or Apache CouchDB [12]. This solution is implemented on student management system in the Faculty of Electrical and Computer Engineering where student marks are digitally signed. In Figure 2 is depicted appearance of control during signing of a certain mark and complete page interface.



**Figure 2. Sequence of ActiveX controls during signing**

### Compatibility with browsers

The problem with ActiveX control is the compatibility or suitability of platforms and browsers. Initially, the adaptability initially is treated with browsers from where the rest goes to suitability for different platforms or systems. The ActiveX control is not supported by different browsers which differ from Microsoft Internet Explorer. This makes it more difficult since there is an impose by Microsoft to use only their technologies.

In order to have the solution to this problem it is necessary to follow a different approach. ActiveX problem is a problem that has plagued earlier software engineers and has challenged them. This is because it is a barrier for other applications and compilation in other technologies is undoubtedly with higher costs. A more efficient solution is that other browsers needs to become like Internet Explorer in terms of structure. This is possible through the installation of additional modules also known as browser plug-ins.

One of the most used Plug-in in the market that simulates the behavior of Internet Explorer to other browsers is IETab plug-in. This plug-in is available for different browsers and is free of charge. IE Tab for Chrome is a browser add-in that allows users to use Internet Explorer to submit web pages tab. Some of the most common uses of IE Tab are [14]:

- Presentation of Web pages that require execution of ActiveX controls
- Testing of web pages with IE to render machine
- Use Windows Explorer to locate image files, with full support for Explorer icons, menus etc..
- Using Outlook Web Access

- Using Sharepoint properties intended only for Internet Explorer.  
Same usage can be done for other browsers such as Firefox. Installing this add-on is done very easily and as said earlier is free.

### Implementation of the solution through Java Applet

Another alternative for the implementation of digital signature is done through Java Web Applet.

### Building Java Applets

Java applet as a Java code which is executed in the browser is certainly a strong element. Java Applet usually is embedded in a web page and is executed on the browser [13]. Java applet came out as a result of the total failure in need fulfillment by ActiveX control. The construction or development of Java Applet was done based on ActiveX control. These controls are developed taking into account the recognized standards for data security in order to be compatible with each other in order to generate data which are needed to generate digital signature.

To realize the applet the researchers used NetBeans IDE 7.0.1. NetBeans IDE is one of the most popular programming languages in Java and provides an easy interface to encrypt and many opportunities for different types of applications

### The class for generating digital signature

Class for digital signature generation is appointed as clsSignature. This class contains two functions for signature generation. However, with a great interest is to discuss the function which makes sealing and which is used in the applet. The function code for the signature looks like Listing 4.

```
public String Signature(String strPlainText, PrivateKey _privateKey, X509Certificate _publicCertificate) {
    String str = "";
    try {
        if (_privateKey == null) {
            return "";
        }
        byte[] data = strPlainText.getBytes();
        Signature signature = Signature.getInstance("SHA1WithRSA");
        signature.initSign(_privateKey);
        signature.update(data);
        byte[] signedData = signature.sign();
        X500Name xName =
        X500Name.asX500Name(_publicCertificate.getSubjectX500Principal());
        BigInteger serial = _publicCertificate.getSerialNumber();
        AlgorithmId digestAlgorithmId = new AlgorithmId(AlgorithmId.SHA_oid);
        AlgorithmId signAlgorithmId = new AlgorithmId(AlgorithmId.RSAEncryption_oid);
        SignerInfo sInfo = new SignerInfo(xName, serial, digestAlgorithmId, signAlgorithmId,
signedData);
        ContentInfo cInfo = new ContentInfo(data);
        PKCS7 p7 = new PKCS7(new AlgorithmId[]{digestAlgorithmId}, cInfo,
            new java.security.cert.X509Certificate[]{_publicCertificate},
            new SignerInfo[]{sInfo});
        ByteArrayOutputStream bOut = new DerOutputStream();
        p7.encodeSignedData(bOut);
        byte[] encoded = bOut.toByteArray();
        str = Base64.encode(encoded);
    } catch (Exception ex) {
        System.out.println(ex.getMessage());
    }
    return str;
}
```

Listing 4: Code for signature function in Java

The function takes three input parameters of type String, PrivateKey and X509 Certificate. From the type it can be seen that is plain text, the private key for digital signature and public certificate for eventual verification of the signature and other data for the signatories. The function returns the signature as information of type string similar as in the case of ActiveX control.

In order for the digital signature to be compatible it is important to follow recognized standards mentioned earlier, mainly to PKCS # 7 messages for digital signatures. The procedure translated into code in order to maintain this standard is provided via the following code. In Java, signature and other security elements are enabled classes available through built-in, java.security and sun.security as they are explained in official Java site [18].

PKCS # 7 in Java is like a separate class. Its initiation is done through several parameters. In this case initiation is done in Listing 5.

```
PKCS7 p7 = new PKCS7(new AlgorithmId[]{digestAlgorithmId}, cInfo,
new java.security.cert.X509Certificate[]{_publicCertificate},
new SignerInfo[]{sInfo});
```

**Listing 5: Initiation of class object that makes PKCS # 7 signed message structure according to this standard**

The first attribute indicates what algorithm will be used to generate the hash function. The second attribute indicates the element mentioned earlier to the relevant standard PKCS # 7 which is ContentInfo [5]. The next attribute is public certificate and the last element is SignerInfo. Each of these attributes are initiated and completed with relevant data earlier in the code. Finally, similarly to ActiveX controls, but this time the syntax of Java converts bytes to Base64 string and returns that value as a result.

### Compliance with platforms and browsers

Adaptability is the main element of their development of solution based on the applets. The adaptability will be discussed here in two aspects, in terms of platforms or operating systems and browsers terms.

In terms of platforms, a detailed study was conducted by the researchers to adapt to different platforms and work without having to make additional configurations. The basic advantage of Java is that it provides support for various platforms. It is only required to have installed Java Virtual Machine and the execution is provided. However the problem is not limited to the execution, it is continuous.

Fundamental challenge to the adequacy of the platform lies in obtaining digital certificates. For different platforms it is followed a different approach by local key store. The first step toward solving this problem is to identify the mode of access to appropriate storage platforms. Once the ways of access have been identified, through the code has been verified the operating system and the approach relevant for that operating system. This approach is shown in Listing 6.

```
KeyStore keystore;
if (System.getProperty("os.name").contains("Windows")) {
    keystore = KeyStore.getInstance("Windows-MY", "SunMSCAPI");
} else if (System.getProperty("os.name").contains("Linux")) {
    keystore = KeyStore.getInstance("pkcs12");
} else {
    keystore = KeyStore.getInstance("KeychainStore", "Apple");
}
```

**Listing 61: Use of different platforms to access the KeyStore**

Access to the store is enabled by determining the type of store. In the case of a Windows operating system, the type to be marked for access in the store is Windows-MY whereas as a service provider is SunMSCAPI. SunMSCAPI provider enables applications to

use the JCA / JCE API to access cryptographic libraries, certificates stores and the holder of the keys to the Microsoft Windows platform. SunMSCAPI provider itself does not contain cryptographic functionality, but is simply a connecting channel between the Java environment and cryptographic services on Windows [16].

In this part it is provided full support for the Windows platform and certificates installed on it. In the following branching are treated the systems based on Linux such as Ubuntu. Keystore in this case based on the type PKCS #12. This standard defines the structure of the digital certificate. When it comes to Linux there are various possibilities of creating personal KeyStore, in which was left in a field that allows you to write a personal path to the keystore.

The last part of the branch has to do with the Mac operating system. To have access to this system is necessary to approach KeychainStore type as permanent store on the Mac and Apple's provider.

This allocation enables the most popular systems (platforms) in the world market to be fully supported. The next step before using KeyStore is uploading them in the application/applet. In order for the load to be successful it is important to check whether we are dealing with Linux systems and if the path to the keystore is listed on the applet interface areas. Otherwise the applet allows marking the password for the specified keystore.

Consequently, the execution and the results will be the same in three most popular platforms worldwide. The following figure show how such a feature is visually seen<sup>166</sup>.



Figure 3. Screenshots from different Operating Systems (Windows, Ubuntu, Mac)

Another concept that should be discussed here is the suitability for different browsers. This is determined precisely by using Java technology which is known as cross platform and Java applets known as supplements that are supported by all popular browsers. Also here the communication with browsers is carried out through JavaScript.

<sup>166</sup> In different platforms it was tested as Java Application, not as Java Applet embedded in specific page. Functionality and other properties are the same as it was Java Applet. This was done in order to have easier testing and deploying.

## Conclusion

In this paper the main work consisted in studying and solving the problem of digital signature on the web. The paper summarizes the issues regarding the use of digital signature on the web starting from the stating the problems and possibilities for implementation, and next part presents a concrete implementation which gives two choices .

As a conclusion, it is worth noting that the digital signature format presented in the paper is unique realization and it was implemented in Kosovo for the first time. The contribution of this paper can be summarized in the following several points:

- Implementation of unique digital signature on the web through controls developed by the researchers, meanwhile respecting the internationally recognized standards for data security.
- Implementation in open source technology and closed source (paid) including Java applet and ActiveX control respectively.
- Increased level of system security in Student Management System at the Faculty of Electrical and Computer Engineering, University of Pristina.

Despite the work and research done in this regard there are still possibilities to expand the solution. One of the aspects for further research and work is related to the optimization of automation for Linux-based systems, mainly because of the diversity of these systems. Another important work that can be done is the expansion of the solution in order to support the most popular mobile platforms such as Android, iOS and Windows Phone .

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## **ORGANISATIONAL POLITICS AND THEIR EFFECT ON WORKPLACE LEARNING**

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### **Abstract**

The paper discusses the findings of the author's doctoral thesis of which results have identified a number of effects of political behaviour that hinder or support workplace learning. The work adds to knowledge since, whilst a small amount of literature exists regarding the relationship between organisational politics and learning, there is very little knowledge concerning the effect of micro-politics on workplace learning.

The case study took place at the University of Malta and evidence was gained from 35 participants who were undergoing some type of workplace learning, through participant observations and semi-structured interviews. The study employed a qualitative research design and research data was extracted from the fieldwork notes and interview transcriptions of the participants who related the effect of political behaviour they were having (if any) on their learning.

A methodology based on an inductivist approach was used to explore the participants' experiences, thoughts and opinions, since the study involved social processes and behaviours. Collected data which was transcribed and converted to text was analysed by using the N-VIVO Qualitative Data Analysis software.

The research clearly shows that interpersonal political behaviour may have an intense effect on the employees' learning, particularly informal learning. The effects can be inhibitive and distressing for some, and supportive and profitable for others, which effects were completely unknown before this research took place. In a minority of cases, workplace politics seemed to have had no effect on individual learning, as some respondents consciously chose to distance and isolate themselves from such behaviours.

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**Keywords:** Organisational Politics, Workplace Learning

### **Introduction**

There have been several developments in the academic literature on organisational politics in the last decade however the relationship between organisational politics and workplace learning is still understudied. Some writers have begun to address this issue. For example, according to Lawrence *et al* (2005) learning is successful when employees are adequately politically skilled. Such research, whilst being helpful in determining the skills required by employees, does not really tackle in detail the effect that political behaviour might have on the employees' learning.

The research addressed in this paper focuses mainly on the competitive interpersonal micro-politics of self-interested individuals, and what effect this might have on the employees' learning at the workplace. As such, the primary focus does not fall on macro-scale industrial politics or structural power struggles, though such issues are of course an important part of the context and are attended to where appropriate. There are debates concerning whether workplace politics are of benefit or an impediment to workplace learning but as yet there has been no authoritative answer to this. According to Meriac & Villanova

(in Vigoda-Gadot & Drory, 2006), studies presented to date have paid more attention to the general perceptions of politics rather than observable political behaviours (2006: 17). Meriac & Villanova also suggest that more research is required to investigate the individual differences of employees and their behaviour in a political climate, specifically the interactions that take place (2006: 27).

Thus, the existing literature provides a somewhat superficial discussion of the relationship between organisational politics and learning, and therefore does not offer a systematic or detailed analysis of the actual effects of political behaviour on learning, and the purpose of this research was to begin to fill that gap.

### **The Study & the Methodology Used**

A number of questions were raised which informed the development of the main research instruments – a participant observation guide and a semi-structured interview guide. The study employed a qualitative research design and research data was extracted from the fieldwork notes and interview transcriptions of the participants who related the effect of political behaviour they were having (if any) on their learning. A methodology based on an inductivist approach was used to explore the participants' experiences, thoughts and opinions, since the study involved social processes and behaviours. Collected data which was transcribed and converted to text was analysed by using the N-VIVO Qualitative Data Analysis software.

The data collection process allowed for a detailed investigation of respondents' experiences of what they saw as political behaviour in the workplace, how they perceived that behaviour, how they reacted to it, and how those perceptions and reactions impacted on their workplace learning. On the basis of the findings, it can be concluded with some confidence that political behaviours and relationships within the workplace can and do have a variety of effects on the employees' workplace learning, which itself is mainly informal. It transpired that organisational politics may enhance as well as hinder the learning at the workplace, or may neither enhance nor hinder learning.

The political behaviours described by the respondents were categorised according to an analytical framework that was based on typologies of political behaviours and tactics provided by Mintzberg (1985), Allen *et al* (1979) and Lawrence *et al* (2005). Like all typologies, this framework is an imperfect tool in terms of faithfully representing all types of political behaviour, but it did provide a clear and, it is argued, valid tool for making sense of the data and delineating commonalities in the behaviours observed and described by respondents. The main themes pervading these behaviours were seen to be authority, power and rivalry. The most significant games and tactics identified include the 'Rival Camps Game', 'Attacking or Blaming Others', 'Insurgency Game' and 'Counterinsurgency Game'. While the respondents mostly described these tactics in terms of what other people in their workplace were doing, a few of the participants were engaging in some political behaviour themselves, in an attempt to get things done at their place of work, namely 'Reciprocity', 'Ingratiation' and 'Developing a Base of Support'.

### **The Kind of Learning Explored**

The majority of learning observed occurred informally mostly through experience and by receiving help from colleagues. This confirms existing evidence about the importance of informal learning, such as Yeo's (2008) suggestion that 80% of the learning occurs informally through self-directed learning, networking, coaching and mentoring (2008: 318). A few also learned in an unconscious way, through observation and by doing their own research. Most of the participants found it easy to learn their relevant tasks, despite the

political activity that affected their learning and some also found learning relatively easy *because of* the political activity.

The majority of the participants learned through receiving feedback from their superior or line manager except for a few: (i) Two participants did not appear to receive any feedback and this seemed at least in part due to a political tactic identified in their respective department, namely the 'Line vs. Staff'; (ii) One participant did not receive any feedback seemingly due to the lack of managerial skills of his superior; and (iii) Another participant had been in the department for a very short period of time and thus had not yet received any opportunity for feedback. The findings illustrate that there are a few employees who have found it difficult to learn due to the effects of political behaviours in their workplace. This echoes Mallon *et al's* (2005) implication that organisational politics can impede learning, thus making workplace learning an unnatural process for the employee (2005: 8).

The research presented in this study portrays an organisation where the journey from periphery to core proposed by Lave and Wenger (1991) (if indeed it does happen) is fraught with the difficulties caused by political relations. However, those same relations and behaviours can promote learning in ways that were unanticipated by Lave and Wenger's communities of practice model, which lacks any detailed analysis of organisational politics and does not identify the ways in which relations and political behaviours may promote learning.

### **The Types of Political Behaviour Observed**

The data revealed that respondents experienced several political tactics and games in the workplace, namely those tactics similar to Mintzberg's (1985) 'Rival Camps Game', 'Insurgency Game', 'Counterinsurgency Game', 'Line vs. Staff', 'Alliance Game' and the 'Expertise Game', Allen *et al's* (1979) 'Attacking or Blaming Others', 'Reciprocity', 'Impression Management', 'Ingratiation' and 'Developing a Base of Support', and Lawrence *et al's* (2005) 'Episodic Power'. The most commonly experienced political tactics are Mintzberg's 'Rival Camps Game' and 'Insurgency Game', and Allen *et al's* 'Attacking or Blaming Others'. According to the observations, these exist in seven departments. Behaviours associated with Mintzberg's 'Counterinsurgency Game' were also observed in four departments. More than one political activity has been identified in some departments. In one instance no significant evidence of political behaviour was found in one department however, the participant described being affected by the political tactics of the central administration.

### **Causes of Organisational Politics**

While the causes of workplace political behaviour are of secondary concern to this study, they still merit attention as they may help us to understand *why* peoples' experiences and perceptions of political behaviours impact on learning and how they can be addressed, eliminated or harnessed to improve learning. Vredenburg & Shea-Van Fossen (2010) affirm that organisational politics may be encouraged by cultural circumstances and individual surroundings at the workplace (2010: 31). This resonates with the results of the research wherein part of the micro-political behaviour seemed to be occurring due to the structure of the organisation. The participants indicated a few reasons behind the political behaviour they encountered; the most common being *narcissism* (a term used by one of the respondents), which corresponds with Lubit's (2002) (in Vredenburg & Shea-VanFossen, 2010) aspect of human nature that enhances organisational politics (2010: 35), *the new employee considered as a threat*, and *bureaucracy*. According to the participants, these three reasons generate the following behaviour and political games: 'Attacking or Blaming Others', 'Rival Camps Game', 'Insurgency Game' and 'Impression management'.

Participants also divulged a variety of emotional responses towards the political behaviour that affects their workplace learning, with the most common being 'frustration'. Some have also shown an amount of antipathy towards the bureaucratic processes within the organisation and saw them as a hazard to their learning. Findings of this research indicate that politics arising out of bureaucratic issues had divergent effects on the learning of individuals, which range from demotivation and frustration to opportunities to learn about the internal systems of a tertiary education institution. This sensitivity towards politics is confirmed by Vigoda-Gadot & Kapun (2005) who argue that employees are sensitive to decisions made in their organisation, that may be perceived as political and individuals may react emotionally in different ways (2005: 258). This also matches Rosen *et al's* (in Vigoda-Gadot & Drory, 2006) illustration that different personalities may perceive politics more positively than others (2006: 47).

### **The Effect of Politics on Workplace Learning**

The study illustrates that behaviour that is perceived as political may have a variety of effects on workplace learning; it may have a supportive effect, which matches the affirmation of Vredenburg & Shea-Van Fossen (2010) that organisational politics can also be functional, and; it may have an inhibitive effect or no effect at all on the workplace learning of employees. This is contrary to Drory & Vigoda-Gadot's (2010) affirmation that workplace learning is only likely to occur when there is low political behaviour in an organisation. All participants manage to learn and in the majority of cases, where a political behaviour was experienced, it had both a supportive and an inhibitive effect on their learning.

Moreover, from the study it transpired that any particular political behaviour may affect employees disparately and this conforms with Kurchner-Hawkins & Miller's affirmation that what is considered politically negative in one culture may be considered otherwise in another (in Vigoda-Gadot & Drory, 2006: 343). An example of this concerns two participants who encountered the same political behaviour of 'Attacking or Blaming Others' and who perceive the same effect differently: one considers the attitude of nonchalance or relaxed approach towards learning as inhibitive whilst the other perceives this same attitude as supportive. Nevertheless, such differences may not be due to cultural variation; they could also be due to personality, identity or dispositional differences towards learning at the individual level (Hodkinson & Hodkinson, 2004). A few of the participants who were affected by this political behaviour did not necessarily experience this from within the department in which they are situated but from certain parts of the central administration with which they had some sort of liaison.

### **Political Behaviour Concerning Authority**

From the findings it transpired that experiences of political games concerning authority had an important effect on workplace learning, and prime among these were similar to Mintzberg's (1985) 'Counterinsurgency Game' and 'Insurgency Game'. The 'Counterinsurgency Game' seemed to be supporting the workplace learning of the participants by compelling them to consider the learning of tasks informally through experience and help from colleagues as a positive challenge and increasing their concentration. The findings confirm in part that according to Lawrence *et al* (2005), without such political behaviour organisations cannot learn (2005: 190). One participant in particular improved his concentration during the learning phase, as a result of the legitimate 'Counterinsurgency Game' adopted by his supervisor. This also supports the conclusions advanced by Drory & Vigoda-Gadot (2010) wherein they say that political behaviour could be a useful part of organisational life (2010: 197). However, where this game is experienced, it can also inhibit the learning by instilling demotivation in other participants. Silverman

(2003) illustrates that lower level employees are often ready for greater autonomy and are eager to participate in decision-making related to their tasks (2003: 17). This was true in the case of some of the participants. During the research, one participant in particular commented that he wants to have more autonomy regarding his job but he is not granted the freedom to exercise his abilities to the full.

The 'Insurgency Game' is another game which, in this study, seems to support informal learning through experience by increasing confidence and making a participant look at things from various perspectives. Conversely, it can also generate frustration and anger towards learning, and learning is taking longer than necessary to be actuated. The study therefore identified both supportive and inhibitive effects in this regard. The findings suggest that insurgency games can be caused by a variety of factors such as; the *age gap*, the *individual likes to feel in control*, *a new employee is considered as a threat*, and *the presence of rigidity in job duties*. For example, respondents in more than one department claimed that supervisors were monitoring younger employees much more explicitly and closely than they did other employees. This lends some support to the contention that political behaviours may emerge partly as a product of age differences. However, the data do not allow any firm conclusions about this to be drawn, and it may be an issue for further study.

In one case, an employee found the workplace learning process arduous and difficult, mainly due to what he saw as behaviours that appeared to reflect the 'Insurgency Game' within his Faculty, especially with regards to decisions that had to be taken for the benefit of the faculty and the students. Conversely, the findings also promote the conclusion that behaviour perceived as political may be a driver for learning in that some managers respond by developing skills that enable them to work around political behaviour. This is in line with the suggestion of Butcher & Clarke (1999) wherein they propose that managers should be able to manage political behaviour and not simply avoid it, since management is also concerned with the resolution of opposing interests (1999: 12). This also raises the issue of individual differences meaning that some individuals may be predisposed to deal with politics in a confrontational way, while others may be predisposed to respond in a more conciliatory way. Their reaction is likely to depend in part on their previous experiences and how they have developed their managerial approach and coping strategies over time. This could possibly be an area for future research by investigating the causes & origins of these different dispositions.

For example, the employee mentioned above engaged in reconciliatory behaviour that was closely aligned to 'Developing a Base of Support' instead of using the 'Counterinsurgency Game' to manage his subordinates in a more confrontational way. He also seemed to engage in behaviours reflective of 'Reciprocity' in order to obtain the necessary resources from the central administration. Likewise another participant seemed to engage in 'Reciprocity' with the head of department by working more than her contracted hours in favour for a future academic post. Similarly, a different participant engaged in 'Ingratiation' in order to obtain the necessary resources from central administration. In this case the participant may have used (though it cannot be affirmed so) this behaviour in order to be seen positively in the eyes of the employees within the central administration, which conforms with the conclusions drawn by Drory & Vigoda-Gadot (2010), Poon (2003) and Sussman *et al* (2002) concerning the use of 'Ingratiation' as an influence technique.

### **Political Behaviour Concerning Power**

The findings illustrate that two particular political tactics specifically concerning power can have a key effect on the workplace learning of the participants. These include Lawrence *et al*'s (2005) 'Episodic Power' and Mintzberg's (1985) 'Expertise Game'. Experiencing political behaviour similar to 'Episodic Power' was seen to support the

informal learning of one participant in an administrative role by helping to increase her accuracy of numerical data related to her work, however when she felt that Episodic Power was being exercised by an academic colleague, it made her feel incapable and led her to question her competence during her learning phase. This is because she did not feel that the academic colleague allowed her to take decisions on his behalf, even in instances where her opinions may have been productive. According to Lawrence *et al* (2005) this perceived political tactic may benefit the organisation where a manipulated idea put forward is of benefit to the organisation, however it can also hinder workplace learning if it is inappropriately used (2005: 189). In the case of the above mentioned participant, the perception that this political tactic was being used did seem to inhibit her learning in a way but it also seemed to have resulted in some positive outcomes for her, by improving her standing with her colleagues. Another participant tried to stay detached from those members of staff engaging in 'Episodic Power' and thus, she seemed to have endured no effect on her informal learning.

On the other hand, the political behaviour similar to the 'Expertise Game' affected one participant in both a supportive and an inhibitive way. The participant felt that an Expertise Game was being played by his predecessor who tried to hoard information for himself because his leaving time was being prolonged by the management. On one side this experience enhanced the participant's rapport with colleagues and subordinates whilst learning informally from them. On the other side of the continuum this political game appeared to promote a sense of frustration, stress, demotivation to learn, and he also considered leaving the job. This supports Ladebo's (2006) and Vigoda-Gadot & Kapun's (2005) proposition that organisational politics are a source of stress at the place of work. This employee in particular had found his informal learning greatly impeded due to what he saw as the stress-inducing 'Expertise Game' played by his predecessor. Silverman (2003) states that a predecessor is the best source of information about a new job, however, Silverman does not mention that in such situations the individual may actually be a hindrance to his successor's learning if it is perceived that there is negative political behaviour such as the 'Expertise Game'.

### **Political Behaviour Concerning Rivalry**

The findings show that a number of political games and tactics concerning rivalry had an effect on the workplace learning of the participants. These games and tactics are similar to Allen *et al*'s (1979) 'Attacking or Blaming Others', and Mintzberg's (1985) 'Rival Camps Game' and 'Line vs. Staff'. Behaviours associated with 'Attacking or Blaming Others' seemed to affect the workplace learning in a supportive way wherein some employees who experienced it adopted a more relaxed approach towards learning (where the learning is formal on-the-job), others improved their knowledge and their political and organisational skills (where learning is informal both by experience and unconsciously), as well as increased their appreciation of learning at work. On the negative side this political tactic seemed to have the potential to instil carelessness towards formal learning and an attitude of nonchalance towards informal learning. Moreover, this political behaviour seemed to be reducing the pace of learning and instilling frustration and irritation in the participants' attitude towards informal learning.

Almost all participants experienced considerable engagement with bureaucracy which led to perceptions of the 'Attacking or Blaming Others' political tactic, and consequently inhibited workplace learning by causing irritation, frustration, conflict and demotivation, whilst in terms of support, this political game developed a better understanding of the organisation. One participant in particular was shocked during the first few weeks of working at the University due to the highly bureaucratic system and the way in which she

perceived that people avoided responsibility. This respondent expressed the view that many employees of the University failed or refused to take responsibility for core tasks, and found this a frustrating experience.

Other participants appeared to have had no inhibitive effect on their workplace learning in respect of 'Attacking or Blaming Others' tactics. In fact, the findings illustrate that some experiences of this political behaviour occurred due to the structure of the organisation. This cause is anticipated by Buchanan (2008) wherein he states that politics may be caused by structural relationships within an organisation (2008: 54). Also, the root of some political behaviour, namely the 'Attacking or Blaming Others' political tactic, seemed to be at least in part associated with institutional or departmental underinvestment in appropriate office space and other resources. The limitation of resources such as lack of space is one of the causes illustrated by Curtis (2003), Latif *et al* (2011) and many others. The supportive thing about this political tactic as encountered by one participant is that the individual unconsciously learned to play political games more effectively i.e. by keeping a paper trail of correspondence. Whether such learning can be described as 'positive' or not is certainly debatable, but that is perhaps a debate for another time.

The 'Rival Camps' game was seen to affect the informal learning by experience in a supportive way by improving the employees' assertiveness and knowledge. However, this political game also seemed to inhibit this same type of learning by instilling an attitude of demotivation, irritation, hesitation and self-doubt towards learning in the employees. A few others did not seem to be affected by this political game.

Behaviours connected to the 'Line vs. Staff' rivalry game were also seen to support informal learning. For example, in one instance it appeared to support the learning by experience of one employee in a way that made him more meticulous in his work. However it also seems to have the potential to inhibit learning by instilling demotivation towards informal learning and an attitude of nonchalance towards both formal and informal learning. One participant in particular experienced such demotivation as a result of such behaviours that he eventually resigned from his job. This may be considered as an addition to the consequences of organisational politics outlined by Vigoda-Gadot & Kapun (2005) wherein they affirm that organisational politics may cause an individual to detach either physically or mentally from the workplace (2005: 260).

In general, it seems that rivalry behaviours of various kinds can significantly impede or undermine workplace learning, and this was particularly illustrated where rivalry games were played out between groups of employees in central administration, namely the 'Rival Camps Game' and 'Attacking or Blaming Others'. The findings reveal a high degree of rivalry between two particular types of staff: (i) those employed on an indefinite basis i.e. until retirement age, and (ii) those employed for a definite period. Staff in (i) above perceive that the employees who are employed for a definite period are treated much better and have higher wages. There is a perception that the first group of employees seem to not be taking full responsibility for their job and there also seems to be a misconception in this regard.

This indicates that there may be a lack of communication between the management and the subordinates and there are also conflicts, which, conforming to Jehn (1997), seem to be task-related conflicts that have changed to relationship conflicts. This rivalry also supports Albrecht's (in Vigoda-Gadot & Drory, 2006) portrayal that employees tend to reduce their dedication, put in less effort and engage in withdrawal behaviour when they feel that they cannot trust other employees and the procedures of the organisation (2006: 109). Similarly, another participant indicated that the formal on-the-job learning she was undergoing is very difficult due to the 'Attacking or Blaming Others' behaviour that she felt occurs at the central administration. This particular participant found the centralised system very time-wasting for

her learning and prefers to do the things herself or seek help from other departments instead of going directly to the central administration.

### **Implications for Theory**

This research has looked closely at the effect of organisational micro-politics on workplace learning of individuals and has systematically investigated the impact of particular political behaviours upon workplace learning activity. The study also delved into the reasons behind the actual political behaviour. According to Buchanan (2008) structural relationships within an organisation may also be the cause of political behaviour (2008: 54). Such seems to be the case at the setting where this study has been carried out, wherein political behaviour in part occurs due to the formation of job duties. There also seems to be a lack of communication between the management and the subordinates which leads to misconceptions and consequently particular political behaviour such as the 'Rival Camps Game' and 'Attacking or Blaming Others'. The lack of performance measures, as also indicated by Gotsis & Kortezi (2010), Othman (2008) and Poon (2003), and other practices such as for example, talent management, are leading employees to become demotivated and engage in various political tactics such as 'Insurgency Game' and 'Attacking or Blaming Others'. In Malta there has been no studies regarding the effect of politics on workplace learning and this research will contribute to discussions in this area of sociological examination.

This study has also made a novel contribution to the existing research on politics and learning since it identified the type of effects that particular political behaviours have on the learning of the individual at the place of work. The effects may be learning-supportive or learning-inhibitive and these effects were completely unknown before this research took place. Where political behaviour is learning-supportive it is meant that the political behaviour improves and boosts the learning of the individual. On the other hand when the political behaviour is learning-inhibitive it is meant that the political behaviour impedes, obstructs or even delays the learning of the employee. The study also identified that any one political tactic can have both a supportive and an inhibitive effect. Other political behaviour seemed to have no effect at all on some employees. Whether the political behaviour is learning-supportive and learning-inhibitive or has no effect at all highly depends on how the individual reacts to a particular political tactic in relation to his or her learning. Thus, one can say that the effect of politics on learning depends to some extent on the individual's perception, character, disposition and state of mind.

### **Implications for Policy & Practice**

Undoubtedly, researchers who undertake a study in the organisation they are employed, do so because they feel the need to improve certain aspects of their organisation's processes (Coghlan & Casey, 2001: 676). Both Allen *et al*'s political behaviour and Mintzberg's political games were important for this study however, Mintzberg's definitions of the games have been very influential in this research. Mintzberg has 'illuminated' the research in question with the thorough characterizations of the various political activities. While he is not deprived of critics, Mintzberg is extensively valued in the arena of management and organisational theory (Lemieux, 1998: 36). One would ask, why choose Mintzberg's definitions of political activity? There are indeed other writers whose work on organisational politics is interesting and it is not intended to suggest that one should not investigate the work on organisational politics of other writers.

However, this research distinguishes Mintzberg's work on organisational politics as a model of how one can apply the definitions of political activity, particularly because he is a well-respected organisational theorist in his own right (Lemieux, 1998: 58). Moreover, his definitions offer a firm basis in understanding and observing commonalities in political

activity since, according to Lemieux (1998), they establish part of a broad construction of the primary theories on organisations drawn from political (as well as other areas on organisational theory) literature up to the late 1980s and because they are determinedly ingrained in the 'neo-functionalist sociological' focal point (1998: 58). As noted above, while no typology of social behaviours can lay claim to totally perfect or comprehensive representation, the benefit of using Mintzberg's typology of political behaviours (and also those used by Allen *et al*) is that it offers a clear framework for analysis and a useful heuristic tool for making sense of common themes in political behaviours.

On a general note, this research can contribute to discussions on policy making and the findings can be used to give advice on the benefit of implementing human resource best practices and how people react to different situations while they are learning. Some political behaviours seem to be beneficial for workplace learning, in certain circumstances and where individuals are positively predisposed towards political behaviours. Other universities might use this research as a guide to inform their understanding of how politics affect their employees' workplace learning. One should bear in mind that politics may have an influence on an organisation and in certain organisations politics may govern, even if for a short span of time (Lemieux, 1998: 59). According to Mintzberg (in Lemieux, 1998), such organisations are best defined in terms of power, not structure, and by power which is applied in illegitimate ways and not by means of authority or capability (1998: 59). As such, managers should have knowledge of how workplace learning takes place. Additionally, they should also have knowledge on the various political behaviour that may be present in a university setting, in particular those political behaviours concerning authority, power and rivalry identified in this study. The specific politics-learning relationships concerning these three types of politics might be most pertinent to them. These should also preferably learn some political skills as sort of 'survival skills', since from the study it transpired that a few participants in a management/supervisory role engaged in political behaviour in order to get things done.

Managers could also carry out a survey based on the causes and effects, perhaps those included in this study, to be able to identify the political behaviour that is present in their organisation and control the learning-supportive effects that the political behaviour is having on the learning of their employees. With the survey, managers could also identify the political behaviour that has a learning-inhibitive effect on the individual and try to contest these by making the necessary changes for example in the work process or the people that are hindering learning due to their political activity, and take action accordingly. It is really a case by case situation. These findings will also be of interest to other type of organisations, wherein employees are engaged in workplace learning.

Last but not least, in this research the bureaucratic structure of the organisation seems to be partly at the root of some political issues. The motive why bureaucracy and consequently organisational politics embellish is that they are a normal evolving quality of an organisation structure. The present structure seems to be influencing the employees' behaviour and thus is stimulating the enhancement of bureaucracy and political behaviour. Maybe the only way to overcome this dysfunction is to change the organisation's structure. This may be done by carrying out a reengineering and a restructuring exercise of the processes, policies and HR practices (such as rewards and incentives) of the organisation.

### **Reflections on Professional Practice**

The previous section shows that this study urges some changes to the HR practices such as the importance of developing several skills and enhancing communication, conflict resolution, coaching and mentoring. Conflict in the workplace may be a natural mechanism in an organisation, however it can be extremely damaging to employees and especially

teamwork. If employees are managed in an incorrect way, factual and reasonable differences between them can rapidly become rampant (Aritzeta et al, 2005: 175). This may result in situations where teamwork collapses and the goals and objectives are susceptible, particularly in circumstances where the wrong tactics to conflict resolution are used (Aritzeta et al, 2005: 161). Conflicting objectives can rapidly change into individual aversions: Teamwork is disrupted and capacities are unexploited as employees will tend to isolate themselves from their tasks, and end up in a rancorous descending meander of pessimism and blaming (Aritzeta et al, 2005: 175). In such situations it is beneficial to use a positive tactic to conflict resolution, where a discussion is considerate and non-provocative, and the focus remains on the issues rather than on the individual employees (Koza & Dant, 2007: 291). As long as individuals listen attentively and analyse the actualities, disputes and potential resolutions appropriately, conflict will likely be resolved in a successful way.

As part of the HR practice, the practitioner is to understand the various ways of resolving conflicts that may be present in a situation, and perhaps should use one of Thomas and Kilmann's (1974) five styles of conflict resolution, namely the Collaborative style. This style is useful since it involves the conflict resolver trying to meet the needs of all the employees involved. The conflict resolvers that use the collaborative style can be very emphatic however they collaborate well and recognize that all employees are significant (Koza & Dant, 2007: 281). This style of conflict resolution is beneficial when the conflict resolver is required to combine a range of perspectives to acquire a paramount resolution (Koza & Dant, 2007: 281).

Communication is important for the conflict resolution process. One has to listen sensibly in order to understand why one group of employees are espousing their point (Moreno, 2010: 103). Moreover, one has to understand where the other employees are coming from before defending the position of the other group of employees. At this stage, communicating effectively by setting out facts and objectives to both groups is vital in order to adopt the best resolution. Speaking of effective communication - it has to be understood that communication is an important tool in an organisation since it creates a clear understanding of the policies of the organisation (Moreno, 2010: 100) and it assists in enhancing the productivity of the employees (Moreno, 2010: 102).

This study clearly illustrates that unblemished communication and transparency are important so that the employees can understand the policies and the job responsibilities of their peers who receive higher wages. This communication would offer a sense of direction to the employees since they would understand what their peers are required to achieve from their tasks. Perhaps, as part of its practices, an HR Department, in line with the other departments, should create an effective communication strategy to outline what the organisation does and what its key objectives are, especially the role of each group of employees. The manager concerned for the groups must communicate effectively with his or her subordinates in order to achieve the team goals with minimal conflicts (Koza & Dant, 2007: 282). In addition, monitoring, which is part of the manager's job, is not possible without effective communication, since communication assists in the monitoring process of the employees' behaviour - this aids the employees to communicate any work issues and grievances to their managers (Koza & Dant, 2007: 282; Moreno, 2010: 105). Therefore, one may say that, in part, communication helps in the monitoring role of management.

Linked with communication are the mentoring and coaching skills. Previously it has been noted that it is most important to implement coaching and mentoring skills, which, apart from the workplace learning, may also enhance the development of relations at the workplace. Coaching and mentoring are skills that empower the employees to realise their full potential since both use the same abilities and tactic: coaching is short term task-based and mentoring is a longer term relationship (Hopkins-Thompson, 2000: 30; Martin, 2006). In

the past coaching and mentoring were only earmarked for directors and executives however, today these are accessible to every individual as a personal improvement instrument (Martin, 2006). These skills are also interconnected with organisational change activities so as to assist employees to agree on and adjust to the changes that take place (Martin, 2006).

In the case of the University of Malta, perhaps those employees who 'hold a grudge' against their peers who receive higher wages, would benefit from the coaching and mentoring skills, since coaching and mentoring focus on the individual employee to enhance his or her morale, motivation and productivity. Several people in a management position have never learned how to be an effective mentor and coach. One of the tasks of the mentor is to encourage an open and two-way communication, which may include the sharing of difficult times employees go through, thus instilling a sense of trust in their superior (Martin, 2006).

One should not forget the jealousy that occurs between work colleagues, especially when one is getting more money than the other, an issue which at the University of Malta is urging employees to be involved in political behaviour. Research shows that monetary payments stimulate the brain equally like other amphetamines such as food and drugs - "nonbiological reinforcers, such as money...can elicit neural activation in the same dopaminergic reward circuitry with drug and food rewards" (Gal, 2012: 1023) – thus earning money feels good. According to Pessiglione *et al* (2007) and Barridge & Kringelbach (2008), the greater the pay, the more stimulated is the brain. Moreover, Barridge & Kringelbach (2008) suggest that the fragment of the brain that is enthused by money is dissimilar from the fragment of the brain that is roused by kindness and thus, individuals are not able to express contentment when their counterparts gain more money. Therefore, the group of employees at the University who are jealous of their peers who have higher wages need to be made aware that the latter may have a natural ability or talent, or are of superior intelligence. They might also be more competent in their line of work in view of their skills and qualifications.

Finally, pay satisfaction may be a significant factor to entice and retain individuals in an organisation (Weiner, 1980: 745). When employees are not contented with the incentive structure of the organisation, they tend to exhibit inadequate role behaviours such as withdrawal or absenteeism (Weiner, 1980: 746). Conceivably the management should ask the following question and seek ways to communicate the answers to the unsatisfied employees: What determines the employees' contentment with their remuneration? There exist two answers for this question: 'Pay Adequacy' and 'Pay Equity'. Pay Adequacy is the extent to which an employee's remuneration fulfills his or her pecuniary requirements (Dyer & Theriault, 1976: 603). On the other hand, Pay Equity is the extent to which an individual identifies that his or her remuneration is just in comparison to other groups of employees in the organisation (Dyer & Theriault, 1976: 597). These answers should be seriously taken into consideration by the management in line with some of the conflicts that exist with regards to the salary structures for different groups of employees.

Undoubtedly, one cannot expect a working atmosphere to be jealousy-free and there may be employees who incorrectly perceive the credentials required to go up the career ladder; however, jealousy can be kept at a minimum level if the perceptions are talked through. Some employees will move up the ladder and others who are less competent or less qualified will not – this will surely generate resentment, jealousy, and further adverse sentiments. Thacker (1998) suggests that over time, those individuals who realize that their perceptions are incorrect as to what fits and what is rewarded in the organisation will ultimately leave the organisation (1998: 51). However, by coaching and mentoring, resolving conflicts, and communicating effectively with employees, the working relations between the different groups of individuals may produce a more harmonious work environment.

### **Further research**

Further research may usefully contribute to this area by examining in a similar way the experiences of employees in other universities, or perhaps employees in a different type of organisation with other types of jobs. Key informants, who are not presently engaging in workplace learning, whilst included in informal discussions as part of the data collection process, played only a minor part in this study and only the perceptions and actions of those newly employed, promoted or transferred to another department played a major role. There is also the need to gain more understanding of the mediating effect that individual dispositions have on the relationship between politics and learning.

### **Limitations of the Research Design**

The research design of this study took the form of a case study. It is often argued that one of the major limitations of a case study is its descriptive method, however according to Easton (2010), a significant opportunity that a case study has to offer is to understand a phenomenon in depth and comprehensively (2010: 119). Some argue that behaviour can only be described and not explained and the case study depends upon descriptive information provided by different employees (Easton, 2010: 124). Much of the information collected is retrospective data and reminiscences of past events, and is therefore subject to the problems related to memory. This may have left scope for important details to be left out. The case study involved only a single organisation and therefore may not be representative of a general group or population. Even though the case study presents rich data on the beliefs and experiences of a group of employees and can provide insights in unexplained frameworks, it does not examine the applicability to other contexts (Bell, 2005: 11; Darke *et al*, 1998; Easton, 2010: 126). By definition, case studies can make no assertion to be emblematic (Bryman, 2004: 51). There is no way of empirically knowing as to what extent the University studied is similar or different from other Universities. In addition, since the sample is particular, and the data is principally non-numerical, there are no means to ascertain the possibility that the data is representative of some larger population (Easton, 2010: 119). However, it is reasonably expected that much of what is described in this study may be found in other universities and therefore, it may be suggested that the research in question could support '*moderatum*' generalisations to other similar higher education institutions (Williams, 2000).

### **Conclusion**

The respective literatures on workplace learning and organisational politics are fairly well developed. However, the potential benefits to be gained from systematically combining these two fields of enquiry have been generally neglected until now. This is where this study has sought to make a contribution; in taking a systematic view of micro-political behaviours in organisations and attempting to illuminate the supportive and inhibitive effects that they can have on learning. Though the observations and the responses of the respondents are not to be viewed as established, objective facts, this study has identified issues which it is asserted add to the knowledge on the effect of politics on workplace learning. It is clear that political behaviour may have a profound effect on the employees' learning, particularly informal learning. These effects can be inhibitive and devastating for some, and supportive and fruitful for others. The study also identified that the organisation yields a lot of rivalry games due to its bureaucratic structure that seems to generate such political games concerning rivalry. One example of rivalry is occurring because one group of employees has the perception that the other group is treated and paid much better. In other cases, a small number of employees seem to have had no effect on their learning due to their choice to remain detached from the political manoeuvres. Probably a supplementary study of these

individuals would be interesting as these may divulge attributes regarding their capacity to remain immune to the political games and tactics.

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# **CYBER RESEARCH MENTORING IN SCIENCE IN PHILIPPINE PRIVATE UNIVERSITIES: LEVERAGING ONLINE COLLABORATION TECHNOLOGIES AND OFFSHORE-BASED ALUMNI**

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## **Abstract**

The paper discusses an innovative, low-cost, and result-oriented approach to science research mentoring for graduate students and/or junior researchers in Philippine private universities. This so-called Cyber Research Mentoring in Science (CRMS) program has three unique features. First, it leverages offshore-based alumni who are active in science and technology research to be mentors. Second, it utilizes free or inexpensive online collaboration technologies as platforms to bridge the physical gap and to provide virtual presence of the mentors. Third, it requires that all activities lead to journal publications. We evaluate the required collaborative technologies from the perspective of students and mentors, offer best practices as well as critical evaluation, and identify other structural/institutional mechanisms and supports to enhance the success of the program across a range of activities. The last section suggests new avenues for future research.

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**Keywords:** Technological research and development, 89.20.Bb, Physics Education 01.40.-d

## **Introduction: Scientific Research**

Graduate student research is an integral part of science and engineering education at any higher learning institutions. It is an essential training ground for students pursuing research careers in academia as well as in industries. One important by-product of these research activities are journal publications. The students' research undertakings are oftentimes constrained by (1) insufficient funding support for the faculty researchers, (2) limited financial resources of the university, and (3) restricted economic state of the country. Due to these limitations, the quality and quantity of science research experienced by graduate students from developing countries are oftentimes at a disadvantage compared with their foreign counterparts in developed countries.

In developing countries like Philippines, three of the most persistent and often-cited major challenges in advancing science research especially in private universities are: (1) limited well-trained technical personnel (teachers, scientists, engineers, researchers, and technologists which we will refer to, for simplicity, as scientists) available to conduct

research, (2) restricted time for local scientists to conduct research since majority of them are tied to lectures, classes and administrative tasks, and (3) lack of affordable facilities and operational laboratories that can be used by these dedicated scientists to advance their research works.

Historically speaking, the first and second problems are a by-product of the complex brain drain problem where large numbers of educated individuals or groups with high technical skills and knowledge emigrate to developed countries for various reasons [1-3]. The third problem is an equally challenging issue, and is rooted to the economic condition of the country, in general, and to the limited financial resources of the private university, in particular. Consequently, these problems (among other issues) narrow the research activities that university scientists can undertake, lower the number of graduate students that they can mentor, and eventually limit their overall productivity to produce Institute for Scientific Information (ISI)-indexed/cited international publications.

Table 1 shows a comparison of two universities in terms of scientific publications in a sub-field like physics from year 2008 to 2012. The two universities are in Philippines - one private (Ateneo De Manila University, ADMU) and one state university (University of Philippines, UP Diliman)

Year	ADMU	NIP
2012	2	20
2011	1	11
2010	3	12
2009	1	21
2008	3	23

**Table 1. Comparison of scientific publications in physics for two local universities.**

This table depicts two important points. First, it illustrates the fact that universities with healthy scientific publication outputs tend to have a strong access to human and financial resources. State universities like UP receive governmental research supports which lead to higher scientific publication outputs compared with a private university like ADMU. Second, the amount of financial supports that UP receives has a direct impact on the overall quantity of research publications. This fact becomes more apparent when we compare the number of ISI publications for the entire university of ADMU against Nanyang Technological University (NTU, Singapore) as shown in Table 2. During a 5 year span, it is apparent that on sheer volume alone, NTU leaps and bounds ahead of ADMU. Here most of the research done by NTU are funded by grants from the government which, according to the statistics provided by NTU, started in fiscal year 2008 at \$180M and is steadily increasing per year [4-5]. It supports the strong correlation between healthy scientific publication outputs and country's economic and political standing primarily because the state funds research projects that are in line with the goals of the state. Thus, the call for private universities like ADMU to increase its scientific publication output is more challenging compared with UP or NTU.

Year	NTU	ADMU
2008	736	85
2009	634	73
2010	147	161
2011	298	116
2012	771	163

**Table 2. Amount of Journal Publications per year for ADMU and NTU over 5-year span**

Against this background, there is a need for private universities like ADMU to explore other creative strategies that can increase its scientific publication outputs. Any strategies must complement on-going efforts of ADMU scientists. Furthermore, it is imperative that any strategies must be result-oriented and low-cost since financial resources are limited to start with. Lastly and most importantly, these strategies must focus on graduate students and junior researchers since they are the engine of sustainable research activities.

In this paper, we propose a new and interesting approach to science research mentoring for graduate students/junior researchers which we refer to as **Cyber-Research Mentoring in Science**. Briefly speaking, it is an offshore-assisted, long-distanced, journal-publication-driven, low-cost, science research mentoring program with the goal of publishing papers at ISI international journal within 6- to 9-months timeframe. In section II, we discuss CRMS and its 4 critical components. In section III, we provide our preliminary results while in section IV we evaluate the internet-based technologies that support this approach. A number of technical issues related to quality of online/distance conferencing including research topics selection are discussed. We also report the best practices we learned in our pilot trial as well as the limitation or practical issues or challenges. In section V, we discuss some recommendations for improvements.

### **Role of Cyber Research Mentoring in Science (CRMS)**

University research is critical to ADMU's continuing efforts to grow and expand from a "Learning University" to a "Learning and Research University" where productive research could lead to goods and products that are explored, designed and branded in Philippines and that will eventually contribute to sustainable national economic developments [6].

Research is one of the main components of science and engineering education that needs special attention. It brings hand-on experience where learned knowledge can be practiced and tested with the eventual goal of creating new goods, products or applications. Although graduate students and junior researchers are the engine of any university research activities, it is scientific research mentoring that is the critical vehicle to bring out the best formation for these future scientists.

Good research mentoring leads to ISI-journal publications which are significant in four levels. First for the graduate students, a list of ISI-publications in their resumes is very helpful especially if they are planning to pursue higher degrees in overseas universities. It is becoming the mode on how students are evaluated in today's highly connected, web-centric world. Second, for the local faculty member, it is significant because a list of ISI-publications is very healthy for rank promotion and career advancement. Third for the university, it is one of the major criteria on how the performance of a particular university is ranked both domestically and internationally. Lastly, for the country, there is a strong correlation between strong ISI publication outputs and economic development. This is clearly visible in the case of Japan in the '80, South Korea in the '90 and China, India and especially Singapore in the recent years.

## II-A. Cyber Research Mentoring in Science (CRMS)

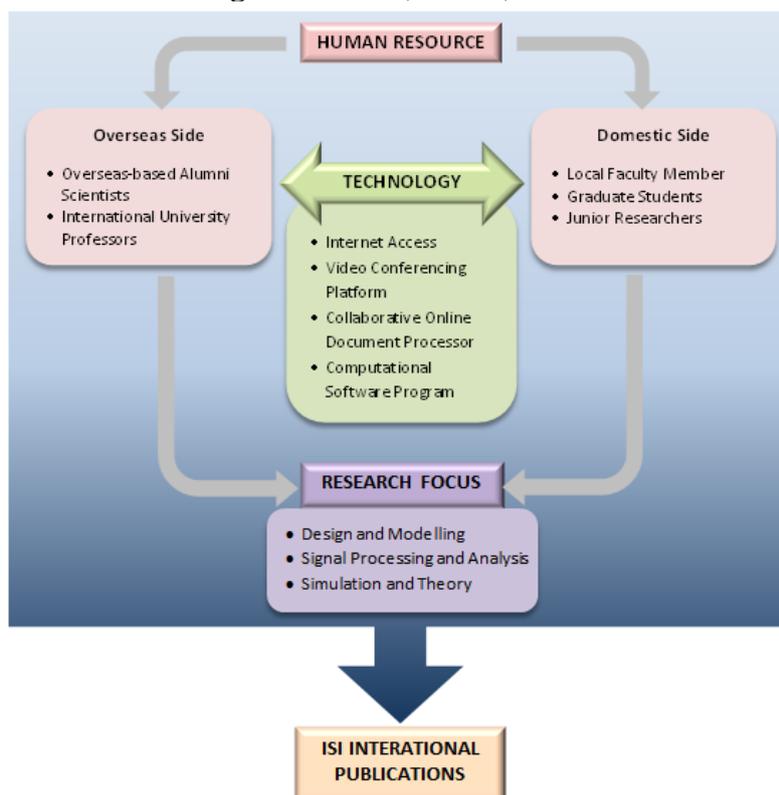


Figure 1. Diagram showing the concept of “Cyber Research mentoring” (CRMS)

**CRMS** is a long-distanced, research mentoring pilot program arranged by ADMU faculty member(s) in partnership with overseas-based Filipino, ADMU alumni/scientists to co-mentor or co-advise graduate students or junior researchers. It is a low-cost, journal publication-driven initiative whose success or failure is judged solely on whether the program translates into ISI journal publications within a period of six to nine months. This short timeframe is based on the principle of “quick failure and learning”. **CRMS** started this June 2013 and is currently in its preliminary stage. Figure 1 graphically conveys the general framework. Operationally speaking, **CRMS** consists of four core features which are described below.

**First, CRMS** is a partnership between three players namely; (1) ADMU faculty member(s), (2) overseas-based Filipino, ADMU alumni who are also active researchers/scientists, and (3) graduate students or junior researchers. It taps the technical expertise of overseas-based ADMU alumni. **CRMS** is a vehicle for overseas-based Filipino scientists to contribute their technical talents and time. This approach is premised on the commitment of these Filipino scientists to partially share their expertise on pro-bono basis. This is a sort of “brain-sharing” phenomena instead of the “brain drain” that is happening across different countries [7-8]. We are moving away from “brain-drain era” where technical knowledge are “carried away” by local scientists when they migrate to developed countries to a new “brain-sharing era” where actual residence of scientists becomes secondary as long as the commitment to serve its country of origin is there. This “new era” is made possible by the rapid development in internet’s collaboration technologies that cut across national boundaries.

**Second, CRMS** leverages these low-cost internet’s collaboration technologies which include the (1) fast internet access, (2) free video conferencing products (ex. Skype, ooVoo, Google Hangouts), (3) free online social networking and collaboration products (ex. Google

doc), (4) open-access publication journals, and (5) other inexpensive internet-based communication tools. The need for physical presence of the mentor is now disappearing with rapidly advancing video conferencing technology. Taken as a whole, all these technologies offer a new platform where “regular but virtual meetings” can be realized between offshore-based scientists and the local graduate students for research mentoring.

**Third, CRMS** limits its research topics to modeling, designs, processing, analysis, theory, and simulations because of two reasons. One, the long-distance aspect of **CRMS** does not make it ideal for physical experimental work. Second, the required software tools to conduct research are easily available in the university setting or are locally accessible at lower cost. These tools include the ever-increasing computing power of today's modest desktop/laptop computers, and easy access to sophisticated yet low-cost mathematical programs like Mathematica, and MATLAB. This simulation-focus research allows the whole program to maintain its low-cost structure. Together with student's increasingly sophisticated coding/programming abilities, these research topics are very doable.

**Lastly**, it requires that the research activity lead to publishable papers at ISI-journals after 6-or 9-months. The whole strategy is judged by this sole criterion. If it can produce publications, then the benefits are clear and obvious to the university, faculty members, graduate students and overseas-based scientists. If it fails, then other alternative strategies should be explored. This is based on the principle of “quick failure and learning”.

## **II-B. Formation of the CRMS Program**

CRMS is a pilot program participated by three entities namely; (1) a New York State (US)-based start-up technology company called Nasfine Photonics Inc. represented by ADMU alumni (Dr. B. Dingel), (2) ADMU Physics Department under the Vacuum research group (Prof. I. Culala), and (3) Mr. M. Jallorina (MJ), and Ms. E. Aranas (EA). Mr. M. Jallorina is currently pursuing his MS degree at ADMU while concurrently teaching in the same department as faculty instructor while Ms. E. Aranas just recently finished her MS at ADMU and is currently teaching at Miriam College, Philippines. Mr. M. Jallorina and Ms. E. Aranas are our graduate student and junior researcher, respectively.

Initial discussion of the CRMS concept took place in April 2013 between Dr. B. Dingel and Prof. I. Culala via email, followed by preliminary tour visit to ADMU Physics Department in May 2013 by Dr. B. Dingel. The program was approved and supported by other faculty members of the Physics Department namely; Dr. Minella Alarcon, and the department head Dr. James Simpas. The actual program started the following month June 2013 with the formation of weekly online meetings using Skype.

## **II-C. Research Topics and Research Process**

As mentioned previously, CRMS limits its research activities to simulation-centric-research topics involving modeling, design, processing, analysis, theory, and simulation because the required software tools are available in the university setting. This simulation-focus research allows CRMS operation to maintain its low-cost structure.

With the goal of publishing papers, Dr. B. Dingel selected the “Microring resonator (MRR)-based, Slow/Fast light-Assisted Optical Devices and Applications” as research area because of his technical familiarity and work in this area. MRR is considered a building block in many highly dense photonics integrated circuits and has wide applications in many fields. This general topic covers full spectrum of state-of-the-art, high performance optical device design challenges from the basic elementary device like optical filters for telecommunication applications to more complex applications such as optical interconnect systems and data center where future petascale and exascale MRR-based architectural platforms are needed. It is the core element in many MRR-based optical bio/chemical sensing applications, and many

physical phenomena such as EIT, etc. Thus, this topic provides a solid foundation where other research topics could emerge.

As an entry point to this research area, we focus on simulation of MRR-based Slow/Fast light-Assisted Gyroscope. Our plan is to initially follow the work of earlier researchers with the goal of extending their work, and then moving toward designing new and better configurations. In the initial online meetings, Dr. B. Dingel gave a series of lectures on on State-of-the-art and current trend in microring-resonator (MRR) technology. He also provided necessary background journal papers and thesis/dissertations as technical background information and references. In the succeeding weeks, Mr. M. Jallorina and Ms. E. Aranas devoted themselves in reproducing simulation results from these earlier journal publications. In between these weekly meetings, there were numerous one-on-one skype meetings between Dr. B. Dingel and M. Jallorina / Ms. E. Aranas to get technical clarifications and answers as well as to provide latest update on the simulation results. Originally, this research topic on MRR-based gyroscope is intended for international journal submission in mid-November 2013.

### III. Preliminary Results

Table 3 summarizes our preliminary, 5-month results related to publishing scientific papers. Although we originally planned to publish only international journal paper, the opportunities to submit papers at domestic conference and UNESCO e-conference just presented itself to us.

Research Paper Title	Research Duration	Conference Type	Conference Submission	Conference Website	Results and Comments
Microring Resonator Gyroscope: Comparison of the Sensitivity Profile for Various Coupling Conditions	3 Months (June to August 2013)	Domestic	SPP 31 <sup>st</sup> Congress (Philippine Physics Society)	<a href="http://www.spp-online.org">http://www.spp-online.org</a>	<ul style="list-style-type: none"> <li>• Missed due date by 1 week and the paper was not reviewed by the panel</li> <li>• There are plans to submit this paper to another local conference</li> </ul>
Design and Modeling of a New Microring Resonator (MRR) based Gyroscope	5 Months (July to November 2013)	International	Optical Communications Journal	<a href="http://www.journals.elsevier.com/optics-communications">http://www.journals.elsevier.com/optics-communications</a>	In preparation for submission mid November 2013
Cyber Research Mentoring in Science in Philippine Private Universities: Leveraging Online Collaboration Technologies and Offshore-Based Alumni	2 Months (August to October 2013)	eConference	UNESCO World Science Day Celebration Conference: Global Multidisciplinary eConference on "Science Does Not Know Borders"	<a href="http://www.econferencunday.net">http://www.econferencunday.net</a>	This Conference

**Table 3. Summary of the research paper submissions in the last 6 months.**

The first publishing challenge came to us after the initial 3-month of research work where we had 80% new simulation results to justify submitting a paper at domestic conference (31<sup>st</sup> Annual Philippine Physics Society Congress). The research paper is entitled "Microring Resonator Gyroscope: Comparison of the Sensitivity Profile for Various Coupling Conditions". However, the tasks required to complete the remaining 20% and to write the collaborative research paper lead us to miss the submission date by 7 days. Although we submitted with request for consideration, the conference organizers unfortunately decided not to accept all other 50 late-submission papers including our paper. At present, we plan to submit this paper to other regional conferences.

This experience brought out both the strengths as well as the weakness of CRMS operation. On the positive side, the fast and speeding learning curves experienced by M. Jallorina / Ms. E. Aranas confirmed that our research topic is appropriate for students in Philippines and the our research mentoring structure under CRMS is working. On the weakness side, it required us to improve our operation and help us identified keys issues such as time allocation and others. These weaknesses will be discussed in details in section IV.

The second publishing challenge came to us after reading this UNESCO e-conference on Global Multi-disciplinary Science's Call of Paper whose conference theme is "Science does not know borders". This came to us as an opportunity to disseminate our proposed science mentoring strategy which blends well with our goal of this e-conference.

Our third publishing challenge is still on-going with the original goal of submitting journal the paper entitled "Design and Modelling of New Microring Resonator (MRR)-based, Slow/Fast Light-Assisted Gyroscope" at ISI journal this coming early December 2013.

All these aggressive submission goals under limited but aggressive 5-month time frame have helped us identify and evaluate key issues both in terms of the necessary collaboration technologies as well as the manpower concerns. In the following section, we discuss these issues in greater details.

#### IV. Evaluation of the Required Technologies:

In this section, we highlight the evaluations of the technologies, best practices, open issues, and articulate this new perspectives toward remote research mentoring,

##### IV-A. Low-Cost Technology Platform

Because local universities are hyper-sensitive to overall cost, a major consideration to CRMS operation is low-cost. Thus, CRMS utilizes (1) free high-speed data internet access at the university setting, (2) inexpensive video conferencing technologies (examples, Skype, Oovoo, Hangout, etc), (3) free social media collaboration (Google Doc, etc) software, (4) locally available computers with increasingly higher computing power, (5) pervasively available generic mathematical software tools (Mathematica, MATLAB, etc), and (6) open-access journals. Taken as a whole, these technologies act as enabling platform that solve many of the financial constraints on the institution side, and yet provide a vital infrastructure for CRMS.

Technologies	Products	Useful Features	Needed Features
Internet Speed	Local ISP provider	University has decent internet bandwidth	Locations outside the University need to have a decent internet connection
Video Conferencing Tools	Skype	Decent network which provides a stable internet connection	Other features such as group video and screen share are only available after a fee
	ooVoo	Group Video and Screen Share	Network is slow and connectivity is an issue, even with a high-speed internet connection
Online Cloud Storage	Google Docs	Users can simultaneously edit a document	Cannot handle equations and certain limitations to word processing functionality
Mathematical Tools	Mathematica	Interactive Parameter Manipulation and Dynamic Data Visualization	Software version mismatch
	MATLAB		Software version mismatch

**Table 4. Evaluation of technologies/products, its useful features, and recommended features to enhance the productivity of CRMS experience.**

Despite these huge low cost advantages of these above mentioned technologies and tools, they have limitations compared with traditional face-to-face meeting between mentor and graduate student. Here, we provide our evaluation from the perspective of both the overseas-based mentor and the graduate students. Table 4 summarizes these limitations or difficulties.

First, the fluidity of discussion during the long-distance, online meeting is often times compromised. In the typical setting, the mentor and the student working in the same university can discuss any time as long as their schedules allow. In off-shore research, however, the participants must consider global time zones. This imposes an additional constraint on both parties, and may sometimes dampen research momentum. Especially in the context of resolving conflicting results or interpretations where a vigorous exchange of reasoning and explanation is needed, the time difference delays the response of both parties, something that does not happen in regular research set-ups.

Second, technological limitations also compromise fluidity. Slow internet connection delivers poor video and audio quality, thereby impairing understanding. The need to terminate the call a few times in the middle of a dynamic discussion just to improve the connection impedes learning.

Third, the video conferencing platform used to facilitate the research meeting can still be improved. While Skype manages group calls neatly, it does not cater much to scientific discussions where a lot of equations and derivations have to be shown and written in real time.

Fourth, the collaborative technical writing programs like Google Drive also needs to be improved. Google (Doc) Drive allows the simultaneous editing of manuscripts where changes can be tracked easily and automatically saved online. This avoids the clutter that would have been brought by repeatedly downloading and uploading the manuscript again every time something is changed. However, the problem with Google Drive is that it does not handle equations, tables and figures well. It destroys the manuscript's format, thereby forcing us to revert to the old, cumbersome way.

Fifth, the mathematical software tools (Mathematica, MATLAB) used to facilitate the numerical simulations are exceptional but software version mismatch used between two parties can lead to difficulties. We had occasions where simulation results have numerical differences from the same Mathematica program run by the two parties using different software versions at two different computers. The worst case is when the Mathematica program created from the latest version can not run on an older one. This forces one party to purchase the latest version of Mathematica to avoid this problem. The emerging applications and services like "cloud computing" where software can be accessed by either parties in the "cloud" would offer the best future solution and create a higher-class of research mentoring experience for the graduate students.

Lastly, projection screens, electronic whiteboards and two-camera setups would be useful technologies. An ideal improvement, however, is to develop an integrated CRMS software application consolidating all the video conferencing, manuscript writing, and electronic discussion tools in one platform.

On a different note, we believe that working on simulations and theory made CRMS more manageable. Had the research study been more experimental in nature, the monitoring of laboratory set-ups and troubleshooting of equipment over the internet would have been more challenging.

#### **IV-B. Participants and University Structure**

Beside technologies, we also evaluate the participants' concern on the following issues as they impact to their performances as they relate to CRMS. These concerns are: (1)

different global time zones, (2) time allocation per day, (3) research topic mismatch, and (4) university structures as shown in Table 5. These issues are rated with rating #1 being minor concern to rating #5 being major concern.

Although CRMS can be very helpful to university, faculty members and graduate students, CRMS would probably fail if it is not integrated into the educational curriculum and/or supported by the university structure. In our experience, one of the most important problems is time allocation of faculty members and graduate students for CRMS. At present, faculty members are participating in CRMS on top of their current administrative duties, teaching loads and current research group activities, while graduate students are performing research activities on top of their current class loads. Eventually, time allocation touches the educational curriculum and the university structure since research activities, in general, and research mentoring, in particular, are time consuming activities. Time is the critical resource. We therefore suggest that the faculty member engaged in CRMS should receive a “deloading credit” from their teaching units while graduate students should received a class “credit”.

Other concern is the mismatch of research topic being conducted with student graduate or junior researcher or faculty member’s specialization or expertise. At present, this can not be avoided since research topic is selected based on overseas-based scientist’s expertise. The rationale for this arrangement is dictated by the goal to publish at the earlier time where overseas-based scientist can provide guidance and direction to the research work. However, future work has to integrate the current research works in the university so that it will truly be sustainable.

Participants	Issues			
	Time Zone	Time Allocation per Day	Research Topic Mismatch	University Structure
ADMU Faculty Members	2	4	3	Faculty De-loading
Graduate Students or Junior Researchers	2	4	2	Class Credit
Overseas-based Scientist or Alumni	2	4	1	N/A
Rating of 1 to 5: 1 being a minor concern and 5 being a major concern				

**Table 5. Evaluation of participant’s main concern experience.**

## Conclusion

For a decade now, these collaborative technologies have been changing the way student learn-read-and-absorb “old” traditional materials, and tinker-and-experiment with “new” materials. They have revolutionized our educational institutions. Now, these tools in conjunction with offshore-based expatriate talents will constitute a paradigm shift in the way we conduct science research mentoring in the future. When video conferencing, mathematical tools, and Google Doc-like application software are integrated with “cloud computing”, this scenario will create an ideal platform for any CRMS activities that can lead to higher-class of research experience for graduate students.

Given the above future outlook, the essential component in making CRMS successful would still be Filipino scientists abroad committed to sharing their talents, time and expertise. ADMU would still need to continue to enshrine the “man-and-women-for-others”upbringing. This is aside from being able to give both its students and faculty the necessary processes and incentives to do and sustain scientific research.

As a summary, we proposed and presented an innovative, low-cost, and journal-publication driven approach to science research mentoring for graduate students and/or junior researchers in Philippine private universities, which we refer to as Cyber Research Mentoring in Science (CRMS). It leverages the two above mentioned elements namely; (1) offshore-based alumni who are active in science and technology research to be mentors, and (2) free or

inexpensive online collaboration technologies as platforms to bridge the physical gap and to provide virtual presence of the mentors. Our preliminary results showed promising potential. We also evaluated the required collaborative technologies from the perspective of students and mentors, offered best practices as well as critical evaluation, and identified other structural/institutional mechanisms and supports to enhance the success of the program.

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## **EDUCATIONAL SERVICE MARKET AND THE PROSPECTS FOR THE DEVELOPMENT OF KNOWLEDGE IN GEORGIA**

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### **Abstract**

The rapid pace of globalization found its reflection in education sphere. Topic studies are in great progress in terms of education development and integration of knowledge. However, no serious researches are done. The same situation is evident in Georgia as well. Analysis in certain aspects of the educational service is made by Unified National Examination Center of the Ministry of Education and Science. But the work carried out by the center in this direction has more in formative nature than a complex scientific research. The paper analyzes the educational field, the most important aspects of marketing; on the base of problem analyzing and the cause-effective evaluation the author offers educational market service survey University model and sets the ways for knowledge development.

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**Keywords:** Labor market, Marketing research, Price policy

### **The problem**

The rapid pace of globalization found its reflection in education sphere. Researches in terms of education, development and integration of knowledge are in progress nowadays. Abovementioned topic is under the attention of the post-soviet scientific societies as well. However, it should be noted that important study of the subject has not yet been carried out in post-Soviet countries. The same situation is evident in Georgia as well. Analysis in certain aspects of the educational service market is made by unified National Examination Center of the Ministry of Education and Science. But the work carried out by the center in this direction has more informative nature and is not considered as a product of complex scientific research.

For example: the program PIRLS- 2006 and PIRLS-2011 was to determine what and how the 9-10 year-old children read in Georgia? What factors contribute to the development of reading skills in our country and how much ahead or behind we are in this term of research than other participating countries? The research objective is to find out how successfully a student could overcome the high school curriculum.

Next, an international educational research program is represented by TIMSS program. TIMSS is international survey of teaching and learning of mathematics and science the aim of which is to promote mathematics and science classes. The study of these subjects provides the formation of logical thinking, analysis and reasoning skills, which is a basis of implementation of a successful teaching and learning process not only in schools, but in high schools.

The quality of education is very important in terms of education development which is greatly dependent on the level of teacher's education. The research under TEDS-M's name, made by the national examination center of the Ministry of Sciences and Education of Georgia, includes abovementioned survey.

Finally, the program PISA, which examines what factors influence student's achievement. PISA allows, for a certain period of time, to conduct monitoring and evaluation of the changes taking place in the educational system.

Separate high schools (Universities) in Georgia conduct analysis of the educational service market. But they are conducted only within the framework of interests of specific institutions and therefore is not a mass character.

Thus, to ensure the integration of educational sector of the country in the world educational environment, our goal is to carry out complex research of educational service market and find the perspectives for problem knowledge development.

## **Research**

During the last decade in the educational environment there is a strong competition between both public and private universities. At first glance, as if all accredited universities found their space and somehow taken their places in the educational services market. However, due to the strategic vision, it's only the beginning and, to establish the name of a competitor in the market, each must strive due to their own resources. At the same time viable will become the one, which will have a very good long-term strategy and could develop and successfully implement its management. This last, due to modern requirements need modern marketing management of a high level. That is why there is a need for education marketing, and moreover the necessity of it.

In the field of education, marketing approach is related to many problems from which the primary is funding issue. Traditionally, even in developed countries, education was and remains primarily the object of attention and support. It is financed by the state and local administration bodies. With the development of knowledge economy, a bounce development of educational services market is noticed, where supply exceeds demand in most cases. This was confirmed once again in 2012, by the national test results. But the purpose of marketing management is that results should not be single signals in corporate (universities) management and should not appear as past reminders. They need exact analysis, cause-effects study of events and on the bases of conclusions implementation and realization of development plans.

The participants of real marketing relationships represent not only educational institutions, but also the users (individuals, organizations, institutions), brokers a wide circle (employment services, labor market, registration bodies, educational institutions, licensing and accreditation, etc.) as well as public institutions that participate in the market for educational service promotion.

Students, their personal sides play a huge role among educational service marketing subjects. They are not just simple carriers of educational services, but they represent the only final consumer. For proper regulation of educational service the functions of user organizations include: information delivery for intermediaries, educational institutions and the individual person about request; special requirements on the quality of educational services; their participation in quality assessment of educational service; full or partial reimbursement of the costs of services provided, which despite salary compensation may be implemented by other forms of compensation. In Georgian reality, this cannot be provided on appropriate level. This indication is based on incorrect and late providence of information for consumers and mediators by the side of Universities; The electronic pages of universities in the wrong administration (incomplete information, non-renewable pages, etc..). A survey conducted in 2007-2011 revealed that from 13 leading Universities only 5% timely conducted renewal of electronic pages, while in the rest ones one could find incomplete information, that makes it difficult for consumers to make right choice. This fact is also undesirable in

terms of marketing. On the basis of incorrect information it is hard to do a proper analysis and recommendations.

Territory marketing is an important object of education marketing. For customers (students) it is important to know where the educational institution is located. How much safer and easier is to travel to university. And, if it is connected to additional costs, how does the part of budget expenditure of students or employee increase? During carrying out joint programs living conditions are very actual not only for students. Despite strong material-technical base, most universities in Georgia(except state universities) do not have a dormitory that complicates the implementation of joint training and exchange programs, increase university costs, which ultimately affects the pricing policy.

The subject of territory of Educational institution becomes less problematic if a university professor- a teacher has a good Renome (experience), and scientists in this or that field provide the university with new, innovative products (research programs, inventions, patents, and various kinds of educational products), which in turn forms the basis for the creation of the brand and its development. Market expansion policy and brand maintaining is the most time-consuming and problematic for education marketing. This is a topic which in complex includes the operating of the following topics:

- \_ to create a stable competitive advantage;
- \_ quality of teaching and training –materials of methodology in accordance with modern requirements;
- \_ differentiate user requirements – pricing policy problems;
- \_ differentiation according to regions and educational product;
- \_ providing consistent quality and competitive price;

According to these criteria, the study shows that the majority of universities do not have a comprehensive approach toward education marketing. The determinant of the competitiveness for universities is their legal status and “competitive price” established by the state.

Due to marketing approach this is a non-profitable policy, because the long-term needs of state universities will not be able to provide relevant input.

The number of students increase due to relevant prices, for whom material-technical base is no longer available; the whole attention is directed to this problem, but the second, more important- human resources- remain without attention. As the entire resource is directed to provide technical base there remain insufficient number of personnel conducting the training process Professors'- Teachers' salaries don't increase, moreover, because of huge flow we get multi-number groups but salaries of Professors'-Teachers' still remain the same. In fact, it decreases- if in 30 member group a lecturer takes 20 GEL an hour, his salary does not change in case of 50 and 100 member group, where the number of students are-2 and 3-times more. This is directly related to the quality of teaching, which is the long-term causes its deterioration. In this case, deterioration of University professors' and teachers' Renome (experience) may begin. Finally, it is followed by the actual loss of brand. Based on survey results (6 state University students were interviewed) 65% of students- noted that the state fee is the factor, why they have chosen the study at this type of universities, for 21% -university status remains a priority, while 14%- could not give the exact answer to the question.

We have quite different picture in case of private universities. Here goes price competition and loses the one which does not care for university and does not implement innovative products throughout university. Universities, which provide a high level of brand management high price is no worry. Simply these two features should be consistent.

Unfortunately, there is still the reality of the private universities, which have low prices to try to withstand the competition and the quality of low override rate. By survey the number of such universities in education service market in Georgia still reaches 35%.

Finally, we will discuss another important issue concerning distributes deals. There can be identified three main tasks for marketing:

1. Selling policy-optimization;
2. Communication policy problems;
3. Marketing research problems

The first two, are more or less carried out at universities, although there are some deficiencies and as for the third one, it should be noted that the kind of deep researches are not carried out in 95 per cent universities.

Most universities are satisfied with the first year students' interview and as for the graduates the interview is the superficial and formal in nature.

Labor market research and studies in this direction and results of the educational process is very important and essential for university competitiveness.

It never occurred in educational sphere to make nationwide integrated research for defining demands according to specialties. Based on some firsthand information, we tried to study present day situation in this direction and do retrospective analysis.

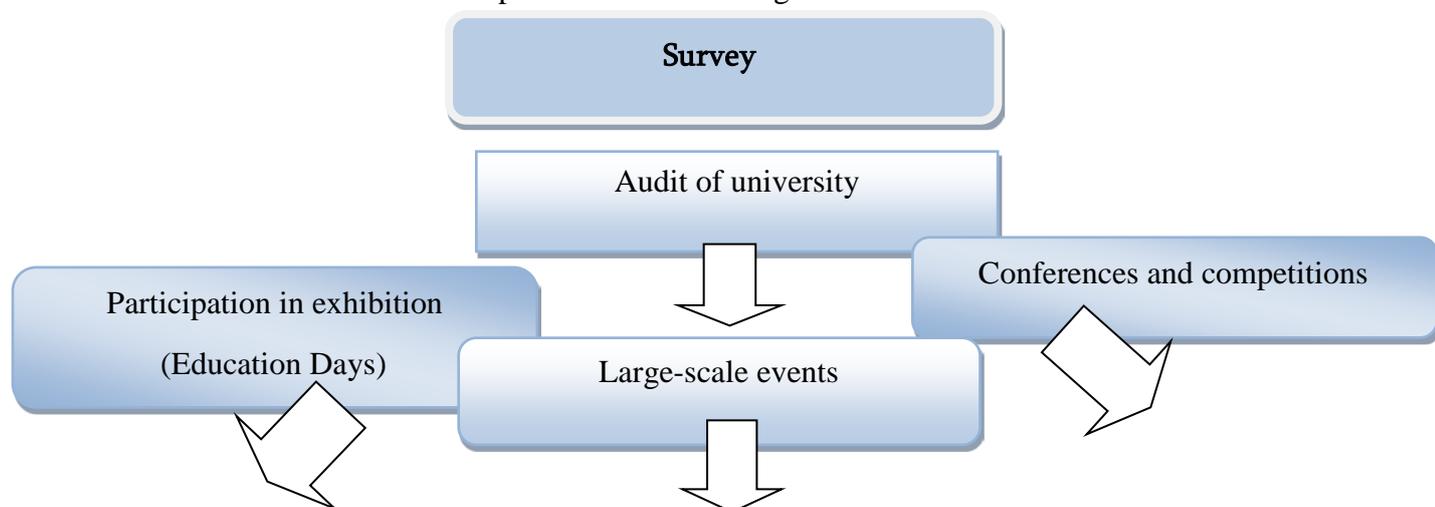
In the labor market from existing vacancies 58-62% of the demand falls on such trends of business administration as: Finance Manager, Operation Manager, Marketing Manager, Project Manager (including international projects), Sales Manager, Consultant Manager, the office manager, personal banker, accountant, assistant Director, and others.

According to the analysis in the labor market done by The Danish Refugee Council in 2012, it is clear that in recent years there is a great demand for qualified personnel in industry and agriculture. Employers' survey identified key indicators of competitiveness, among which the first three places are for the production of high professionalism of the staff (23%); knowledge of Competitive production (21%), and the effective management of employees (12%). This indicates that at present demand for professionals, skilled specialists in business administration grows more and more. The same research indicates that in industry and agriculture there is demand for profession-oriented, practical skills staff. Similar arguments and conclusions are made in employment project as well as in regional labor market research.

### Conclusion

The paper carried a small study which showed timeliness and urgency of education marketing for the competitiveness of universities.

The abovementioned is represented as following:



Picture 1. University model of service marketing

On the basis of university audit an effective distribution of marketing expenses and university income is possible. Implementation of large-scale activities is an important element of university image and reputation. Participation in variety of exhibitions, different activities and competitions organized by the university, promotes the expansion of the brand. As for the pricing policy, there are several available options which may be considered by the University. These are: informational, consultative services, leasing, renting; organizing various training and preparatory courses for enrolling the university, implementation of short-term educational programs and others.

For graduates employment it is possible to develop the program “maximum” and “minimum”. The first one involves establishing and maintaining feedback with potential employers which provides employment for graduates and improves the university image. The program “maximum” provides employers with a means to develop “maximum”.

Although the international researches done by the Ministry of Science and Education of the national examinations are focused on determination the level of school students learning and teaching and in this aspect sort out the problem, we think it will be good if the results of the research will be analyzed and used in certain higher institutions in order to process future educational programs and methodology. The research information will also help universities (chiefly, the newly established and small universities) have a look at the subjects rating scores and in advance determine the answers on the main questions of education marketing: Who to teach? Why to teach? Whom to teach? Where and how to teach? Which ultimately determines their competitive position in the educational market?

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# THE ACADEMIC PROFESSION AMONG FACULTY AT SAUDI UNIVERSITIES

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## Abstract

Discourse about the academic profession on higher education institutions has grown in recent years. This paper explores the significant role of the academic profession. In addition, it gives an overview of the problems and challenges surrounding academic profession among Saudi faculty members. The study has included a proposal to improve the process of the academic profession, and to develop faculty performance for teaching, research process, and society services.

**Keywords:** Academic Profession, Higher Education, Faculty, Saudi Arabia

## الاحتراف الأكاديمي

لأعضاء هيئة التدريس في الجامعات السعودية

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ملخص بالعربية

يظل التحدي قائماً بين جامعات اليوم على امتداد خارطة العالم في درجة الاهتمام بأستاذ الجامعة، وتوفير البيئة العلمية المناسبة له، والسعي لتطوير قدراته ومهاراته، باعتبار أنه أهم الركائز الرئيسة في العملية التعليمية، وأن الاهتمام به أحد المعايير التي تعكس جودة التعليم وجوده مخرجاته في أي مؤسسة تعليمية، ولم تخل أي حركة إصلاح في التعليم قديماً وحديثاً من برامج خاصة تهتم بتطوير أستاذ الجامعة، وتعمل على تهيئة جميع الظروف المناسبة له لتأدية كافة أدواره في خدمة العلم وثقافة المجتمع.

ومع الثورة التقنية والتحول الاجتماعي والاقتصادي التي تحتاج عالم القرية الكونية اليوم أصبحت برامج التنمية المهنية لأعضاء هيئة التدريس والنمو المهني جزء لا يتجزأ من خطط وسياسات الجامعات المنتجة *Productive Universities*، على اعتبار أن الأداء المهني لعضو هيئة التدريس وتطويره وتقييمه وتهيئة المناخات العلمية له هو نوع من الاستثمار الأكاديمي *Academic Capital* الذي يجب أن تتضمنه سياسات وبرامج التعليم العالي.

هذه الدراسة تسعى إلى تشخيص جانب من حالة القلق الأكاديمي *Academic Anxiety* داخل أروقنا الجامعية من خلال تسليط الضوء على واقع الأداء المهني لأعضاء هيئة التدريس وحرث الأرض الأكاديمية بأبعادها المختلفة لمعرفة أسباب غياب مبدأ " الاحتراف " الأكاديمي لدى أعضاء هيئة التدريس، وكشف معوقاته، وعرض لبعض تجارب الجامعات الذي تقوم على مبدأ الاحتراف والمهنية في الأداء الأكاديمي، ومن ثم المساهمة في تأسيس رؤية علمية تنتهي برسم برنامج متكامل لتطبيق مبدأ الاحتراف الجامعي كأحد المداخل الذكية في تحقيق التنمية المهنية المستدامة لأعضاء هيئة التدريس بمؤسسات التعليم العالي.

**الكلمات المفتاحية:** (الاحتراف الأكاديمي، التعليم العالي، أعضاء هيئة التدريس، السعودية)

**تمهيد**

يظل التحدي قائماً بين جامعات اليوم على امتداد خارطة العالم في درجة الاهتمام بأستاذ الجامعة، وتوفير البيئة العلمية المناسبة له، والسعي لتطوير قدراته ومهاراته، باعتبار أنه أهم الركائز الرئيسة في العملية التعليمية، وأن الاهتمام به أحد

المعايير التي تعكس جودة التعليم وجوده مخرجاته في أي مؤسسة تعليمية، ولم تخل أي حركة إصلاح في التعليم قديماً وحديثاً من برامج خاصة تهتم بتطوير أستاذ الجامعة، وتعمل على تهيئة جميع الظروف المناسبة له لتأدية كافة أدواره في خدمة العلم وثقافة المجتمع.

ومع الثورة التقنية والتحول الاجتماعي والاقتصادي التي تجتاح عالم القرية الكونية اليوم أصبحت برامج التنمية المهنية لأعضاء هيئة التدريس والنمو المهني جزء لا يتجزأ من خطط وسياسات الجامعات المنتجة *Productive Universities*، على اعتبار أن الأداء المهني لعضو هيئة التدريس وتطويره وتقييمه وتهيئة المناخات العلمية له هو نوع من الاستثمار الأكاديمي *Academic Capital* الذي يجب أن تتضمنه سياسات وبرامج التعليم العالي.

ويورد تقرير استراتيجية تطوير التربية العربية ما نصه " إن مستقبل الأمة العربية في المدى القريب والبعيد يتوقف على هذا التعليم - أي التعليم العالي - باعتباره السبيل إلى إعداد القوى البشرية المتخصصة ومجال توليد الفكر وإعداد الباحثين والقادة في مجالات العمل والإنتاج وأداة تجديد الثقافة".

ورغم النجاحات الكبيرة التي تحققت في فترة وجيزة من عمر التعليم العالي في المملكة العربية السعودية إلا أننا نتطلع للمزيد من التطوير وتجاوز كثير من العقبات التي تعترض هذه المسيرة المباركة، ويمكن رصد بعضها لتساعد على شخصنة واقع التعليم العالي:

- نسبة نمو الإنفاق الحكومي على التعليم العالي والجامعات في المملكة لا تزال ضعيفة رغم تحسنه مع الوقت إذ تشير لغة الأرقام إلى أن نسبة النمو في الإنفاق على التعليم العالي بالنسبة للنواتج المحلي في عام 1400هـ (1.45%) وفي عام 1418 كان (1.48%) وفي عام 1425هـ كان (1.50%) ليصل في عام 1429 إلى (4.5%) وفي عام 1433 وصل الإنفاق على التعليم العالي (6.9%) من مجمل الإنفاق العام من ميزانية الدولة (وزارة التعليم العالي، 1433).
- واقع البحث والإنتاج العلمي لأعضاء هيئة التدريس في الجامعات السعودية لا يزال ضعيفاً ناهيك عن حجم الإنفاق عليه، وفي دراسة حديثة أثبتت أن معدل الإنتاج العلمي لأعضاء هيئة التدريس عينة الدراسة بلغ 1.25 عمل/عضو/سنة. بينما بلغ متوسط عدد البحوث المنشورة والكتب والأوراق العلمية 0.63 بحث/عضو/سنة و 0.25 كتاب/عضو/سنة و 0.37 ورقة/عضو/سنة (الشايح، 1425هـ).
- الواقع الأكاديمي لأعضاء هيئة التدريس يشير بوضوح بعدم عدالة توزيع الساعات لعضو هيئة التدريس، فالتدريس الجامعي يأخذ النصيب الأكبر على حساب البحث والإنتاج العلمي وخدمة المجتمع مما يعني خلل كبير في الوظيفية الأكاديمية لعضو هيئة التدريس، حتى أصبح التدريس اللغة المسيطرة على مهام أستاذ الجامعة.
- سياسة اختيار المعيدين في بعض الجامعات لا تزال تخضع لمعايير عامة وغير دقيقة مما يعني إعادة إنتاج الواقع مرة أخرى دون أن تكون هناك برامج خاصة تسعى لتأهيلهم ورفع قدراتهم خلال السنة الأولى من تعيينهم والتي تعتبر في حكم السنة التجريبية.
- تقويم الأداء الأكاديمي لأعضاء هيئة التدريس في الجامعات لم يتحول بعد إلى برنامج عملي بل لا يزال مفهوماً علمياً نقرأه فقط في الدراسات والبحوث العلمية، ورغم بعض الاجتهادات والمحاولات في بعض الجامعات إلا أنها تصطدم ببيئة أكاديمية اعتادت على نمطية معينة في الأداء الأكاديمي وثقافة لها جنودها تحارب هذا النوع من التطوير والتقييم.
- كما أن الجامعات تشهد حالة من فقد أعضائها إما بالتسرب للقطاع الخاص، أو طلب التعاقد المبكر، أو بلوغ سن التعاقد النظامي، و كما عبرت إحدى الدراسات أن الهيئة التدريسية تقترب من مرحلة الكهولة، والوضع ينذر بالقلق، مما سيضطر الجامعات إلى اللجوء إلى بديل التعاقد، لتباطؤ خطط الإحلال وتأهيل أعضاء هيئة تدريس عن طريق تعيين المعيدين وابتعاثهم، لكن المشكلة كما تذكر الدراسة بأن الجامعات أصبحت ليست الخيار الأول لغير السعوديين في

التعاقد لأعضاء هيئة التدريس المتميزين وخريجي الجامعات الأجنبية المرموقة لعدة أسباب منها سلم رواتب المتقاعدين والبيئة التعليمية والبحثية في الجامعات السعودية (مازي & أبو عمة، 1425هـ).

هذا الواقع لم يكن وليد اليوم بل كانت هناك إرهابات سابقة توجي بتداعيات هذه الصورة، ووجدت دراسات سابقة تنبأت بحدوث هذه الأزمة في بداية الثمانينات الميلادية وطالبت بالتخطيط وسرعة الإصلاح في التعليم العالي (كشميري، 1984)، وفي أول مؤتمر عربي لمسئولي التعليم العالي الذي عقد في الجزائر في مايو 1981 كان موضوع التنمية العلمية والمهنية لأعضاء هيئة التدريس في الجامعات جزء من التوصيات التي انتهت إليها المؤتمر، غير أن الآليات والبرامج العملية والمتابعة لمثل هذه القرارات وتفعيلها هو ما ينقص التعليم العالي في عالمنا العربي.

واليوم تزداد الحاجة مرة أخرى إلى إعادة النظر في واقع التعليم العالي من خلال تشخيص الواقع الأكاديمي للجامعات بوضوح، وتبني سياسة إصلاح واسعة في التعليم العالي، يقف في طليعة عملية الإصلاح هذه تطبيق برنامج الاحتراف الأكاديمي لأعضاء هيئة التدريس ونشر ثقافته في الوسط الجامعي.

### مشكلة الدراسة

هذه الدراسة تسعى إلى تشخيص جانب من حالة القلق الأكاديمي Academic Anxiety داخل أروقتنا الجامعية من خلال تسليط الضوء على واقع الأداء المهني لأعضاء هيئة التدريس وحرث الأرض الأكاديمية بأبعادها المختلفة لمعرفة أسباب غياب مبدأ " الاحتراف " الأكاديمي لدى أعضاء هيئة التدريس، وكشف معوقاته، وعرض لبعض تجارب الجامعات التي تقوم على مبدأ الاحتراف والمهنية في الأداء الأكاديمي، ومن ثم المساهمة في تأسيس رؤية علمية تنتهي برسم برنامج متكامل لتطبيق مبدأ الاحتراف الجامعي كأحد المداخل الذكية في تحقيق التنمية المهنية المستدامة لأعضاء هيئة التدريس بمؤسسات التعليم العالي، وبالتالي يمكن صياغة تساؤل الدراسة على النحو التالي:

ما مفهوم الاحتراف الأكاديمي، وما معوقاته، ومكوناته الأساسية، وما هي الخطوات العملية التي يمكن تبنيها لتحقيق مبدأ الاحتراف الأكاديمي بين أعضاء هيئة التدريس في الجامعات السعودية؟

### أهمية الدراسة

تتبع أهمية الدراسة من أن تبني أسلوب الاحتراف الأكاديمي في الجامعات كأسلوب منهجي ومؤسسي يمكن أن يساهم في تأسيس ثقافة جديدة ومنتجة ذلك لأن الاحتراف الأكاديمي:

- عملية منظمة وهادفة ومع الوقت يمكن تطويرها وتمييزها.
- عملية يمكن تحويلها إلى مؤشرات أداء، وبالتالي يمكن قياس نموها.
- عملية استثمار حقيقي للعنصر البشري في الجامعة.
- أحد المدخلات المهمة في عملية تحسين الجودة النوعية في التعليم العالي.

### أهداف الدراسة

تسعى هذه الدراسة إلى تحقيق الأهداف التالية:

- (1) تشخيص الوضع الراهن لواقع الاحتراف الأكاديمي لأعضاء هيئة التدريس في الجامعات.
- (2) كشف أهم معوقات الاحتراف الأكاديمي.
- (3) التعرف على أبرز مكونات الاحتراف الأكاديمي.
- (4) بلورة رؤية وبرنامج لتوطين مفهوم الاحتراف الأكاديمي داخل الجامعات ومؤسسات التعليم العالي.

### منهج الدراسة

استنادا على طبيعة هذه الدراسة فإنها تعتمد على المنهج الوصفي التحليلي الذي يهتم بدراسة وتشخيص الواقع ويكشف عن أسباب مشكلة البحث ويرصد ظواهرها ويفسر أسبابها بهدف الوصول إلى نتائج وحلول تساهم في الإجابة على تساؤلات ومشكلة البحث (العساف، 1409).

### مفهوم الاحتراف الأكاديمي

لم يطلع الباحث على أي دراسة علمية باللغة العربية أطلقت هذا المصطلح من قبل على الأداء المهني لأعضاء هيئة التدريس، وتعد هذه هي الدراسة الأولى التي تتبنى هذا المفهوم وتدعو إليه وذلك على الأقل على مستوى علم الباحث. وبالرجوع إلى قاموس اللغة العربية نجد أنه قد جاء في لسان العرب أن الحرفة من الاحتراف وهو الاكتساب يقال "يحرف لعياله ويحترف" بمعنى يكتسب من ههنا وههنا، وقيل هو الصناعة وجهة الكسب و"حرفة الرجل" صنعته، و"أحرف الرجل" إذا كد على عياله، والمحترف هو الصانع، وفلان "حرفي" أي معاملي أي صاحب عمل، وفي المأثور "إني لأرى الرجل يعجبني فأقول هل له من حرفة؟ فإن قالوا لا سقط من عيني".

وفي اللغة الإنجليزية نجد أن مصطلح professional هو أقرب المصطلحات لمفهوم الاحتراف والذي يطلق على الفرد الذي يمتلك الكفاءة والاختصاص والمهارة في نشاط أو علم محدد ويتوقع أن يؤديها الفرد على نحو مؤثر وفعال، كما يؤكد المصطلح على معنى دقيق وهو أن يؤدي الفرد هذا العمل في صورة عمل مدفوع بأجر مع تفعيل جانب الخبرة والبراعة في هذا العمل، كما تضع اللغة الإنجليزية مصطلح amateur الذي يعني الهاوي والفرد غير المتقن، والذي تعوزه الخبرة والبراعة في أي فن أو علم في مقابل مفهوم professional مما يؤكد المعاني السابقة لمفهوم الاحتراف.

وبذلك يمكن القول بأن الاحتراف في اللغتين العربية والإنجليزية يدور حول عدة معان منها:

- أن المحترف صاحب عمل وصناعة محددة.
- أن يكون قصده الاكتساب وأن يكون عمله مدفوع الأجر.
- امتلاك الكفاءة والاختصاص والخبرة في عمله.
- أن يؤدي العمل بكل براعة ومهارة.
- أن المحترف يأتي في مقابل الهاوي وغير المتقن.

فالاحتراف الأكاديمي إذا عملية منظمة يؤدي عضو هيئة التدريس من خلالها واجباته العلمية والمهنية على نحو فعال ومؤثر يعتمد فيه على الكفاءة والتميز العلمي، والسعي لتطوير قدراته ومهاراته، والتحلي بأخلاقيات العمل الجامعي، ويتحول العمل الجامعي بذلك إلى مهنة يرتبط بها أستاذ الجامعة دون غيرها بحيث يتفرغ للأداء الأكاديمي ويتفرغ لكل نشاط له علاقة بمهامه الأكاديمية داخل أو خارج الجامعة.

ويمكن تعريف الاحتراف الأكاديمي بأنه عملية منظمة وهادفة تسعى إلى رفع الكفايات العلمية والمهنية لأعضاء هيئة التدريس وخلق اتجاهات إيجابية نحو العمل الجامعي وداخله ورفع مستوى إنتاجية عضو هيئة التدريس وتحقيق أهداف التعليم العالي.

والاحتراف الأكاديمي مفهوم شامل لما تطلق عليه بعض الأدبيات العلمية النمو المهني لأعضاء هيئة التدريس، والذي يشير إلى النمو الذاتي الذي يمارسه عضو هيئة التدريس، رغبة في تطوير مهاراته وقدراته العلمية والمهنية، كما يشمل مفهوم الاحتراف الأكاديمي أيضا عملية التنمية المهنية والتي يقصد بها عادة الجهد المؤسسي الذي تقوم به مؤسسات التعليم للرفي بالجوانب العلمية والمهنية لأعضاء هيئة التدريس.

### الدراسات السابقة

تناولت مجموعة من الدراسات العربية الأداء الأكاديمي/المهني لأعضاء التدريس في الجامعات العربية، لكنها لم تتحدث بشكل دقيق عن مفهوم الاحتراف الأكاديمي ونقل الأداء الأكاديمي بصورته التقليدية إلى صورة أكثر مهنية، و ركزت هذه

الدراسات على المعوقات التي تواجه أعضاء هيئة التدريس وتمنع من أداء مهامهم بصورة أفضل، ومن تلك المعوقات الإدارة البيروقراطية لدى الجامعات، وسوء المناخ العلمي، وضعف العلاقة بين أستاذ الجامعة وطلابه، وزيادة العبء الدراسي، وضعف الإمكانيات المادية والتقنية، وضعف المقررات الجامعية وتقليدية التدريس، وضعف الثقافة العلمية لأعضاء هيئة التدريس، وندرة المشاركة في المؤتمرات العلمية، وضعف الحوافز المالية، وضعف التأهيل المهني لأعضاء هيئة التدريس (المحسن، 2003).

أما في الدراسات الغربية فنشير بشكل سريع إلى مجموعة منتقاة من أوضاع متعددة في العالم التي تبنت مفهوم الاحتراف الأكاديمي من خلال حركات إصلاح ونهوض شاملة أو جزئية لأوضاع التعليم العالي، جعلت الاحتراف ركيزة رئيسية فيه، والملاحظ بشكل دقيق لمجمل هذه الحركات الإصلاحية يجد أنها بدأت في وقت متقارب وهو عقد التسعينات الميلادية من القرن الماضي تزامنا مع الثورة التقنية والانفجار المعرفي التي تشهده البشرية.

ففي إيطاليا بدأت عملية الإصلاح التعليمي للعمل الجامعي في منتصف التسعينات الميلادية بهدف تحسين المنتج الجامعي وتوزيع مخرجاته بشكل أكثر فعالية وتأثيرا في عالم اليوم، واعتمدت عملية الإصلاح على مجموعة من المرتكزات الأساسية من أهمها نظام التقويم المستمر لأداء الجامعة وأعضائها وعلى رأسهم أعضاء هيئة التدريس لدفعهم لمزيد من الاحتراف والمهنية في أدائهم (Moscatti, 2001).

وفي أسبانيا تشير إحدى الدراسات عن أن عملية الاحتراف الأكاديمي تأخذ تقدما ملحوظا مع الوقت منذ البدء في عملية الإصلاح الجامعي في عام 1980م وأشارت الدراسة إلى أن زيادة أعداد الطلاب في التعليم العالي والثورة التقنية في التسعينات وتطور المعرفة والتحديات الاقتصادية كانت عوامل محفزة لعملية إصلاح جامعي جديدة للأخذ بمبدأ الاحتراف الأكاديمي وتنمية قدرات وكفاءة أعضاء هيئة التدريس في الجامعة (Mora, 2001).

أما في الولايات المتحدة تتواصل عمليات التقويم والتطوير للعمل الجامعي في وسط تحديات متعددة من أبرزها التغيرات الاقتصادية والاجتماعية والتطور التقني، وتركز عملية الإصلاح على مبدأ التقييم والمحاسبة لأعضاء هيئة التدريس ورفع مستوى أدائهم وأدوارهم ووظائفهم في ظل تلك المتغيرات بشكل أكثر فاعلية. ويوضح Levine Arthur بشكل أكثر المتغيرات التي حفزت صناعات القرار في التعليم العالي في الولايات المتحدة على تبني عملية إصلاح واسعة في التعليم العالي وهي:

- (1) التحول في متطلبات وأنماط التعليم العالي
- (2) التغيير في خصائص الطلاب وتطلعاتهم
- (3) التحول في نظام التوظيف في الجامعات
- (4) الزيادة المطردة في استخدام التقنية والانفجار المعرفي
- (5) نمو القطاع الخاص المنافس في عملية التعليم العالي

كما تكشف دراسات أخرى عن مجموعة من المشكلات التي تواجه عملية الاحتراف الأكاديمي في التعليم الجامعي في الولايات المتحدة، وأهم هذه المشكلات التفرقة في الحقوق على أساس "الجنس والعرق، ففي دراسة مقارنة بين الوضع الأمريكي والوضع في اليابان، كشف الباحث الياباني في رسالته للدكتوراه على أن عدم المساواة في المرتبات بين الرجل والمرأة تحت قبة الجامعة، وأزمة التوازن بين عمل المرأة في الجامعة وعملها الأسري هي أهم السمات المشتركة بين البلدين والتي تقلل بشكل أو بآخر من عملية الاحتراف الأكاديمي وتؤثر عليه (Yuka, 2004).

وتوضح دراسة أخرى إلى أن أهم ما يواجه الأقليات والسود بشكل خاص من مشكلات في العمل الجامعي أنهم يشعرون بأنهم معزولون عن زملائهم الآخرين، وأنهم لا يزالون يجدون بعضاً من صور العنصرية، وعدم التقدير الكافي من

مرؤوسيتهم، وأنهم ينظرون إلى أعمالهم على أنها أقل درجة من غيرهم، وأنهم عادة لا يثبتون Not tenured كثيرا بعد فترة التجربة في العمل الجامعي كما هو حال غيرهم، إضافة إلى انخفاض المرتبات مقارنة بغيرهم (المحسن، 2003). وفي بداية التسعينيات الميلادية أيضا كانت هناك صحوة جديدة في التعليم العالي في البرازيل، و تشير إحدى الدراسات إلى أن أهم مظهر من مظاهر هذه الصحوة هو دخول القطاع الخاص بقوة في مجال التعليم العالي نتيجة ظاهرة الضعف العام في الجامعات الحكومية، وترصد الدراسة التحول الكبير لأعضاء هيئة التدريس وانتقالهم للقطاع الخاص والتي يقدم مميزات ضخمة كمرتبات عالية مقارنة بمرتبات القطاع الحكومي، ويقدم لهم عقودا أطول، ويدعم مجالات البحث العلمي، كما يساهم في تقديم البرامج والخدمات التي تزيد من تأهيلهم وتمييزهم بشكل أفضل، وتشير الدراسة أيضا إلى أن هذه الظاهرة ساهمت بشكل لافت في زيادة أعضاء هيئة التدريس واتجاههم نحو الاحتراف الأكاديمي، فبينما كانت نسبة أعضاء هيئة التدريس من حملة الدكتوراه في القطاع الخاص لا تتجاوز نسبته 8% في عام 1992م أصبحت النسبة في عام 2003 أكثر من 25%، وأما حملة الماجستير فقد زادت من 20% في عام 1992م إلى 41% في عام 2003م، مما يعكس أهمية البيئة وعوامل التحفيز في تجذير ثقافة الاحتراف الأكاديمي (Balbachevsky & Holzhaecker, 2004).

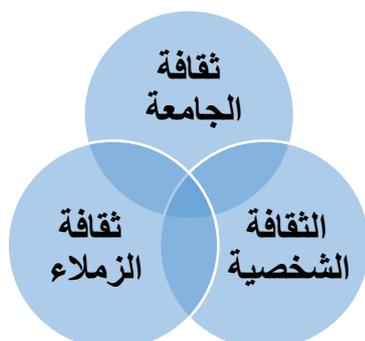
وفي دراسة عن عوامل القوة في عملية الاحتراف الأكاديمي في المكسيك أظهرت الدراسة إلى أن رسم السياسات الجامعية وبلورة البرامج داخل الجامعة بشكل أكثر وضوحا لأعضاء هيئة التدريس كان له أثره في تطوير العملية التعليمية داخل الجامعة، وتنمية قدرات ومهارات أعضاء هيئة التدريس بشكل احترافي، كما أتضح أثره أيضا في اتجاهات أعضاء هيئة التدريس للحصول على درجات علمية أفضل في السلم الوظيفي الخاص بهم، كما أشارت الدراسة إلى أن عضو هيئة التدريس في المكسيك لا يزال يقضي معظم وقته في التدريس على حساب البحث العلمي مما أضعف إنتاجهم مقارنة بالدول الأخرى، وانتهت الدراسة إلى أن تفعيل الاحتراف الأكاديمي مرتبط كثيرا بالسياسات العامة لكل جامعة (Gonzalez & Laura, 2004).

وتتزايد الأصوات داخل المؤسسات التعليمية على امتداد خارطة العالم التي تتادي بضرورة إعداد أستاذ الجامعة ومراجعة أدواره ووظائفه في ظل التغيرات والتحولات التي اكتسحت العالم، وأصبحت هذه الدعوة جزء لا يتجزأ من أي دعوة إصلاح للتعليم العالي في أي بقعة في العالم، وبدأت تطرح كثير من جامعات وكليات العالم اليوم برامج متخصصة في الاحتراف الأكاديمي وذلك عبر مراكز خاصة بتطوير مهارات وقدرات أعضاء هيئة التدريس، وتكون هذه البرامج جزء من سياسة الجامعة وبرامجها الدورية.

#### معوقات الاحتراف الأكاديمي

تتأثر عملية الاحتراف الأكاديمي بمجموعة عوامل متعددة ترجع بمجموعها في ظن الباحث إلى ثلاث ثقافات رئيسية:

أولاً: ثقافة الجامعة	University culture
ثانياً: ثقافة الزملاء	Collegial Culture
ثالثاً: الثقافة الشخصية	Personal Culture



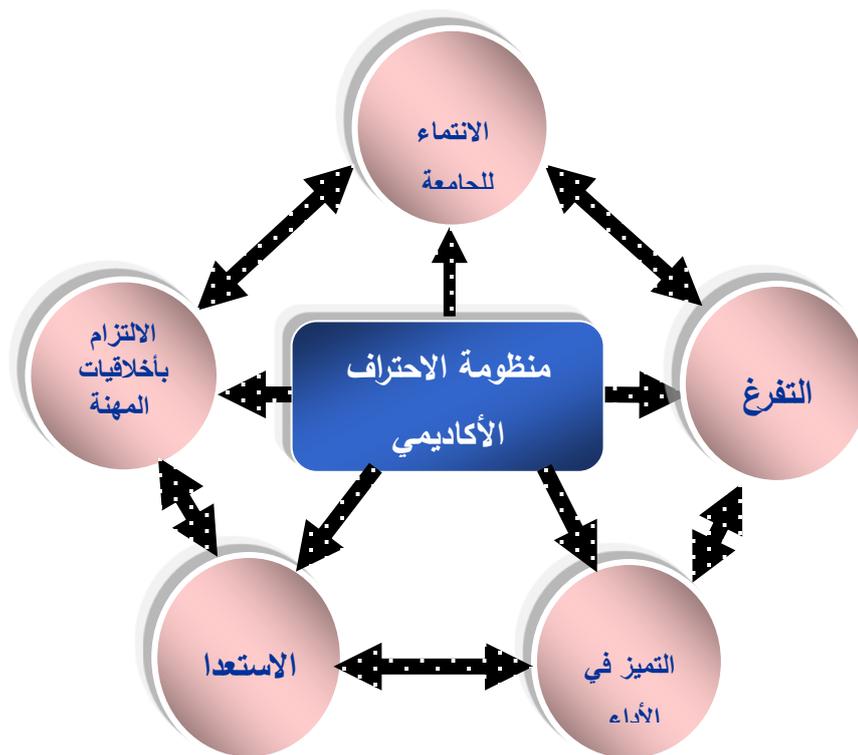
## شكل رقم (1) الثقافات الثلاث

هذه الثقافات الأكاديمية الثلاث تساهم سلباً أو إيجاباً في عملية الاحتراف الأكاديمي، ونرصد هنا مجموعة من المعوقات التي تنتبثق من مجموع تلك الثقافات والتي تحول دون أن يتمكن أستاذ الجامعة من الوصول إلى تطبيق مفهوم ومبدأ الاحتراف الأكاديمي، ومن تلك المعوقات ما يلي:

- (1) غياب المعايير العلمية لتقويم الأداء الأكاديمي
  - (2) غياب تنميط الشخصية الأكاديمية
  - (3) غياب إدارة الجودة الشاملة
  - (4) ضعف البيئة الأكاديمية بشكل عام
  - (5) عدم وجود برامج عملية لتنمية مهارة وكفاءة أعضاء هيئة التدريس
  - (6) فقدان الشراكة الأكاديمية بين الجامعات والقطاع الخاص
  - (7) ضعف الحافز لدى أعضاء هيئة التدريس
  - (8) ضعف الكادر المالي لأعضاء هيئة التدريس
  - (9) إغراءات القطاع الخاص لأعضاء هيئة التدريس
  - (10) الأعداد الكبيرة من الطلاب داخل القاعات الدراسية
  - (11) نمطية وتقليدية المنهج الجامعي
  - (12) زيادة العبء الدراسي لعضو هيئة التدريس
  - (13) ضعف النشاطات العلمية والبحثية لأعضاء هيئة التدريس
  - (14) كثرة الأعباء الإدارية الملقاة على عاتق عضو هيئة التدريس
  - (15) شدة المؤثرات النفسية والاجتماعية والأسرية
  - (16) قلة الوقت المخصص للتنمية العلمية والمهنية
  - (17) عدم وجود سياسات واضحة لتوجيه أعضاء هيئة التدريس نحو تنمية قدراتهم ومهاراتهم العلمية
  - (18) الاعتقاد السائد بأن عضو هيئة التدريس ليس بحاجة إلى برامج التنمية المهنية
- ويلخص الخطيب تأثير هذه المعوقات في دراسة له مشيراً إلى أن هذه "الاحباطات المتلاحقة التي يعيشها أعضاء هيئة التدريس في التعليم العالي بسبب عدم مراعاة احتياجاتهم، وشدة الظروف التي يعانونها، وكثرة القيود على حرياتهم الشخصية وغير الشخصية، وعدم النظر إليهم بمنظار يراعي تفوقهم وإبداعهم وإنتاجهم العلمي ومشاركتهم المجتمعية والدولية، وإعطاء الفرص الجيدة والمزايا لمن هم دونهم وتقصي العديد من صور الاتصال غير الفعال معهم وبينهم، كل ذلك له تأثير سلبي خطير على النمو العلمي المهني لأعضاء هيئة التدريس، والخاسر الأكبر دائماً هو المجتمع الأكاديمي، والمجتمع الكبير برمته" (الخطيب، 1425هـ).

## المكونات الأساسية لمنظومة الاحتراف

تقوم عملية الاحتراف الجامعي في اعتقادي على خمس مكونات أساسية (أنظر الشكل 2) يمكن إجمالها فيما يأتي:



شكل رقم (2) المكونات الرئيسية لمنظومة الاحتراف الأكاديمي

### (1) الانتماء للجامعة

وتعتمد درجة الانتماء أو الولاء عادة على توافر مقومات رئيسية من أبرزها:

- الأمن الوظيفي Job Security
- الاستقلالية Professional Autonomy
- المشاركة في اتخاذ القرار Decision-making
- الرضا الوظيفي Job Satisfaction

في دراسة علمية لمجموعة من الدول الغربية عن مستوى الولاء (loyalty) أو ما يطلق عليه أحيانا في بعض الأدبيات العلمية درجة الالتزام للمؤسسة (commitments) أوضحت الدراسة أنها تتفاوت قوة وضعفا تبعا لمجموعة من المتغيرات من أبرزها الأمن الوظيفي، والموقع الوظيفي لعضو هيئة التدريس داخل الجامعة، وطول الفترة الزمنية التي يقضيها عضو هيئة التدريس في الجامعة، وأكدت الدراسة على أنها هذه العوامل هي التي تحفز أعضاء هيئة التدريس على مزيد من الولاء للمؤسسة التعليمية، كما أشارت الدراسة إلى أعضاء هيئة التدريس ممن هم على درجة الأستاذية هم أكثر ولاء ممن هم دونهم مرتبة علمية، ويلاحظ هنا أن هذه الفئة في الجامعات الغربية لها مكانة علمية مرموقة وأجور عالية ضخمة، كما أوضحت الدراسة أخيرا إلى أعضاء هيئة التدريس ممن يعملون بالنظام الجزئي هم أقل ولاء للمؤسسة التعليمية. (Enders, 1997)

بينما تلمح دراسة أخرى إلى أن مبدأ الولاء للجامعة يرتبط بالتوجه المهني لعضو هيئة التدريس فالذين يميلون إلى التدريس الجامعي يكون ولائهم للجامعة أشد، بينما الذين يفضلون البحث العلمي ويرتبطون بمؤسسات أخرى في قضايا البحث العلمي يقل ولائهم مع الزمن. (Anderson, 2002)

### (2) التفرغ للعمل الجامعي

تجمع الأدبيات العلمية على أن مهام أستاذ الجامعة تنحصر في التدريس، والبحث العلمي، وخدمة المجتمع، وهي مهام ضخمة وذات أعباء كبيرة مما يعني أهمية وضرورة التفريغ للقيام بها وأدائها بصورة أفضل، وقد نصت اللائحة المنظمة لشؤون منسوبي الجامعات السعودية على أن من واجبات عضو هيئة التدريس "أن يتفرغ لعمله في الجامعة ولا يجوز له العمل خارج الجامعة إلا بعد أخذ موافقة مسبقة وفق الأنظمة واللوائح" ورغم ذلك ولأسباب متعددة سبق ذكرها، تبدو الصورة مخالفة في واقعنا اليوم فقلة من أعضاء هيئة التدريس هم من يحقق هذه الميزة، ويتفرغ لمهامه كعضو هيئة التدريس، وفي دراسة استطلاعية غير منشورة في إحدى الجامعات وجد أن 16% فقط من مجموع أعضائها غير مرتبطين بأعمال خارج الجامعة ويحققون مفهوم التفريغ في العمل الجامعي، بينما النسبة الأكبر قد ارتبطت بأعمال متعددة ومتباينة وبعيدة كل البعد عن وظيفة ومهام أستاذ الجامعة. (المحسن، 2001) هذه الصورة لها أسبابها ولها آثارها على عملية التعلم الجامعي، مما يؤكد مرة أخرى أهمية دراسة الوضع الأكاديمي لأعضاء هيئة التدريس داخل الجامعات ميدانيا والسعي لبلورة حلول عملية تحفظ أذوار ومهام أستاذ الجامعة، وتحافظ على دور الجامعة العلمي في مستقبل الأيام.

### (3) التميز في الأداء

تتفق الأدبيات العلمية على أن الأداء الاحترافي من أهم مكوناته الكفاءة العلمية والتخصصية كما يتضح أيضا من مفهوم الاحتراف الذي استند على البراعة والجودة وتحسين العمل وتجويده وإخراجه في أفضل صورة، والتميز في الأداء يرتبط برفع الكفايات لدى أعضاء هيئة التدريس، كما يرتبط بالتميز بالإعداد العلمي لأعضاء هيئة التدريس، وقدرة الجامعات ومؤسسات التعليم العالي على حسن اختيار عضو هيئة التدريس بمعايير واضحة ودقيقة، كما يشمل مفهوم التميز الاهتمام بقضايا البحث العلمي.

وقد اعتبرت وقائع ندوة عضو هيئة التدريس في الجامعات العربية المنعقدة بجامعة الملك سعود قبل ما يزيد عن عشرين عاماً أن النمو العلمي المهني يرتبط أساساً بأساليب اختيار أعضاء هيئة التدريس، وطبيعة إعدادهم، وأساليب تهيئتهم لتحمل المسؤوليات، وسبل معالجة إخفاقاتهم ومشكلاتهم.

ويشمل التميز هنا ما يشير إليه بعض الخبراء بالنمو العلمي لعضو هيئة التدريس ومنه:

- (1) التمكن من التخصص
- (2) التوسع والتبحر في التخصص
- (3) متابعة المستجدات في التخصص
- (4) التجديد والابتكار في التخصص
- (5) التكوين المؤسسي للتخصص (الخطيب، 1425هـ).

ويرى (فرمان، 1995م) أن معايير التميز لدى أعضاء هيئة التدريس يمكن حصرها في:

- مؤهلاتهم ومستوى إعدادهم
- خبراتهم السابقة وكيفية تفعيلها بشكل أفضل في حياتهم العلمية
- مهاراتهم العامة والخاصة
- إنتاجهم العلمي

### (4) الاستعداد لتطوير الذات

يرى (Clapper) أن التميز في الأداء الأكاديمي لا يمكن أن يعزز من وجود الأنظمة والقوانين في المؤسسة التعليمية بل لا بد من وجود نوع من الالتزام الشخصي نحو تطوير الذات بشكل دائم، ويشدد (Clapper) على أن السبب الرئيسي في عدم كفاءة التدريس ليس في الأعداد الكبيرة للطلاب وليس في خبرة أستاذ الجامعة أو عبء العمل الجامعي فهي أسباب ثانوية لكن السبب الحقيقي هو أن أعضاء هيئة التدريس لم يعدوا للتدريس "لقد اعتمدنا على المقولة بأن

المدرسين الجيدين مطبوعون لا مصنوعون" ويرى أن هذا هو السبب الرئيس وراء عدم كفاية التدريس الجامعي وضعف المخرجات الجامعية (مرسي، 2002).

وفي ثقافتنا العربية، السعي لتطوير الذات هو جزء من شعار التعلم المستمر، وهناك مجموعة من المهارات والقدرات التي يتوجب على عضو هيئة التدريس رفع مستواه فيها، من أبرزها في وقتنا الحالي القدرة على التعامل مع تقنية المعلومات في ظل الانفجار المعرفي، وكذلك تطوير الذات في مهارات التفكير، وحضور المؤتمرات والندوات العلمية، وتطوير الذات في مهارات الاتصال الفعال، وإدارة الصف، ومهارات التدريس، والتعرف على الأساليب الحديثة في التقويم الجامعي، إضافة إلى تطوير مستمر في مهارات البحث العلمي.

## 5) الالتزام بأخلاقيات المهنة

تغفل كثير من الدراسات العلمية الجانب الأخلاقي ودوره في عملية الاحتراف الأكاديمي وتركز كثيرا على الجانب العلمي والمهاري، وفي دراسة علمية تستكشف العلاقة بين الاحتراف الأكاديمي والالتزام الشخصي لمبادئ ومعتقدات عضو هيئة التدريس تخلص الدراسة إلى أنه رغم أن هذه العلاقة معقدة وواسعة وتختلف كثيرا عن المتغيرات الأخرى التي يمكن قياسها والوقوف عليها بشكل واضح، إلا أن العوامل الأخلاقية والتزام Commitment عضو هيئة التدريس بمبادئه وأخلاقه يقوده إلى تحديد أفضل لدوره في الجامعة كعضو هيئة التدريس كما يساهم في بلورة أهدافه الأكاديمية بشكل أفضل، ويقوده لمزيد من التحفيز الذاتي نحو المعرفة واكتساب أكبر قدر ممكن المهارات والخصائص المهنية (James, 2003).

وباعتبار أن الجامعة على حد تعبير أحد الغربيين أنها مجتمع البالغين أو الراشدين "Community of Adults" مما يعني ضرورة وجود دستور أخلاقي بين أطراف العملية التعليمية في الجامعة، ومبدأ الاحتراف الأكاديمي كما ذكرت سابقا يعتمد على المهنية ولذلك فهو أحق من غيره في تبنيه لأخلاقيات المهنة والتزامه بها، والشروع في تبنى دستور أخلاقي متكامل خاص بأعضاء هيئة التدريس، وهذه الأخلاقيات تبدأ بحب نشر المعرفة أو كما استخدمت إحدى الدراسات مفهوم "الإيثار" العلمي Altruism التي يتمتع بها عضو هيئة التدريس في عملية الاحتراف بمعنى أن لديه رغبة جامحة في مشاركة الجميع بما لديه من علم أو تميز في تخصص ما أو في فن من الفنون.

ومن أخلاقيات المهنة بناء جسور الصداقة والحب مع الطلاب، وعدالة التقويم، والعناية والاهتمام بالطلاب، وحسن المظهر العام، والهدوء والاتزان العاطفي، وتواضع عضو هيئة التدريس واحترامه لمشاعر طلابه، والسعي لرفع الروح المعنوية لهم، والمشاركة في حل مشكلات الطلاب وتشجيعهم وتحفيزهم، فهم ذكره الحسن، وثروته الحقيقية مستقبلا، وامتناده العلمي في كشف خبايا هذا الكون وإعادة اعمارها ثانية.

وفي دراسات متعددة كشفت أن هناك علاقة كبيرة بين التدريس الفاعل والمنتج وبين سلوكيات وأخلاقيات عضو هيئة التدريس، وفي مقدمة هذه السلوكيات حماس وإخلاص عضو هيئة التدريس للعملية التعليمية، وسعة إطلاعه ومعرفته، واهتمامه بالنمو المعرفي والسلوكي لطلابه، وقدرته على كسب ثقتهم واحترامهم وحبهم (Strickland, page and Hawk, 1990)

## كيف ندعم عملية الاحتراف الأكاديمي؟

إن بناء ثقافة الاحتراف الأكاديمي لأعضاء هيئة التدريس تتطلب جهدا كبيرا تتبناه المؤسسات التعليمية، خصوصا في ظل المتغيرات الواسعة التي تشهدها ساحة التعليم العالي، إذ تشير دراسات المستقبل في التعليم العالي إلى مجموعة من التغيرات التي سوف تطرأ على مهام ووظائف أستاذ الجامعة والتي تحفز على ضرورة احتراف العمل الأكاديمي ومن أبرز هذه التغيرات:

- تزايد الاتجاه نحو تقييم ومحاسبة أعضاء هيئة التدريس في أدوارهم الأكاديمية والمهنية.
- استخدام التكنولوجيا محل الأساتذة في كثير من مهامهم التقليدية.

- الاتجاه نحو توظيف أعضاء هيئة التدريس بالنظام الجزئي محل الأساتذة الدائمين.
- إعادة تحديد أدوار الأساتذة والانتقال من دور الناقل للمعرفة إلى دور الميسر والمشرف على المعلومة.
- تفتيت مهام أساتذة الجامعات من العمل الشامل إلى أعمال جزئية يتم التعاقد معها من قبل الجامعة كالتدريس والإشراف والتقييم وغيرها من المهام.
- ارتباط التعليم العالي بأنظمة المعلومات والاتصالات وبرامج التعليم من بعد والتعليم المفتوح والنظم الافتراضية وشبكات المعلومات (نوفل، 2002).

ويمكن المساهمة من خلال هذه الدراسة إلى وضع خطوط عامة ترسم النموذج الثلاثي المقترح لتحقيق مفهوم الاحتراف الأكاديمي داخل الجامعات، وهذا النموذج يتكأ على ثلاث ركائز أساسية هي:

### (1) توفير البيئة المناسبة والمناخ العلمي وذلك من خلال:

- توفير الخصوصية والحرية ومزيداً من الاستقلالية لأعضاء هيئة التدريس.
- بناء العلاقات الايجابية بين أعضاء هيئة التدريس.
- توطین التقنية الحديثة في الجامعات.
- تبني أسلوب الجودة الشاملة في إدارة الجامعة.
- تحقيق مبدأ النسبة والتناسب بين عدد أعضاء هيئة التدريس وبين عدد الطلاب في القاعات الدراسية.
- اعتماد برامج التقييم والاعتماد للأداء الأكاديمي.
- الانتقاء الدقيق والاختيار الجيد لأعضاء هيئة التدريس وبدرجة أخص المعيدین الذين يمثلون مستقبل مؤسسات التعليم العالي.

- زيادة الاهتمام بالبحث العلمي وزيادة الإنفاق عليه.
- تحديث الخطط والمناهج والمقررات الدراسية، وتلك حكاية أكاديمية أخرى لا تزال كثير من مؤسسات التعليم العالي لم تعطها الفرصة الكافية للتحديث والتجديد.

### (2) التحفيز لأعضاء هيئة التدريس وذلك من خلال:

- إعادة النظر في رواتب أعضاء هيئة التدريس وتحقيق أكبر درجة ممكنة من الأمن والرضا الوظيفي لهم.
- رفع سن التقاعد لأعضاء هيئة التدريس والاستفادة من خبراتهم وتجاربهم العلمية والعملية.
- دراسة طرح بدائل تحفيزية لأعضاء هيئة التدريس في الجامعة مرتبطة بوظائفهم الأكاديمية والبحثية.
- دعم أعضاء هيئة التدريس المتميزين في الجامعات ومؤسسات التعليم العالي وإبراز جهودهم الأكاديمية.
- تشجيع أعضاء هيئة التدريس لحضور المؤتمرات والندوات وتخفيف الإجراءات والشروط الإدارية في ذلك.
- إحياء ثقافة التبادل الأكاديمي من أعضاء هيئة التدريس بين الجامعات ومؤسسات التعليم العالي، وتخفيف الإجراءات الإدارية في ذلك.

- التشجيع المعنوي له دوره الفاعل كذلك في إحياء هم بعض أعضاء هيئة التدريس، وهو ملمح تربوي تغفل عنه كثير إدارات وقيادات مؤسسات التعليم العالي.

### (3) برنامج تنمية مهارات أعضاء هيئة التدريس

يفترض أن تكون عملية التطوير لأعضاء هيئة التدريس لا تتبنى أسلوب التطوير الذاتي فقط الذي يعتمد على الرغبة الذاتية والمبادرة من عضو هيئة التدريس بل لا بد ممارسة التطوير المؤسسي الذي تتبناها الجامعة وتوفر له كافة الوسائل لتحقيق مبدأ الاحتراف الأكاديمي، ومن هنا تبرز الحاجة الماسة إلى تبني برامج خاصة داخل كل جامعة تهدف إلى ترسيخ مفاهيم وممارسات التطوير الذاتي للأداء الأكاديمي والمهني لأعضاء هيئة التدريس بما يتناغم مع جودة مخرجات التعليم

العالي ويتوافق مع التحديات المعاصرة للتعليم الجامعي ويحقق التوازن مع مهام أستاذ الجامعة اليوم، و ذلك عبر مراكز متخصصة أو برامج دورية تسعى بشكل خاص لتحقيق الأهداف التالية:

- تنمية المهارات الأكاديمية والمهنية لأعضاء هيئة التدريس بالجامعة
  - تعزيز جوانب الكفايات العلمية والخبرة الذاتية لأعضاء هيئة التدريس بالجامعة
  - نشر ثقافة الاحتراف الجامعي داخل الوسط الأكاديمي
- ويتضمن البرنامج مهارات أساسية ومنها:
- مهارات التدريس والبحث العلمي
  - مهارات التفاعل الإنساني
  - المهارات الشخصية
  - المهارات القيادية

وقد لخص (أبو حطب، 1994) أهمية هذه البرامج التدريبية لعضو هيئة التدريس، ومنها إعطاء أستاذ الجامعة خلفية عن فلسفة التعليم الجامعي، والتعريف بالأسس التربوية لعملية التعليم، وتوعية المناهج الجامعية وطرق التدريس، ومهارته وأنظمة التقويم والقياس، وفتح الفرص لمزيد من أوجه التعاون بين أعضاء هيئة التدريس، وزيادة دور الجامعة في المجتمع خصوصاً وأن الفجوة لا تزال كبيرة وتتسع مع الزمن بين الجامعة والمجتمع كعالمين منفصلين لا يعياً أحدهما بالآخر ولا تلتقي أهدافهما ومصالحهما.

وهذه البرامج لا بد أن تكون لها أهداف واضحة وأن تكون مرنة وشاملة ومتنوعة بحيث تستوعب جميع شرائح منسوبي الجامعة، وتلبي جميع احتياجات عضو هيئة التدريس، ولا تقتصر على لون واحد من البرامج، وأن توفر لها الكوادر البشرية المؤهلة علمياً ومهارياً، وأن ترصد لها الموارد المالية الكافية، وتكون ضمن الخطط الاستراتيجية لكل جامعة ومؤسسة تعليمية.

كما يفترض أن تكون هذه البرامج فاعلة وغير تقليدية في طرحها ومحتواها، فقد أشارت نتائج بعض الدراسات التي أجريت في هذا المجال إلى أن عدداً كبيراً من أعضاء هيئة التدريس والذين شاركوا في مثل هذه الدورات، ويشكل أخص دورات إعداد المعلم الجامعي قد أشاروا إلى أن هذه الدورات لم ترفع من مستوى كفاءتهم المهنية لكونها اعتمدت على أسلوب النصح والإرشاد والمحاضرات النظرية فقط، كما أكدت نتائج هذه الدراسات على أن أهداف التنمية المهنية تقتصر على مجال التدريس والبحث العلمي فقط دون غيرها من المجالات (حداد، 1996م).

### التوصيات

يوصي الباحث بما يلي:

- (1) تبني أسلوب التخطيط الاستراتيجي في تطوير أستاذ الجامعة باعتباره راس المال البشري في مؤسسات التعليم العالي.
- (2) إلزام كل جامعة بإنشاء مراكز للتعليم الجامعي للتنمية المهنية لأعضاء هيئة التدريس، وأن تتعاون هذه المراكز فيما بينها في سبيل تطوير برامجها وتبادل خبراتها.
- (3) توطين ثقافة الاحتراف الأكاديمي في الوسط الجامعي، والعمل على تجاوز جميع عقباتها، وخلق الظروف والبيئة المحفزة لها.
- (4) تبني أسلوب الجودة الشاملة داخل الجامعات باعتبار أن الاحتراف الأكاديمي هو أحد مخرجاتها.
- (5) نشر الثقافة المحاسبية لأعضاء هيئة التدريس بشكل عادل وفاعل.
- (6) حسن الاختيار للمعيدين والإعداد الجيد لهم خلال السنة الأولى باعتبارهم أساتذة الجامعات مستقبلاً.

## خاتمة

إن واقع أستاذ الجامعة اليوم يتطلب ضرورة اتخاذ جميع الخطوات العملية التي تساهم في تطوير قدراته ومهاراته، وتزاد الحاجة إلى ذلك في ظل التغيرات والتحولات التي تشهدها عملية التعليم العالي، وقد خلصت الدراسة إلى أهمية تبني مفهوم الاحتراف الأكاديمي كعملية مهنية ذات أهداف ووسائل محددة تنقل أستاذ الجامعة من حالة "تقليدية الأداء وضعفه" إلى "أداء أكثر تميزاً ومهنية واحترافاً" وذلك عبر تبني هذه الثقافة ونشرها في الوسط الجامعي وتهيئة كافة الوسائل التي تساهم في خلق بيئة محفزة ومشجعة، وكذلك تحفيز أستاذ الجامعة عبر تحقيق الأمن والرضا الوظيفي له، كما أكدت الدراسة أيضاً على ضرورة إنشاء مراكز وبرامج خاصة تعنى بتطوير قدرات ومهارات أعضاء هيئة التدريس في الجامعات ومؤسسات التعليم العالي.

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## HIGHER EDUCATION FUNDING IN THE CZECH REPUBLIC IN THE YEARS 2001-2011

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### Abstract

This paper is focused on the financing of higher education and its present, very discussed changes, which go hand in hand not only with the adopted strategic document, White Paper on tertiary education, but also with the overall economic and social situation of the Czech Republic. Based on data from Czech statistical office, Ministry of Education, Youth and Sport and the Eurostat database which are compared according to the relation to the problem, the status of higher education in the national economy is deduced. The issue of public and private resources are also discussed. The aim of the paper is to summarize information related to the decision making regarding interconnection between tertiary education and national economy and the possibilities of financing of higher education. Work analyse the above mentioned contexts by quantifying the relationship between changes in total public expenditure on education in the Czech Republic and changes of GDP of the Czech Republic based on available sources.

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**Keywords:** Public expenditures, private expenditures, GDP, education funding, education

### Introduction: Development of number of university students

In the last decade, with the emergence of private education, the need to increase the competitiveness of individual universities appears, which forces them to submit to the market mechanism reflecting their differing quality. This leads to a somewhat paradoxical situation - the authoritative role of the state recedes into the background and carries a large part of public financial support. Public higher education is forced to look for alternative sources, although the market is developing and the number of students at public universities is constantly increasing - the total number of 207 170 students in the academic year 2001/2002 to 387 719 in 2010/2011. (Ministry of Education, 2013). See tab. In Annex III. However, at the public universities studied in 2011 345 689 students and at private universities 53 883 students, which is 13,5 % (Ministry of Education, 2012). Overall, there is a minor decrease in the number of students, in the year 2011 it was -1 % and in 2012 was a decrease of -3 %. In the coming year (2013/2014) further decline is expected. Significantly, this trend is visible among newly admitted students, where is a decrease of -6,6 %, while at the private universities, this trend is more pronounced, there was a decrease of 17,3 %. This trend is even more pronounced when the information that the percentage of students admitted to public universities is 71 % and private high schools 94 % (Ministry of Education, 2012) is taken into account.

Most students studies in undergraduate courses (61,6 %) 32 % in master studies and in the form of a doctoral degree is 6,4 % of students. In 2011 there is a decrease in undergraduate courses (-1,6 %), a slight increase in the number of students at master level (0,1 %) and a reduction in the number of doctoral students (1 %). For all forms of study in 2012, there is a decrease, which is most pronounced at bachelor forms (-3,6 %). The PhD has

a similar decline, by 3,0 %. The mildest drop is in the master form (1,8 %). (Ministry of Education, 2013) See tab. In Annex III.

Due to gradual changes in tertiary education, the need for change of tertiary education subfinancing is evident (Gherghina et al., 2010). Since the eighties in Western Europe or nineties in post-communist countries there are gradual changes in tertiary education, namely the decentralization of financing and establishing national criteria for evaluating the outputs of the education system. Ideally, a new system of providing resources policy should be set up to support a direct link between finance provided and the resulting performance (ie quality of graduates).

And although the Bologna process has identified a number of beneficial actions on amendments to the tertiary education, agreement on ways and forms of financing have not been included in discussions (Oxford Analytica, 2012). At present, the Bologna Process has got to the stage where it needs to be carefully evaluated what has been achieved, to think about how to improve what has partly failed and to tighten the reforms that have not been in the spotlight (Ministry of Education, 2012). Financing of tertiary education is one of them. However, students may benefit at least that they are able to move freely within European universities and they can choose where and how they want to study. The unsatisfactory conditions in connection with the financing can this way be bypassed.

Article The reasons why the Czech Republic and other post-communist countries still did not widely apply principle and forms of tertiary education that are applied in Western Europe may be following (Nemec et al., 2011):

- Limited competition and short-term business strategies.
- "Insufficiently developed" democracy, where citizens can not evaluate the decisions of the ruling minority.
- Limited "quality" of state law.
- Territorial fragmentation in some postcommunist countries.
- Relatively widespread and deep corruption in these countries.

Another paradox is, that higher education is in terms of financial resources strictly divided to education private, not financed by public funds and higher education public, which is dependent on public funding, in the situation where there is no distinction whether future taxpayers are studying at one or the other type of high school. Financing of tertiary education then becomes an issue.

Access of individual countries in the European Union to the ways of financing tertiary education (the ratio of public and private funding) is different. The model is historically based rather on public funding (EU average is almost 80% public funding sources (Oxford Analytica, 2012)), which increase with the number of students, however, ceases to be satisfactory (Prudký et al., 2010), and sometimes the system is rather closer to non-European standards e.g. in the UK where the ratio of private finance is even lower than in the U.S. On the contrary, other European countries have rather high above the average public funding sources.

Engagement of education in expenditure of the public budget is an indisputable fact the vast majority of countries. Comparison of these expenses with a total GDP also predicts the role that education plays in relation to other sectors of the national economy, and thus reveals the importance that is attributed to education in the overall economic development of the country.

Stagnation or necessary spending cuts in the state budget expenditures in times of crisis help the logical idea of decentralization of funding of public universities towards multi-source acquisition of funds, both from multinational funds and the private sources. Decrease in economy performance ultimately substantially burdens the individual, whose participation in the financing of his higher education deepens this economic "chasm".

As noted in the White Paper on Tertiary Education (2009), the growing demand for higher education, which is presented as a guarantee of the future career (and the associated economic) success along with its modernization and increasing dynamics, by which the attractiveness of higher education is supported caused a "sharp increase in the number students" in the Czech Republic, but "it was not accompanied by a corresponding increase in expenditure, so there was the fastest decline in spending per student among the whole OECD." (Matějů et al., 2009, s. 42) These long-term below-average numbers, along with a significant increase in the number of students fell primarily on the quality of higher education, which was in this regard, despite its commercial success, frozen. Although higher education is the key mean for raising living standards and quality of life of individuals, and thus an important factor for GDP growth, real increase in state funds flowing to this sector is insatiable. Given the current economic situation, as well as current demographic changes, importance of public budget chapters that promote social development and health is emphasized.

The paper focuses on the changes and their causes in higher education funding in the Czech Republic. It deals with the role of higher education in the national economy and particularly the ratio between private and public funding of universities. The aim is to provide a summary of information relevant to decision-making regarding the consistency of tertiary education with the national economy and the possibilities of its funding.

The paper will address the weighing of public and private funds spent on education currently marked by global economic crisis. Seminar work tries to find out if there is a correlation between changes in total public expenditure on education in the Czech Republic and changes in GDP. Based on data from the Czech Statistical Office (data on tertiary education were received and processed from the public database of CSO (2013)), the Ministry of Education, Youth and Sports (mainly from annual reports (Ministry of Education, 2001-2012)) and Eurostat (data related to tertiary education and the criteria of the Lisbon strategy (Eurostat, 2013, b)), which are compared in view of the the examined subject, deduces the work status of higher education in the national economy devoted to the issue of public and private funding sources inserted into it. Data were compiled into tables using MS Excel. For further processing the correlation analysis and regression were used.

Due to the heterogeneous publication of data from different years, or non-disclosure of data from the period prior to 2007, some tables and time series are given only since 2007. In other cases, there was an attempt to make the longest time series. The specifics and particular length of time series are highlighted in the text.

### **Current development of higher education**

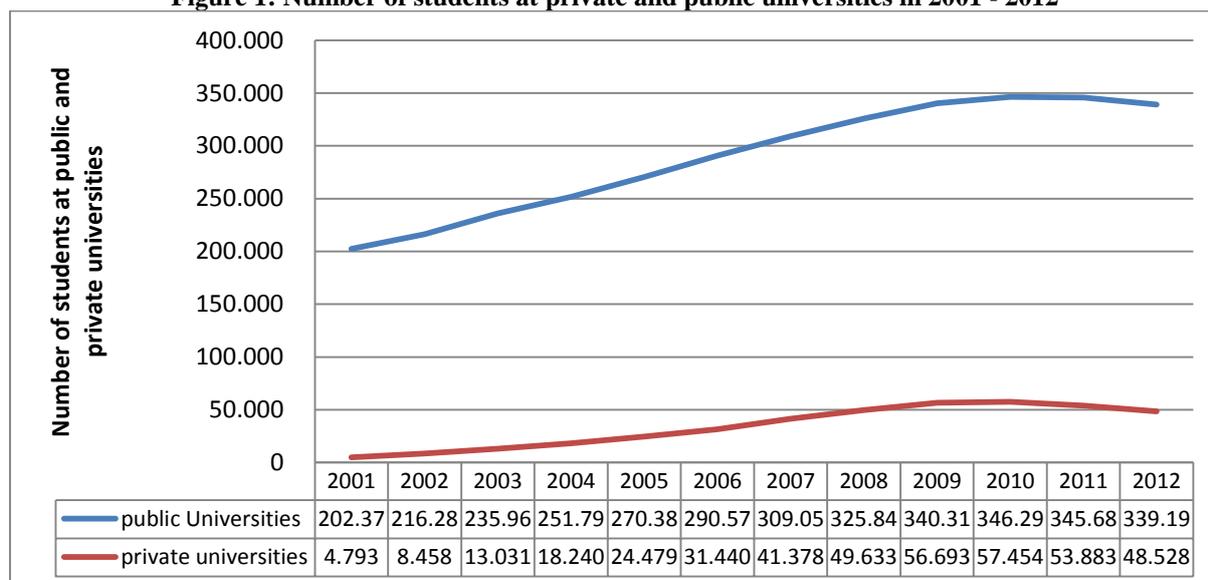
From Table 1 is clearly apparent downward trend of support of education from the public finances due to the increasing number of university students. Figure 2 gives an insight beyond our Republic, and thus reveals not only that the percentage of this expenditure is low in an international comparison, but also really negligible share that the private sector occupies in the financing of this resort. Table 1 contains data only from 2007-2011, as other data on the CSO and the Ministry of Education was not traceable in these contexts. The year 2012 still isn't available in the database. The number of students are always listed, but not the normative. It is available only since 2007. The total number of students and its development in the Czech Republic and other EU countries, USA and Japan in the period 2000-2011 can be found in the Annexes in Table II. Figure 2 below shows the trend in the number of students at private schools and universities, for comparison.

**Table 1: Number of students vs. basic normative per one study [14]**

Number of students	2006/07	2007/08	Annually	2008/09	Annually	2009/10	Annually	2010/11	Annually
Full-time study	241 151	250 269	3,78 %	264 304	5,61 %	277 184	4,87 %	283 486	2,27 %
Other forms of study	85 815	97 283	13,36 %	109 209	12,26 %	116 396	6,58 %	117 097	0,60 %
Total	326 966	347 552	6,30 %	373 513	7,47 %	393 580	5,37 %	400 583	1,78 %
Basic norm (in CZK)	2007	2008	Annually	2009	Annually	2010	Annually	2011	Annually
	34 325	34 325	0,00 %	34 325	0,00 %	29 554	-13,90 %	26 428	-10,58 %

Source: Ministry of Education (2011), CSO (2013)

Funds per one student from public finance are set out as a normative contribution, which is then multiplied by the coefficient of accredited field, this coefficient is proportionately increased especially with its technical complexity. Although the basic norm, as the table clearly shows in the first three years monitored (2007 - 2009), does not change, its real value decreases. The year 2010 brings the total decline, to the extent of almost 14%. This trend given not only by the state of the economy, but also by the policy of the Ministry of Education is also reflected further - year 2011 brings more than 10% reduction in this expenditure, the balance for this year (not included in the table), according to the Ministry of Education is about -7,5 %. (Ministry of Education, 2011). Indicator of the number of students responds to the high drop these numbers in 2010. Although the number of students does not drop in average to minus items, its rapid growth slows from 7,47 % in the academic year 2008/2009 to 5,37 %, respectively to 1,78 % in 2010/2011. The biggest drop is recorded in students studying out of the full-time study. The effort to meet the demand for higher education for economically active persons of middle age that immediately after the acquisition of secondary education could not or would not continue their studies, is evident by the dominance in this percentage that between 2007 - 2009 exceeds 10% limit and almost disappears to 0,60 % in 2011 with the growing financial crisis.

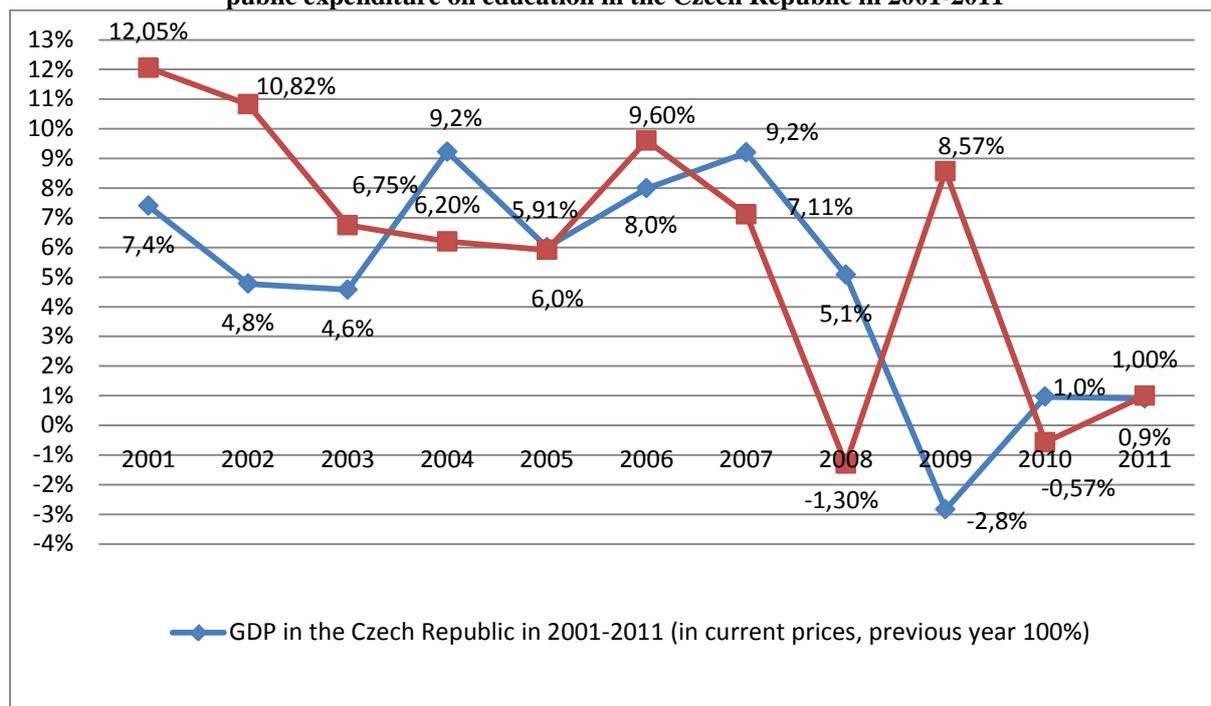
**Figure 1: Number of students at private and public universities in 2001 - 2012**

Source: (Ministry of Education, 2013)

As can be seen from Figure 1, the number of university students in the reported period has a slightly rising trend. At public universities, there is the reduction in increase visible, however, at private universities was a slight decline since 2010.

Table 2 in the Annex shows comparison of the number of population with tertiary education absolved in the European Union. For all monitored countries an increase in the number of university graduates in the population can be traced. The aim is to follow-up the Lisbon Treaty and achieve at least 40% of graduates aged 30-34 years by 2020. Currently, the European Union average is at 24,5 %, and increases in the reporting period by an average of 1 % within 2 years.

**Figure 2: Comparison of the development of changes in GDP of the Czech Republic and changes in total public expenditure on education in the Czech Republic in 2001-2011**



To determine if there is a correlation between changes in total public expenditure on education in the Czech Republic and changes in GDP in the selected period in each year, the proportion of total public expenditure on education to GDP in the Czech Republic in the period of 11 years (2001-2011) is reported, see the source data in table 3. In figure 2, there is a comparison of the development of GDP changes in the Czech Republic and the changes in total public expenditure on education in the Czech Republic in 2001-2011.

Figure 2 compares the development of changes in total public expenditure on education in the Czech Republic in the observed period (years 2001-2011) and the development of country's GDP in current prices is shown in the same graph in the same period. The source data are listed in table 3. Development of total public expenditure on education in the CR in 2001-2003, has similar shape as scores of GDP development of the Czech Republic in this period (both observed variables show reduction in the rate of growth). Reduction in the rate of growth of total public expenditure on education in the Czech Republic continues until 2005. CR GDP recorded an increase in the rate of growth in 2004, with its consequent reduction in the following year (2005). Worldwide, the influence of emerging global economic crisis were noticeable, starting in 2008. Development of total public expenditure on education in the Czech Republic in 2007 already shows a loss in the rate of growth from 9,6 % to 7,1 % and continues by decrease of the growth rate and ultimate decline of GDP in 2008 (-1,3 %, see Figure 2).

Budgeting of the total public expenses on education in the Czech Republic for the year 2009, based on the GDP development in 2008 is surprisingly optimistic and budgeted change in development is almost 9% (8,57 %). This increase in the rate of growth of total public expenditure on education in the Republic was due to the influence of increase in salaries for the staff of RGS and increasing expenditures in the area of operational programs.<sup>7</sup> Reduction in the rate of growth of GDP of the CR occurs in 2009 (2,8 % at current prices)<sup>8</sup>, but total public expenditure on education in the CR this year, as already commented above, increased their growth rate. This positive blip in the development of the growth rate of total public expenditure on education in the CR in 2009 was replaced by a reduction in growth rate (-0,57 %) in 2010. Subsequent positive CZ GDP development in 2010 offers an optimistic outlook for the budgeting of total public expenditure on education in the Czech Republic for the year 2011. A positive influence have the news about the unwinding of the global economic crisis.

Because of the potential time lag between the observed variables a regression was performed. It is expected that public expenditure on tertiary education will rise with increasing GDP, but will have some delay because the state does not respond and does not increase expenditure immediately in response to changes in the state budget. Furthermore, the volume of expenditure should most likely grow with higher number of students, but as mentioned in this paper above, it is indicated that this dependence does not apply and the normative per student decreases.

When calculating the regression coefficient reached a value of 0,481, which indicates compliance with the requirement. The increase in GDP leads to a very minor increase in total public expenditure. The increase is not high, however, confirms the theoretical assumption and is fully consistent with rational distribution of budget.

It can be assumed, according to commented connectors of traces of the development total public expenditure on education in the Czech Republic and the connectors of CZ GDP development, that the prediction of GDP of the CR was more difficult by the onset of the global economic crisis thus the quality of the basis for budgeting has decreased for next year. In this paper, there is not monitored the development of budgeting of the total expenditure of chapter 333 of the Ministry of Education, Youth and Sports, but if there is any budgeting, it may be assumed that this budget will usually be exceeded. The negative impact of the global economic crisis still join other negatively acting factors such as the ongoing reform of the public finance of the Czech Republic, the demographic development in the country and also the ongoing discussion on tuition.

To determine the dependence between changes in GDP of CR and changes in development of total public expenditure on education in the Czech Republic in the years 2001-2011 the source data in Table 3 are used. It contains data source of the development of Czech republic GDP (in current prices, previous year is 100 %) in the observed years 2001-2011.

**Table 3: The values for calculating the correlation between the Czech Republic GDP development and the development of the total public expenditure on education in the Czech Republic in the years 2001-2011**

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
GDP development	7,4	4,8	4,6	9,2	6,0	8,0	9,7	4,3	-1,7	1,1	0,9
The development of the public expenses on education	12,05	10,82	6,75	6,20	5,91	9,60	7,11	-1,30	8,57	-0,57	1,00

Source: Ministry of Education, Final Accounts for the years 2001-2011: Chapter 333

Dependencies between the observed variables were tested using SPSS programme. To determine the possible dependence was used Pearson and Spearman correlation coefficient. Expected result was improved by Spearman coefficient, due to the nature of the variables that are of an ordinal nature.

**Table 4: Correlation between GDP development and expenditure on education in the Czech Republic from the data in Table 3 (in the period 2001-2011)**

	Value of dependence	Standard error	p-value	Dependence
Pearson's correlation coefficient	0,371	0,236	0,261	Medium; inconclusive
Spearman's rank correlation coefficient	0,340	0,264	0,306	Medium; inconclusive

Source: own processing of data from the Ministry of Education (2012)

As shown in Table 4, the dependence between the observed variables was found, but the value cannot be considered conclusive, because the level of significance is too low. The reason for this may be too short time series, changes in external parameters and not included explanatory variables.

Just as the relationship between GDP growth and the number of students, resp. developments in the Czech Republic, was investigated, data from the EU and 27 other selected countries (Germany, France, Great Britain) were subjected to the same analysis. The results are conclusive, as shown in Table 5 below. Just those dependencies that make sense are shown (the individual countries in their characteristics and comparison with the EU average). Likewise, the table shows only the values below the diagonal, which are expected to repeat. Correlation on and above the diagonal is equal to 1.

**Table 5: Correlation between GDP development and expenses on education in selected EU countries (period 2000-2011)**

	PS EU	HDP EU	% EU	PS CZ	HDP CZ	% CZ	PS GE	HDP GE	% GE	PS FR	HDP FR	% FR	PS UK	HDP UK	% UK
PS EU															
HDP EU	,940 **														
% EU	,639*	,403													
PS CZ	,956 **	,922 **	,710 *												
HDP CZ	,939 **	,922 **	,560	,968 **											
% CZ	,543	,527	,080	,422	,386										
PS GE	,876 **	,742 **	,842 **												
HDP GE	,926 **	,970 **	,501				,826 **								
% GE	,524	,281	,971 **				,764 **	,391							
PS FR	,953 **	,888 **	,491												
HDP FR	,964 **	,991 **	,514							,899 **					
% FR	-,611 *	-,749 **	,184							-,664 *	-,668 *				
PS UK	,968 **	,885 **	,707 *												
HDP UK	,352	,530	-,394 *										,304		
% UK	,913 **	,782 **	,783 *										,954 **	,216	

Source: own processing of data from Eurostat (2013b)

Note: Abbreviations: PS = number of students; % = percentage of GDP on education, EU = European Union, CZ = Czech Republic; GE = Germany, FR = France, UK = United Kingdom; \*\* = evidence for  $\alpha = 0,01$ ; \* = evidence for  $\alpha = 0,05$

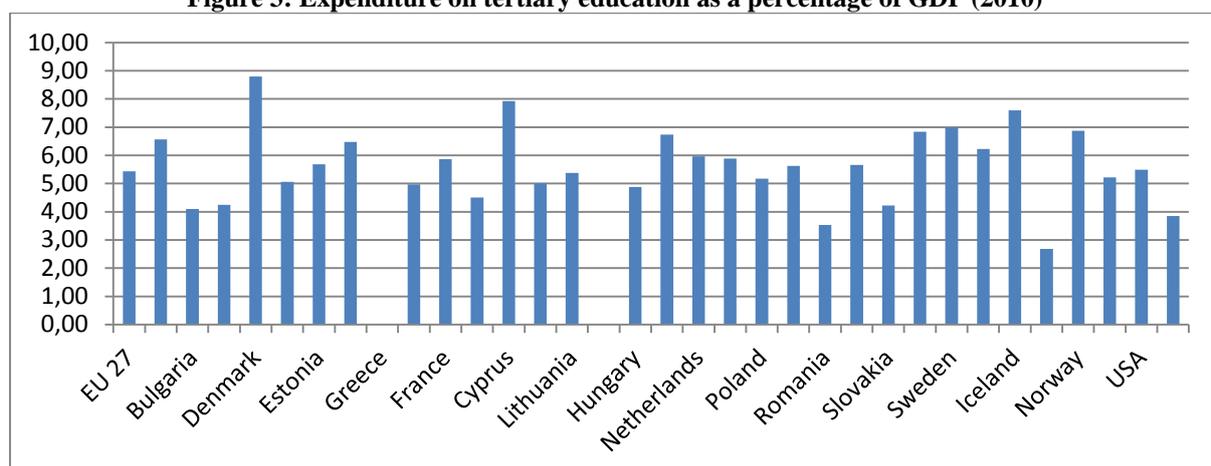
As shown in Table 5, most of the selected countries strongly correlate in the observed characteristics with the European Union average. This is not surprising, partly because it is an average and partly due to the fact that all observed countries have adopted the Lisbon Strategy, which sets out the criteria and size of the monitored variables. The only exception is France, where the coefficients are sometimes quite opposite. That's because, unlike the other countries, the monitored variables don't grow (as is the trend in other countries), but rather stagnate.

A third variable, namely the number of students, was tested in Table 5 in addition to Table 4. This variable very strongly correlates with GDP growth in the Czech Republic. The same is true for Germany and France. In Germany and the UK in addition the number of students correlates with expenditure on education. This is a significant difference from the Czech Republic, where the normative declines. In France, however, the correlation is even negative. Likewise, in France a strong and significant negative correlation between the percentage of GDP spent on education and GDP growth was shown. As resulting from the data source, this is due to the fact that although the GDP in France grows quite significantly, the percentage of expenditure on education lightly drops. The trend in France is therefore similar to the Czech Republic. This relationship is inconsistent in the EU, and therefore there was no evidence of dependency.

### The funding of higher education in an international comparison

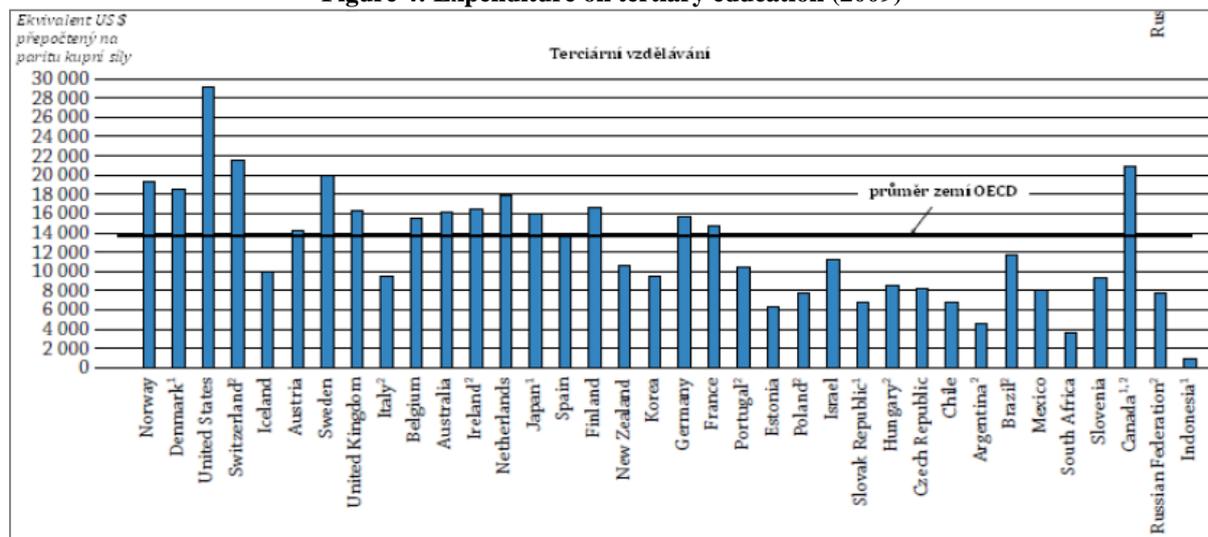
In the next chapter a comparison of higher education funding with EU countries will be preceded. Due to the large number of countries some tables and graphs contain only the selected countries. Figure 3 below shows expenditure on education as a percentage of GDP. Data are for the year 2010, as for other years the data from Eurostat are not available in the monitored indicators and countries. It may be noted that Greece and Luxembourg have no data for 2010. Summary table of expenditure on education in each country is given in the table I in Annex. Expenditure per student studies in the countries surveyed are also listed in Annex in the graph I (in 2010) and in the graph II (for 2009, because 2010 does not include data from all countries).

**Figure 3: Expenditure on tertiary education as a percentage of GDP (2010)**



Source: own elaboration of data from Eurostat (2013b)

The average annual expenditure per student at the tertiary level, without spending on research and development, is in the EU, USA and Japan 5,61 % of GDP. Figure 3 below provides a more complete portfolio of values for 2009 from the OECD.

**Figure 4: Expenditure on tertiary education (2009)**

Source: OECD, tab. B1.1a, Annex 3 ([www.oecd.org/edu/eag2012](http://www.oecd.org/edu/eag2012))

Figure 4 reflects the state of tertiary education funding in 2009, the OECD didn't supply newer complex numbers yet. The average annual expenditure per student at the tertiary level, without spending on research and development, is 8 944 U.S. \$, in OECD countries and the data in individual countries range from 5 000 USD or less in Estonia and the Slovak Republic, to more than U.S. \$ 10 000 in Brazil, Canada, Finland, Ireland, Netherlands, Norway, and more than U.S. \$ 23 000 in the United States. The Czech Republic has a yearly average of U.S. \$ 6 827. Public finance issued for the higher education represented less than one percent (0,94 %) of GDP of the Czech Republic in 2008, private funds represented about 0,24 % and in total the Czech Republic spent 1,2 % of its GDP on tertiary education, and thus remained below OECD average, which reaches 1,5 %.

## Conclusion

The essay highlights the current trends and their possible effects on higher education funding. The aim of the paper was to determine if there is a correlation between changes in total public expenditure on education in the Czech Republic and changes of GDP in 2001-2011.

Based on the empirical analysis the dependence between changes in GDP of the Czech Republic and the development of changes in total public expenditure on education in the Czech Republic in 2001-2011 was not proved.

It can be therefore assumed, according to the results of correlation analysis between changes in GDP and changes in development of total public expenditure on education in the Czech Republic in the period 2001-2011, that due to the global economic crisis and the crisis of public finance sources in the years 2008-2010, the predictions of the Czech Republic GDP development in the coming years was erroneous. Thus the quality of the basis for budgeting of the total public expenditure on education in the Czech Republic in the coming years was reduced. The value of calculated correlation coefficient is 0,371, by calculating the Spearman correlation coefficient (0,340) the value was more accurate, due to the critical values both coefficients of correlation.

These coefficients are not conclusive. Therefore, further analysis between the evolution of variables (1) the number of students, (2) GDP and (3) the percentage of public expenditure on education was performed. The dependencies were here found. The EU average (27 countries), Czech Republic, Germany, France and Great Britain were tested. Most of the selected countries as expected and in line with the Lisbon strategy strongly

correlate in the observed characteristics with the European Union average. The exception is France, where the coefficients are sometimes completely opposite due to stagnating trend of the variables entering the analysis. By testing the number of students conflicting trends in the EU were found. While with the growing GDP and growing number of students the expenditure in Germany and the UK increase, in the Czech Republic and France it is opposite. This inconsistency is traceable also in other countries.

Expenditure on education is an important part of public budgets in most countries. At the same time education is also an essential investment in the development of long-term economic potential of the countries. Public investment in education are compensated by subsequent higher financial revenues from taxes, especially from people with higher education. Benefit of achieved education becomes a necessity given the demographic and structural changes in the labor market. High-quality education is the main factor that increases the chance of an individual to get a job and allows him to be able to remain longer in the labor market.

It is essential that lawmakers note, that the developed countries in EU but also worldwide spend out much higher percentage of GDP on education than the Czech Republic. The current crisis of public budgets at the expense of public education funding in the form of cut education funding, while introducing tuition fees (in the case of tertiary education) causes basically a denial of access to higher education for people from the staff. Repeal of social grants for students causes that people with low incomes do not have access to education. The introduction or increase of tuition fees will bring minimal state budget savings and in the long term the decline of population education could have an adverse impact on creation of GDP.

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## Annex

**Tab. 2: Development of % of the population with tertiary education absolved**

Country/Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
EU 27	17,1	17,1	17,4	18,1	19,1	19,6	20,0	20,6	21,2	22,0	22,7	23,7	24,5
Belgium	23,8	24,4	24,9	25,6	26,8	27,2	27,9	28,1	28,4	29,4	30,7	30,4	31,3
Bulgaria	15,1	17,7	17,5	17,7	17,9	17,8	18,2	18,5	18,9	19,2	19,4	20,1	20,7
Czech Rep.	9,5	9,7	9,9	10,0	10,4	11,0	11,4	11,6	12,4	13,4	14,5	15,9	17,0
Denmark	22,0	24,1	25,1	27,2	27,9	28,5	29,3	26,0	26,3	26,9	27,5	27,9	28,6
Germany	21,4	20,0	18,9	20,3	21,1	20,6	20,1	20,4	21,4	22,3	22,6	24,2	24,1
Estonia	24,1	25,0	25,0	25,2	25,7	27,4	27,2	27,3	28,1	29,8	29,7	31,0	31,8
Ireland	19,2	20,9	22,0	23,5	24,9	26,1	27,7	28,9	30,4	31,6	32,7	33,3	34,7
Greece	14,1	14,4	15,2	15,7	17,6	17,7	18,7	19,2	19,8	20,0	21,0	22,3	23,0
Spain	21,2	22,0	22,6	23,2	24,1	25,8	26,1	26,5	26,8	27,1	28,1	29,0	29,6
France	19,8	20,7	21,5	22,2	22,7	23,4	24,0	24,4	24,9	26,0	26,3	26,8	27,9
Italy	8,1	8,3	8,6	9,1	10,0	10,7	11,4	12,0	12,7	12,8	13,0	13,1	13,8
Cyprus	22,1	23,6	25,7	26,1	25,7	25,7	27,6	29,7	31,0	30,5	32,1	33,7	35,0
Latvia	15,1	15,2	16,2	15,1	16,7	17,1	17,6	18,8	21,0	21,7	22,5	23,6	25,1
Lithuania	35,3	19,2	19,0	19,8	21,2	22,0	22,4	24,1	25,4	25,5	27,0	27,9	28,8
Lux.	16,7	16,0	16,2	12,6	20,8	23,0	20,5	22,7	23,7	30,2	30,3	31,7	33,4
Hungary	11,7	11,7	12,1	13,1	14,2	14,5	15,0	15,4	16,4	16,9	17,2	18,1	19,0
Malta	4,9	8,5	8,2	8,5	10,2	10,2	11,1	11,7	11,8	12	13,4	14,3	14,8
NL	20,6	20,8	21,6	23,8	25,7	26,2	26,2	26,7	27,8	28,4	27,7	27,9	28,7
Austria	:	:	:	:	15,7	15,1	14,8	14,8	15,2	16,1	16,4	16,5	17,0
Poland	9,2	9,6	10,2	11,6	12,8	13,9	14,9	15,7	16,5	18,1	19,8	20,7	21,5
Portugal	7,5	7,9	8,2	9,5	10,9	11,1	11,7	12,0	12,7	13,1	13,8	15,6	16,8
Romania	7,5	7,9	8,0	7,9	8,7	9,1	9,6	9,9	10,7	11,2	11,9	13,0	13,6
Slovenia	12,9	11,6	12,3	14,4	15,7	16,7	17,8	18,5	19,0	19,6	20,2	21,6	23,0
Slovakia	8,2	8,6	8,8	9,6	10,4	11,4	11,9	11,9	12,3	13,4	15,1	16,5	17,0
Finland	27,1	27,0	26,9	27,5	28,3	28,6	29,0	30,0	30,2	30,9	31,6	32,5	32,8
Sweden	26,8	22,5	23,2	23,9	24,7	25,9	25,9	26,4	26,9	27,6	28,2	29,1	30,1
United Kingdom	25,7	25,9	26,7	25,5	26,3	26,7	27,6	28,6	28,7	30,0	31,5	33,3	34,7
Iceland	19,0	19,1	20,6	23,4	23,9	24,9	24,0	24,8	25,5	26,5	26,3	27,4	28,5
Norway	28,6	30,7	30,2	27,5	28,2	28,4	28,2	29,2	30,2	30,7	31,4	32,1	33,0

Source: Eurostat (2013a)

**Table I: Expenditure on education as% of GDP**

Country/Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
EU 27	4,99	5,10	5,15	5,06	5,04	5,03	4,95	5,07	5,41	5,43
Belgium	5,99	6,09	6,02	5,95	5,92	5,98	6,00	6,43	6,57	6,57
Bulgaria	3,70	3,94	4,09	4,40	4,25	4,04	3,88	4,44	4,58	4,10
Czech Rep.	3,93	4,15	4,32	4,20	4,08	4,42	4,05	3,92	4,36	4,24
Denmark	8,44	8,44	8,33	8,43	8,30	7,97	7,81	7,68	8,74	8,80
Germany	4,51	4,72	4,74	4,62	4,57	4,43	4,49	4,57	5,06	5,06
Estonia	5,24	5,47	5,29	4,92	4,88	4,70	4,72	5,59	6,09	5,68
Ireland	4,24	4,27	4,35	4,66	4,72	4,73	4,92	5,71	6,47	6,47
Greece	3,50	3,57	3,56	3,83	4,09	:	:	:	:	:
Spain	4,24	4,25	4,28	4,25	4,23	4,26	4,34	4,62	5,01	4,97
France	5,95	5,90	5,92	5,80	5,67	5,61	5,62	5,62	5,90	5,86
Italy	4,83	4,60	4,72	4,56	4,41	4,67	4,27	4,56	4,70	4,50
Cyprus	5,98	6,60	7,37	6,77	6,95	7,02	6,95	7,45	7,98	7,92
Latvia	5,71	5,77	5,34	5,08	5,09	5,09	5,02	5,75	5,64	5,01
Lithuania	5,86	5,81	5,14	5,17	4,88	4,82	4,64	4,87	5,64	5,38
Luxembourg	3,75	3,79	3,77	3,87	3,78	3,41	3,15	:	:	:
Hungary	5,06	5,39	5,91	5,44	5,46	5,44	5,29	5,10	5,12	4,88
Malta	4,27	4,22	4,48	4,66	6,58	6,45	6,18	5,72	5,32	6,74
Netherlands	5,06	5,15	5,42	5,46	5,53	5,50	5,32	5,50	5,95	5,96
Austria	5,74	5,68	5,53	5,48	5,44	5,40	5,33	5,47	5,98	5,89
Poland	5,42	5,41	5,35	5,41	5,47	5,25	4,91	5,08	5,09	5,17
Portugal	5,39	5,33	5,38	5,10	5,21	5,07	5,10	4,89	5,79	5,62
Romania	3,25	3,51	3,45	3,28	3,48	:	4,25	:	4,24	3,53
Slovenia	5,86	5,76	5,80	5,74	5,73	5,72	5,15	5,20	5,66	5,66
Slovakia	3,99	4,31	4,30	4,19	3,85	3,80	3,62	3,61	4,09	4,22
Finland	6,06	6,22	6,43	6,42	6,30	6,18	5,90	6,10	6,81	6,84
Sweden	7,06	7,36	7,21	7,09	6,89	6,75	6,61	6,76	7,26	6,98
UK	4,58	5,12	5,27	5,17	5,36	5,44	5,36	5,34	5,64	6,22
Iceland	6,24	6,79	7,70	7,47	7,59	7,55	7,36	7,56	7,81	7,60
Liechtenstein	:	2,96	2,46	2,43	2,29	2,05	1,92	2,05	2,90	2,68
Norway	7,18	7,58	7,55	7,42	6,97	6,49	6,66	6,40	7,24	6,87
Switzerland	5,25	5,57	5,72	5,55	5,52	5,28	4,88	4,95	5,36	5,22
USA	5,55	5,49	5,61	5,32	5,09	5,43	5,31	5,42	5,47	5,49
Japan	3,58	3,60	3,64	3,59	3,48	3,46	3,45	3,46	3,61	3,85

Source: Eurostat (2013b)

**Tab. II: Development of the number of students in the EU, USA and Japan (in thousands)**

Země/Rok	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
EU 27	15 920,8	16 517,3	17 139,3	17 761,8	18 232,9	18 530,2	18 782,5	18 884,2	19 037,2	19 470,4	19 846,6	20 130,0
Belgie	355,7	359,3	367,0	374,7	386,1	389,5	394,4	393,7	401,7	425,2	445,3	462,4
Bulharsko	261,3	247,0	228,4	230,5	228,5	237,9	243,5	258,7	264,5	274,2	287,1	285,3
Česká Republika	253,7	260,0	284,5	287,0	318,9	336,3	337,4	362,6	392,5	416,8	437,4	446,2
Dánsko	189,2	190,8	195,3	201,7	217,1	232,3	228,9	232,2	230,7	234,6	240,5	258,9
Německo	2 054,8	2 083,9	2 159,7	2 242,4	2 330,5	2 268,7	2 289,5	2 278,9	2 245,1	2 438,6	2 555,6	2 763,1
Estonsko	53,6	57,8	60,6	63,6	65,7	67,8	68,3	68,8	68,2	68,4	69,0	69,1
Irsko	160,6	166,6	176,3	181,6	188,3	186,6	186,0	190,3	178,5	182,6	194,0	196,3
Řecko	422,3	478,2	529,2	561,5	597,0	646,6	653,0	602,9	637,6	:	641,8	660,7
Španělsko	1 829,0	1 833,5	1 832,8	1 840,6	1 839,9	1 809,4	1 789,3	1 777,5	1 781,0	1 800,8	1 879,0	1 950,5
Francie	2 015,3	2 031,7	2 029,2	2 119,1	2 160,3	2 187,4	2 201,2	2 179,5	2 164,5	2 172,9	2 245,1	2 259,4
Itálie	1 770,0	1 812,3	1 854,2	1 913,4	1 986,5	2 015,0	2 029,0	2 033,6	2 013,9	2 011,7	1 980,4	1 967,6
Kypr	10,4	11,9	13,9	18,3	20,8	20,1	20,6	22,2	25,7	31,0	32,2	32,1
Lotyšsko	91,2	102,8	110,5	118,9	127,7	130,7	131,1	129,5	127,8	125,4	112,6	103,9
Litva	121,9	135,9	148,8	167,6	182,7	195,4	198,9	199,9	204,8	210,7	201,4	187,1
Lucembursko	2,4	2,5	3,0	3,1	:	:	2,7	:	:	:	5,4	6,1
Maďarsko	307,1	330,5	354,4	390,5	422,2	436,0	438,7	431,6	413,7	397,7	389,0	381,9
Malta	6,3	7,4	7,3	8,9	7,9	9,4	8,9	9,8	9,5	10,4	10,8	11,4
Nizozemsko	487,6	504,0	516,8	526,8	543,4	565,0	579,6	590,1	602,3	618,5	650,9	780,0
Rakousko	261,2	264,7	223,7	229,8	238,5	244,4	253,1	261,0	284,8	308,2	350,2	361,8
Polsko	1 579,6	1 775,0	1 906,3	1 983,4	2 044,3	2 118,1	2 145,7	2 146,9	2 166,0	2 150,0	2 148,7	2 080,3
Portugalsko	373,7	387,7	396,6	400,8	395,1	380,9	367,3	366,7	376,9	373,0	383,6	396,3
Rumunsko	452,6	533,2	582,2	643,9	685,7	738,8	835,0	928,2	1 056,6	1 098,2	999,5	871,8
Slovinsko	83,8	91,5	99,2	101,5	104,4	112,2	114,8	115,9	115,4	114,4	114,9	107,1
Slovensko	135,9	143,9	152,2	158,1	164,7	181,4	197,9	218,0	229,5	235,0	234,5	226,3
Finsko	270,2	279,6	283,8	291,7	299,9	306,0	309,0	309,2	309,6	296,7	303,6	308,3
Švédsko	346,9	358,0	382,9	414,7	429,6	426,7	422,6	413,7	406,9	422,6	455,0	463,5
Spojené království	2 024,1	2 067,3	2 240,7	2 287,8	2 247,4	2 287,5	2 336,1	2 362,8	2 329,5	2 415,2	2 479,2	2 492,3
Island	9,7	10,2	11,6	13,3	14,7	15,2	15,7	15,8	16,6	16,9	18,1	18,8
Lichtenštejnsko	0,5	:	:	0,4	0,5	0,5	0,6	0,7	0,8	0,8	0,8	1,0
Norsko	190,9	190,1	197,1	212,4	213,8	213,9	214,7	215,2	212,7	219,3	224,7	229,7
Švýcarsko	:	:	170,1	186,0	195,9	199,7	205,0	213,1	224,5	233,5	248,6	257,7
USA	13 202,9	13 595,6	15 928,0	16 611,7	16 900,5	17 272,0	17 487,5	17 758,9	18 248,1	19 102,8	20 427,7	21 016,1
Japonsko	3 982,1	3 972,5	3 966,7	3 984,4	4 031,6	4 038,3	4 084,9	4 032,6	3 938,6	3 874,2	3 836,3	3 880,5

Source: Eurostat (2013b)

**Tab. III: Students at public universities and private universities according to the form and type of study**

	2001			2002			2003			2004		
	VŠ	VVŠ	SVŠ	VŠ	VVŠ	SVŠ	VŠ	VVŠ	SVŠ	VŠ	VVŠ	SVŠ
total	203 461	198 783	4 784	220 189	211 875	8 433	243 723	230 986	12 945	264 792	246 980	18 043
total full-time	168 124	165 282	2 891	179 372	174 753	4 683	195 589	189 208	6 479	207 998	200 185	7 919
bachelor full-time	29 030	26 285	2 758	41 823	37 431	4 417	64 468	58 444	6 054	89 855	82 526	7 375
mastermaster full-time	124 611	124 480	138	122 483	122 292	196	114 589	114 372	221	99 092	98 862	234
following master full-time	9 955	9 955	–	10 178	10 107	74	10 583	10 378	207	11 801	11 466	335
doctoral full-time	6 722	6 722	–	7 666	7 666	–	9 101	9 101	–	10 016	10 016	–
total combined	36 654	34 768	1 896	42 358	38 616	3 757	49 930	43 487	6 475	58 854	48 749	10 151
bachelor combined	14 089	12 222	1 875	19 171	15 469	3 708	25 983	19 657	6 342	33 875	24 574	9 323
master combined	10 814	10 814	–	10 177	10 177	–	9 513	9 513	–	8 356	8 356	–
following master combined	2 115	2 093	22	2 712	2 651	63	3 678	3 475	207	5 482	4 516	973
doktorské kombinované	9 806	9 806	–	10 491	10 491	–	11 020	11 020	–	11 476	11 476	–
	2005			2006			2007			2008		
	VŠ	VVŠ	SVŠ	VŠ	VVŠ	SVŠ	VŠ	VVŠ	SVŠ	VŠ	VVŠ	SVŠ
total	289 455	265 358	24 362	316 177	285 146	31 379	343 941	303 129	41 304	368 048	319 148	49 531
total full-time	223 137	213 725	9 517	238 171	226 691	11 592	251 908	237 182	14 908	263 899	246 930	17 203
bachelor full-time	112 826	104 215	8 662	132 776	122 466	10 368	149 151	136 031	13 234	161 173	146 301	15 036
master full-time	86 456	86 219	241	73 490	73 309	183	60 169	60 041	129	49 289	49 195	94
following master full-time	16 435	15 814	627	24 628	23 591	1 047	35 352	33 811	1 554	45 940	43 865	2 096
doctoral full-time	10 101	10 101	–	9 973	9 973	–	9 962	9 959	3	10 506	10 500	6
total combined	68 688	53 867	14 872	80 780	61 021	19 828	95 347	68 983	26 439	107 981	75 711	32 382
bachelor combined	41 942	29 297	12 676	50 131	34 187	15 986	60 121	39 692	20 469	69 421	44 569	24 919
master combined	7 092	7 092	–	6 041	6 041	–	5 052	5 052	–	4 095	4 095	–
following master combined	7 632	5 365	2 273	11 469	7 618	3 856	16 382	10 412	5 985	20 732	13 286	7 467
docárál combined	12 281	12 281	–	13 387	13 387	–	14 064	14 060	4	14 047	14 033	15
	2009			2010			2011			2012		
	VŠ	VVŠ	SVŠ	VŠ	VVŠ	SVŠ	VŠ	VVŠ	SVŠ	VŠ	VVŠ	SVŠ
total	389 044	333 148	56 589	396 047	339 361	57 387	392 176	339 054	53 788	381 272	333 501	48 392
total full-time	277 104	256 912	20 436	283 607	262 564	21 291	284 356	263 379	21 215	282 082	261 195	21 158
bachelor full-time	170 940	153 510	17 590	176 394	158 602	17 972	176 540	159 032	17 668	175 193	158 136	17 228
master full-time	42 940	42 889	52	38 097	38 077	20	35 271	35 263	8	32 483	32 482	1
following master full-time	54 648	51 862	2 811	59 441	56 175	3 286	62 457	58 940	3 533	64 015	60 114	3 939
doctoral full-time	11 595	11 585	10	12 512	12 495	17	12 832	12 804	28	12 733	12 705	28
total combined	116 287	80 171	36 208	116 728	80 683	36 151	111 947	79 409	32 636	102 788	75 538	27 319
bachelor combined	74 363	47 336	27 075	73 514	47 609	25 955	69 286	46 444	22 896	61 907	43 366	18 575
master combined	3 154	3 154	–	2 651	2 651	–	2 221	2 221	–	2 047	2 047	–
following master combined	25 166	16 075	9 108	27 414	17 290	10 145	27 828	18 173	9 678	26 890	18 222	8 682
docárál combined	13 951	13 904	47	13 455	13 397	59	12 884	12 812	72	12 194	12 119	75

Source: Ministry of Education (2013)

## CREATIVITY AT SCHOOL? CONCLUSIONS FROM POLISH STUDY

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### Abstract

Referring to the visual study, conducted on non-representative sample of Polish secondary schools, the paper discusses a problem of creativity in the school environment. The study allows to distinguish three types of creativity related to school environment (fanned and triggered by school agenda – most frequent in the set; against school agenda; beside school agenda) which points to the conclusion that one may move from a concept of creativity (singular) to a concept of creativities (plural). Almost a half of pupils claim that their school is a creative place. However, it is worth to think about the type of creativity they refer to, since the dominant number of images taken by pupils present creative activities as related to the school agenda.

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**Keywords:** Creativity, school, visual methods, education

### Introduction

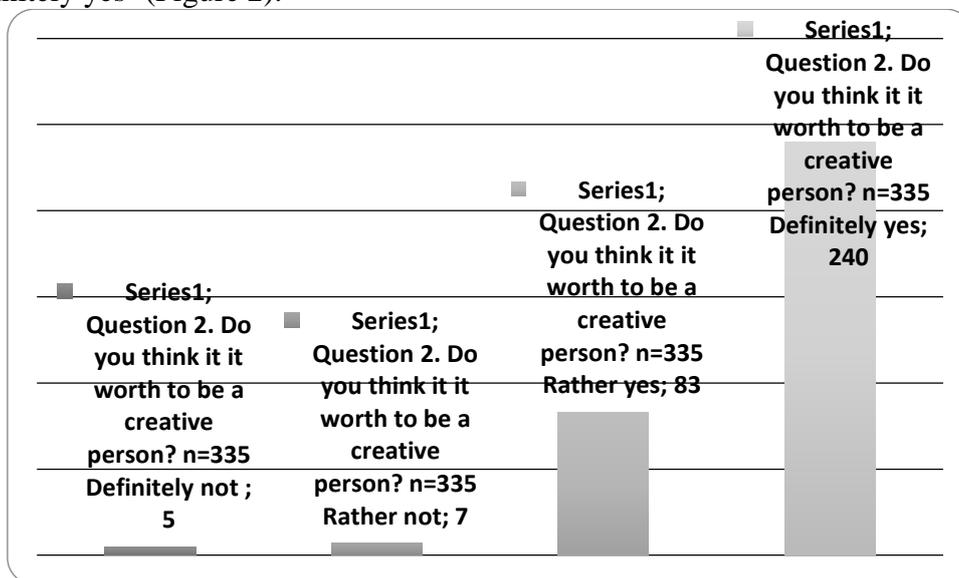
In the emerging information society and informational economy creativity and innovation (treated here as synonyms) become relevant factors of both social transformations and economic development. According to Manuel Castells and Pekka Himanen: ‘an essential element for a country to attain productivity growth is innovation’ (2002: 45). The authors state that innovations in private, public and civic sectors are being produced by educated individuals in the context of a culture of innovation which is a factor *sine qua non* of creativity (beside education and money). Culture of innovation is understood as an open web of individuals, desiring to pursue their passions. This concept is inspired by the hacker ethic (Himanen 2001), hence, Castells and Himanen call such individuals ‘hackers’, wanting a full self-realization, seeking to transcend themselves constantly, and as a result creating new material and symbolic qualities. A hacker’s figure mirrors hyper-individualized individuals characteristic for the late modernity. Therefore, the concept of culture of innovation is closely related to the concept of individualist culture (Lash, Freidman 1992). The process of individualization situating an individual in the very center of the social produces a cultural context in which an individual must transcend his/her-self in order to be authentic. This intertwinement may explain – in cultural terms – why individual creativity became socially and economically desirable and give a reason to scrutiny it. In the following text I explore the problem of creativity at school, a relevant institution in the process of adapting individuals to social and cultural expectations one of which today is creativity. Whether Polish schools are creative places? I will try to answer to this question basing on research conducted in secondary schools in Poland, between 2011 and 2013. Pupils, participants of the research, prepared photo-diaries which show acts of creativity at school environment. Because of the scope of collected data the research is explorative. Therefore, it should be treated as an attempt to study the issue of creativity in school by the use of visual methodology.

**Main Text**

Today, the value of creativity is becoming increasingly higher. Following Castells and Himanen I do not define creativity as an attribute of an individual but as a feature of an environment or a culture – these are material and symbolic features of a place or a context that trigger creative acts which transcend existing conditions. Hence, a scrutiny of creativity is not about psychological constitution of an individual but about a context in which he or she operates. The main research question of the study refers to the problem whether pupils perceive school as a creative place.

Data were collected by the use of a questionnaire and a photo-diary. The first method delivers opinions of informants; the second allows reconstructing broader concepts and gathering associations which is of relevance in the study of a vague concept such as creativity. Additionally, a visual method may allow accessing spheres of experience which are hard to verbalize due to a dominant discourse. The dominant discourse on creativity (which defines it as a desirable and uncommon feature or attitude) might block expression of informants. Surprisingly, acts of creativity at school photographed by pupils are common, usual and mostly related to the school agenda. This conclusion is to be developed later in the text. Returning to visual methods, I selected a photo-diary which is a procedure of day-to-day taking photographs on a given topic. Pupils from 17 selected higher schools<sup>167</sup> in Poland<sup>168</sup>, between 2011 and 2013, were asked to take photos of creative acts in the school environment for 5 day (Monday till Friday, one week). I received 335 questionnaires and 200 photographs from 30 returned photo-dairies. Photographs were analyzed by the use of content analysis method (Rose 2007). Let's discuss results.

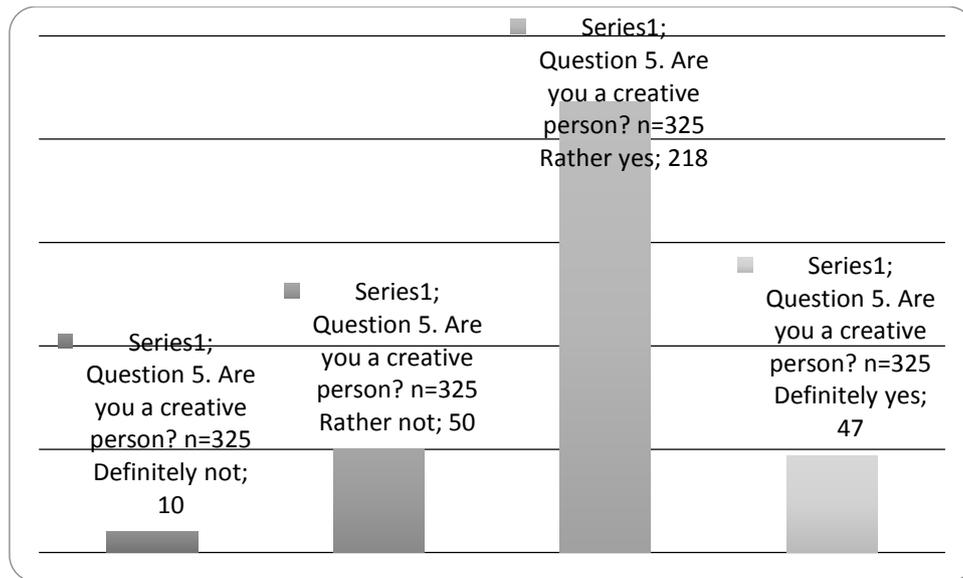
Pupils think that is worth to be a creative person. 323 respondents of all 335 said 'definitely yes' or 'rather yes' ('definitely yes' – 240 answers, 'rather yes' – 83), (Figure 1). Additionally, respondents find themselves creative – 245 pupils chose answer 'rather yes' and 'definitely yes' (Figure 2).



**Figure 1.** Answers to the question: 'Do you think it is worth to be a creative persons?' n=335.

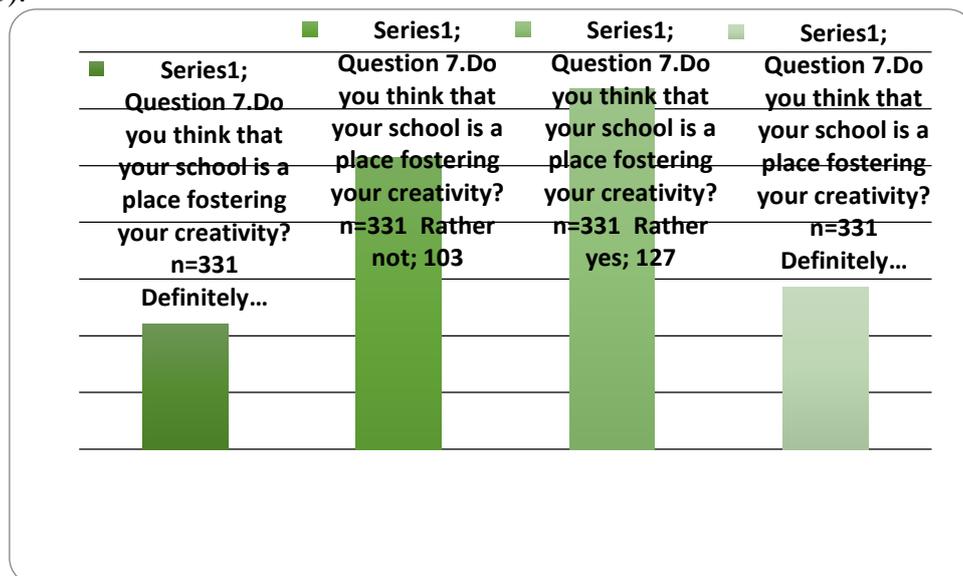
<sup>167</sup> Pupils in age of 13-19.

<sup>168</sup> The research was a part of my classes on visual methodologies. Students selected schools and conducted the research. I am thankful to students from CSWU and CC for participating in the project.



**Figure 2.** Answers to the question: ‘Are you a creative person?’ n=325.

Most important and perhaps a bit counterintuitive, almost a half of respondents admit that their schools are places fostering development of their creativity. ‘Definitely not’ and ‘rather not’ answered 147 out of 331, and ‘definitely yes’ and ‘rather yes’ 184 respondents (Figure 3).



**Figure 3.** Answers to the question: ‘Do you think that your school is a place fostering your creativity?’ n=331.

Visual data shed light on these declarations. Collected photographs – acts of creativity at school by pupils – were coded according to – only – three categories: acts of creativity farmed, defined and triggered by the school agenda (code 1) – most frequent in the set, acts of creativity against the school agenda (code 2) and acts of creativity beside the school agenda (code 3). Photos 1, 2, 3 and 4 were coded as 1 because creativity presented in the pictures refers to acts triggered by the school: a composition on the pin board (Photo 1), a Christmas tree made from books (Photo 2), classroom decorations (Photo 3) and stickers, graffiti and tags on classroom walls (school’s authorities allow for it) (Photo 4). Photo 5 and 6 are examples of creative acts which are against the school agenda (code 2), since the respondents indicate creativity as an activity allowing to ‘fight boredom at school’ (Photo 5) or present themselves imprisoned (Photo 6). Photos 7 and 8 are coded as 3, because their

content does not refer directly to the school agenda – the pictures are an abstract expression of creativity.



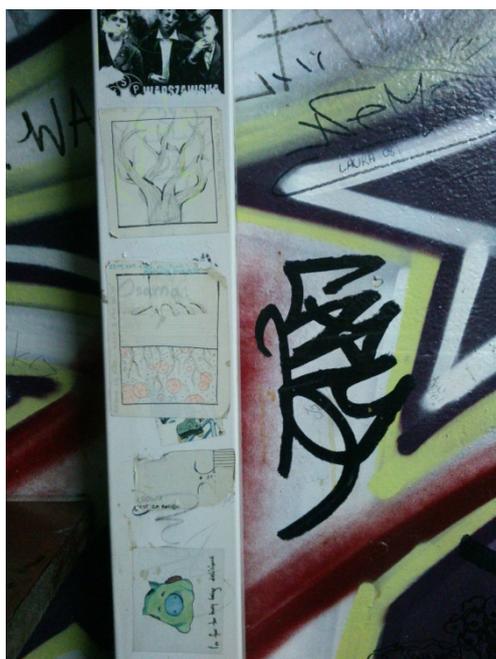
**Photography 1.** An example of creativity produced within and created by the school agenda. A respondent wrote below the picture: ‘On this photograph I can see the creativity, because ... there's an interesting comparison of works of art with the present days ‘.



**Photography 2.** An example of creativity produced within and created by the school agenda. A respondent wrote below the picture: ‘An effect – humanistic Christmas tree ;D’.



**Photography 3.** An example of creativity produced within and created by the school agenda. A respondent wrote below the picture: 'Creative variety of ordinary lamps. And what a joy!'



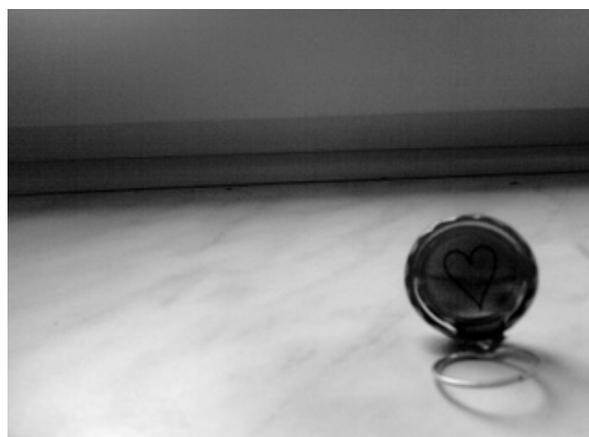
**Photography 4.** An example of creativity produced within and created by the school agenda. A respondent wrote below the picture: 'I took this photo to show that the students in my school do stickers, graffiti and tags, and it is not suppressed'.



**Photography 5.** An example of creativity produced against the school agenda. A respondent wrote below the picture: 'In this photograph I see creativity as it is a creative way to kill boredom in class :)'.



**Photography 6.** An example of creativity produced against the school agenda.



**Photography 7.** An example of creativity beside the school agenda.



**Photography 8.** An example of creativity beside the school agenda.

Table 1 presents visual data quantitatively.

Code / Frequency	Acts of creativity farmed, defined and triggered by school agenda	Acts of creativity against school agenda	Acts of creativity beside school agenda
<b>SUM</b>	<b>171</b>	<b>12</b>	<b>15</b>

**Table 1.** Frequencies of codes in the set.

The code 1 dominates in the set of visual data (171 for 198 photos). This result clearly shows that pupils perceive school as a creative place. However, 'the quality' of creativity also counts. Instances of creativity presented in these photos are institutionally approved once: inscriptions and decorations on the walls of a school, newly created items such as a Christmas tree from books, the robot from Star Wars or playing table tennis during breaks. Hence, pupils see creativity where and as they should.

At the same time only a few images were coded as against and beside the school agenda. This indicates that the contestation of the school is being seen by students as a creative activity. These are, for instance: inscriptions on the benches (breaking the rules), drawings in a notebook (next to the educational activities in the classroom), distinctive shoe for walking around the school (versus uniformity student), the words "I love you" on the board (versus function). A creative act in these cases is related to go beyond institutional boundaries imposed by the school.

## Conclusion

The study seems to clearly show that the photo-dairy method is a good tool for the study of creativity. Distinguishing three different types of creativity related to school environment (farmed and triggered by the school agenda – most frequent in the set; against the school agenda; beside the school agenda) points to the conclusion that one may move from a concept of creativity (singular) to a concept of creativities (plural). It also shows that in everyday understanding creativity is not a monolithic concept.

Referring to the collected data one may say that almost a half of pupils claim that their school is a creative place. However, it is worth to think about the kind of creativity, since the dominant number of images present creative activities as related to the school agenda.

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# SCIENTIFIC LITERACY IN THE DIGITAL AGE: TOOLS, ENVIRONMENTS AND RESOURCES FOR CO-INQUIRY

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## Abstract

This paper describes some European and International projects to promote Scientific Literacy in the digital age as well as technologies, environments and resources for co-inquiry. The aim of this research is also to describe computer applications, software tools and environments that were designed to support processes of collaborative inquiry learning to promote Scientific Literacy. These tools are analyzed by describing their interfaces and functionalities. The outcomes of this descriptive research points out some effects on student learning and competences developed known from the literature. This paper argues the importance of promoting scientific citizenship not only through schools and Universities (formal learning), but also non-credit online courses and community-based learning programmes (non-formal context), as well as daily life activities, educational open digital materials through social networks (informal scenario).

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**Keywords:** Scientific literacy, tools, environments and resources, co-inquiry

## Introduction – Scientific Literacy

Scientific literacy is considered as a key competence for social inclusion and well as active participation for a better world (European Union, 2013; UNESCO, 1993). The Royal Society's (1985:9) highlights scientific literacy as "*a major element in promoting national prosperity, in raising the quality of public and private decision making and in enriching the life of the individual*".

Due to the the rapid technological and scientific advances as well as the growing area of science communication, the meaning of scientific literacy has become more relevant for government bodies and non-governmental organizations. Currently, scientific literacy has been interpreted not only as the ability to read and comprehend science-related articles but also the capability to understand and apply scientific principles to everyday life.

In addition, according to the Literature about Responsible Research and Innovation (RRI), societal actors and innovative scientists should become mutually responsive to each other for developing a better understanding of scientific and ethical issues (including risks, benefits and barriers). This would therefore allow a proper embedding of scientific and technological advances in their society (Owen et al. 2012; Von Schomberg,2013). RRI deals with uncertain areas of knowledge is uncertain, where values and argument matter as much as facts. It is critical for each nation that its future citizens embrace the potential of science and technology. Scientific literacy as one of the key competences for 21st is considered essential to any citizen, who see it as the capacity to access, read and understand the global world with a scientific and/or technological dimension, in order to make a careful appraisal of it, and use that evaluation to make and inform everyday decisions.

Most of the initiatives in this area including international and national projects focus on promoting scientific skills through formal education. This paper, however, argues the importance of promoting scientific citizenship not only through schools and Universities

(formal learning), but also non-credit online courses and community-based learning programmes (non-formal context), as well as daily life activities, educational open digital materials and social networks (informal scenario).

This paper describes some European and International projects to promote Scientific Literacy in the digital age as well as technologies, environments and resources for co-inquiry. The aim of this research is also to describe computer applications, software tools and environments that were designed to support processes of collaborative inquiry learning to promote Scientific Literacy. These tools are analyzed by describing their interfaces and functionalities. The outcomes of this descriptive research points out some effects on student learning and competences developed known from the literature.

### **The Importance of Collaborative Inquiry Learning**

Several authors emphasize inquiry based learning as a meaningful approach for science learning, particularly develop Scientific Literacy competence. The traditional approaches for learning Science has focused on the memorization of scientific facts and information of phenomena. In order to develop a proper understanding and scientific skills new pedagogical strategies have been emerged which focus on supporting students to apply scientific concepts and methods as a scientists. Dewey (1910, 1938) argued that scientific knowledge is a process which develops as a product of inquiry, learning activities should encourage them to find inquiry-based solutions for authentic problems (Greeno, Collins, & Resnick, 1996; Henning, 2004).

Due to the rapid advances of digital technology for open education, the opportunity for citizens to develop their competences and skills are wider than ever before on both non-formal and informal contexts. Significant technological development has been perceived through new generation of open educational resources, open educational or professional networks, innovative massive open online courses as well as communities of practices. An significant number of initiatives related to science education based on inquiry and problem based approaches have been increased during this decade for promoting scientifically literate citizens, who are able to understand the value of science in their daily lives, evaluate public policy decisions as well as make informed questions and decisions about science at personal and global levels. Most of those initiatives developed by formal education aim to develop key competences and skills summarised through the following three topics PISA (2015):

1. Explain phenomena scientifically: Recognise, offer and evaluate explanations for a range of natural and technological phenomena
2. Evaluate and design scientific enquiry: Describe and appraise scientific investigations and propose ways of addressing questions scientifically
3. Interpret data and evidence scientifically: Analyse and evaluate data, claims and arguments in a variety of representations and draw appropriate scientific conclusions.

### **Collaborative Inquiry Learning - technologies and virtual environments**

During the last two decades, many software tools and virtual learning environments were developed for promoting inquiry based learning. Most of them, however, have not been updated since their projects were completed or their funding finished.

Period	Active?	Tool / Project	More information
1996 – 2012	yes	<u>WISE = Web-based inquiry science environment</u>	WISE, a free on-line science learning environment for students in grades 4-12 created by a <u>large team</u> from the University of California, Berkeley.
1998	No, last update 1998	<u>GenScope learning environment</u>	GenScope is a learning environment that uses the computer to provide an alternative to text-based science education. It provides teachers and learners with a new tool that enables students to investigate scientific and mathematical concepts through direct manipulation and experimentation.
2001 – 2010	No, last update 2010	<u>The Progress Portfolio</u>	The Progress Portfolio is software that helps students conduct long-term inquiry projects on computers (e.g. visualization projects, web-based inquiry projects, explorations with CD-ROMs, simulations, digital libraries, etc.). It allows students to document and reflect on their work using an integrated suite of screen capture, annotation, organization, and presentation tools. In addition, teachers can use the Progress Portfolio to guide students in their work through the design of prompts and templates that encourage students to think about key issues as they work. It is used by SIBLE: Supportive Inquiry-Based Learning Environment Project.
1995 – 2002	No, last update 2002	<u>BGuILE = (Biology Guided Inquiry Learning Environment)</u>	BGuILE, learning environments bring scientific inquiry into middle school science and high school biology classrooms. The environments consist of computer-based scenarios and associated classroom activities in which students conduct authentic scientific investigations.
2007 – 2010	No, last update 2010	<u>nQuire</u>	The nQuire software enables students guided by teachers to design and run science inquiries at school, at home, or outdoors on mobile devices. Teachers can choose from a set of ready made inquiries for their students, modifying them as they need, or creating their own new inquiries. They can also monitor their students' progress through inquiries, and give them access to new parts as they complete each stage.
2008 – 2011	SCY-lab is not available, but some tools are accessible	<u>SCY – Science created by You</u>	Science Created by You (SCY) is a project on learning in science and technology domains. SCY uses a pedagogical approach that centres on products, called “emerging learning objects” (ELOs), that are created by students. Students work individually and collaboratively in SCY-Lab (the general SCY learning environment) on “missions” that are guided by socio-scientific questions
2008	No, Website not accessible	<u>Lets' go</u>	LETS GO frames its vision of “open inquiry” as the opportunity to catalyse and sustain global learning using mobile science collaborators that provide open software tools and resources, and online participation frameworks for learner project collaboration, mobile media and data capture, analysis, reflection and publishing.
2013 – 2015	Available Soon	<u>weSPOT</u>	The weSPOT project aims to propagate scientific inquiry as the approach for science learning and teaching in combination with today's curricula and teaching practices. weSPOT is currently developing a “Working Environment with Social, Personal and Open Technologies” that supports users (from 12 to 25) to develop their inquiry based learning skills .
2014 – 2017	In development	<u>ENGAGE</u>	The ENGAGE project (Equipping the Next Generation for Active Engagement in Science) aims to help teachers develop the beliefs, knowledge and classroom practice for RRI (Responsible Research and Innovation) teaching. This requires adopting a more co-inquiry based methodology, which gives students opportunity for self-expression and responsibility for coming to informed decisions through collaborative and open scientific research projects.

## WISE - Web-based Inquiry Science Environment

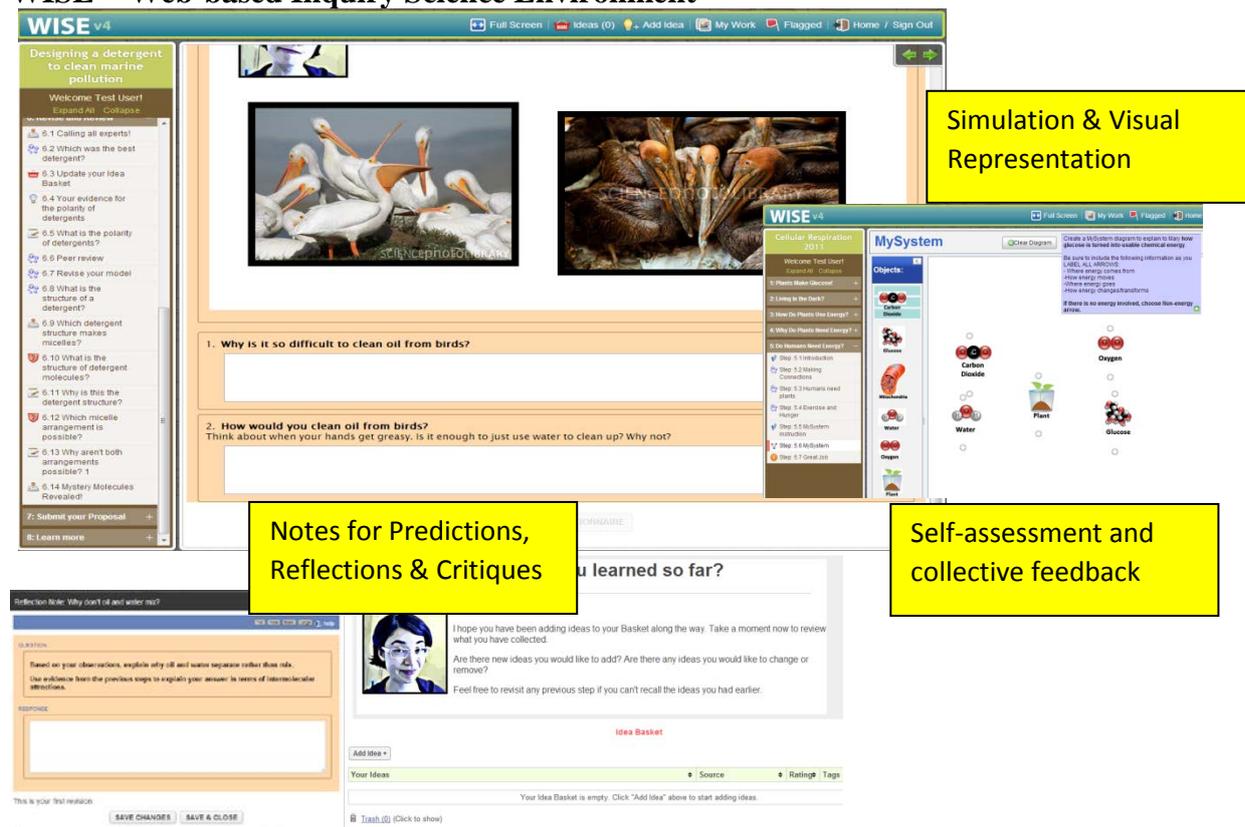


Figure 1 – WISE web-based Inquiry Science Environment - Colearn Community

WISE - **Web-based Inquiry Science Environment** was developed in 1997 by Berkeley University supported by the National Science Foundation. WISE is a virtual learning environment for designing, developing, and implementing science inquiry activities collaboratively. Its participants comprise a growing community of more than 15,000 science teachers, researchers, and curriculum designers, as well as more than 100,000 students around the world. Its main objectives are to investigate and provide:

1. Effective designs for inquiry activities and assessments.
2. Technology supports for students and teachers.
3. Authoring partnerships to create a library of inquiry projects.
4. Professional development programs to enable a wide audience of teachers to succeed with inquiry and technology.

### What are its key features?

WISE (<http://wise.berkeley.edu/>) is entirely browser-based; it does not require the installation of any software. Users only need access to a computer with an Internet connection, with no required software other than the Web browser. It provides an easy-to-use interface for online discussions, visual graphical representations, reflective notes, interactive simulations and assessments. It also offers a library of inquiry projects with an increasing variety of science topics and range of student age groups.

WISE is Free and Open Source. It is available for anyone with a computer and internet connection. It is driven by a growing community of teachers, researchers, and software developers, who are continually expanding and improving the system. The WISE project library is also result of collaboration among teachers, researchers and experts. It focuses on bringing science inquiry into diverse learning settings: classrooms, museums, home-school environments.

**How does it work?**

Students can create and save their work on the central project server hosted by Berkeley University that enable their accounts be coordinated with teacher's accounts. Users can access their work as well as the library of curriculum projects from any computer on the Internet. Teachers can choose from in the WISE Teacher's Portal, a set of materials including a detailed lesson plan with assessments grounded on to the AAAS National standards. Teachers can manage their student accounts, grade and monitor and student work as well as provide formative feedback during a inquiry based learning project.

Students can develop their inquiry projects through four steps:

1. Prediction, Observation, Explanation, and Reflection: Students register their predictions, include their observations with data collected, and integrate their evidence to describe explanations and changes to their predictions.
2. Critique and Feedback: Students define criteria to evaluate different claims in terms purpose and sources of evidence. Based on these criteria, they review the work of their peers by writing critical responses.
3. Science Narratives: Students then prepare coherent narratives based on the feedback received.
4. Challenge Questions: Students evaluate the quality of different scientific explanations and are redirected to relevant activities to improve their understanding.

**What is its pedagogical approach for IBL?**

WISE pedagogical approach is to emphase collaborative inquiry, engaging students to both self-monitoring and collaborative reflection. It also help teachers develop a sense of ownership, by providing opportunities for them to reuse, readapt or recreate new projects. Some pedagogical principals are:

1. Making Science Accessible

- Project builds on student ideas and scientific knowledge framework to model the inquiry process
- Students can connect project to personally relevant questions on topics of standards-based curricula

2. Making Thinking Visible

- Students explore and create personal representations to express their ideas
- Students can access and review multiple representations incorporated into assessments
- Activity promotes learning through representations as well as illustrates the process of inquiry

3. Learning From Others

- Students exchange ideas and learn from each other
- Peers have productive interactions to develop understanding
- Groups of learners develop shared criteria for scientific discourse
- Learners have the opportunity to share their findings after generating their own ideas

4. Promoting Autonomy and Lifelong Learning

- Project engages students in meaningful reflection as critics of diverse scientific information
- Project helps students understand and generalize the inquiry process to diverse science projects
- Project provides opportunities for learning and applying context-embedded content knowledge

## SCY- Science created by you

Figure 2 – SCY Science created by you - Colearn Community

### What is SCY?

SCY - Science Created by You was developed by a consortium of 12 countries under coordination of Universiteit Twente, supported by the European Commission from March 2008 to February 2012. SCY is a system for students between 12-18 years developing their constructive and productive learning of science and technology. SCY offers some missions which requires a combination of knowledge from different content areas (eg, physics, mathematics, biology, as well as social sciences). Students perform several types of learning activities: experiment, game, share, explain, design, etc.

The configuration of SCY-Lab is adaptive to the actual learning situation and may provide advice to students on appropriate learning activities, resources, tools and scaffolds, or peer students who can support the learning process. In the course of the project, a total of four SCY missions were developed: "the design of a CO<sub>2</sub>-friendly house", "creating a healthy pizza", "determining water quality", and "forensic DNA".

### What are its key features?

SCY (<http://www.scy-net.eu/>) is based on 'emerging learning objects' (ELOs) that are created by students individually or collaboratively in SCY-Lab, which is the general SCY learning environment on 'missions'.

The SCY approach is enabled by the innovative architecture of SCY-Lab that supports the creation, manipulation, and sharing of ELOs (models, data sets, designs, plans, etc.). The central unit in the SCY architecture is a broker that configures SCY-Lab to unfolding learning processes and activities. For this it uses information from pedagogical agents that exploit techniques of educational data mining to monitor information in the SCY

repository that stores the ELOs as well as domain information, the log-files of student behaviour, and the recorded chats between students.

### How does it work?

Users can find the detailed instructions for getting started in The teachers' manual, which is available at <http://scy-net.eu/web/scycom/manual>. The SCY-Lab and SCY-Portal, however, are not available <http://scy-net.eu/web/scycom/full-scy-lab-and-missions>.

The SCY-Lab digital learning environment provides the look and feel of a computer desktop. However the Using SCY-Lab, the student can navigate through a mission, open assignments, browse through previously made ELOs. For that, they can use these following tools to make new ELOs, communicate with fellow students and customize their workspace:

- SCY-Interview: helps learners to design a good interview.
- SCY-Feedback: is a peer assessment tool with which students can easily ask for and provide feedback on ELOs as they are being developed in a Mission.
- SCY-Data: enables students to process and visualize numerical data sets.
- SCY- Experimental Design: allows learners to write down experimental procedure as task trees.
- SCY-Lighter: is a Mozilla Firefox Add-on for collecting relevant information on the web and saving it into the SCY-Lab.
- SCY- Mapper: makes concept-maps representing ideas as nodes and the relationship between these ideas as links.
- SCY-ePortfolio: is used to build a mission portfolio to be assessed by the teacher.
- SCYAssessment : is a tool with which teachers assess submitted Portfolios (summative assessment).
- SCY-Text: is a simple text editor integrated into SCY-Lab.
- SCY-Uploader: enables students to import external files into SCY-Lab as ELOS (e.g. word documents).
- SCY-Dynamics: is a modelling tool that helps create and simulate graph-based models of complex problems and phenomena.
- SCY-Tagging: is a co-operative tagging tool used by students to tag ELOs in SCY-Lab.
- SCY-Chat: allows learners to communicate with each other in SCY-Lab and thereby collaborate on ELOs.
- SCY-Search: enables students to search the collection of ELOs to find relevant work by themselves or by other learners.
- SCY-Draw: Allow learners to create simple drawings, with elementary drawing capabilities: shapes, freehand drawings, importing images.
- SCY-Simulator: is a multi-purpose simulation tool that is able to show and run simulations.
- SCY-Datacollector: is a means for learners to collect numerical and multimedia data in the field with their mobile devices (based on the Android platform) and store the collections as ELOs. SCY-Formauthor is fully integrated into SCY-Lab and can be used to create forms for data collecting activities.
- Teacher tool: SCY-Authoring offers the teacher the ability to fine-tune a mission and obtain a real-time overview of activity in SCY-Lab.

## What is its pedagogical approach for IBL?

SCY uses a flexible and adaptive pedagogical approach to learning based on "emerging learning objects" (ELOs) that are created by learners. The basic ideas behind constructionism focuses on learning by creating knowledge, this construction takes place when students are engaged in building objects. SCY's ELOs such as models, concept maps, artefacts, data sets, hypotheses, tables, summaries, reports, plans and lists of learning goals.

In SCY-Lab (the SCY learning system) students work individually and collaboratively on "missions" which are guided by a general socio-scientific question (for example "how can we produce healthier milk?") and fulfilling the mission requires a combination of knowledge from different domains (e.g., physics and mathematics, or biology and engineering).

While on a SCY-mission, students perform several types of learning actions that can be characterised as productive (experiment, game, share, explain, design, etc.), students encounter multiple resources, they collaborate with varying coalitions of peers, and they use changing constellations of tools and scaffolds (e.g., to design a plan, to state a hypothesis etc.). The configuration of SCY-Lab is adaptive to the actual learning situation, advising students on appropriate learning actions, resources, tools and scaffolds, or peer learners that can support the learning process.

## weSPOT – Working Environment with Social Personal and Open Technologies for inquiry-based learning

Figure 3 – weSPOT - Colearn Community – individual and collective examples

## What is weSPOT?

The weSPOT project, supported by the European Commission from 2012-2015, aims to propagate scientific inquiry as the approach for science learning and teaching in combination with today's curricula and teaching practices. In inquiry-based learning co-learners take the role of explorers and scientists and are motivated by their personal curiosity, guided by self-reflection, and develop knowledge personal and collaborative sense-making and reasoning.

**What are its key features?**

weSPOT will create a “Working Environment with Social, Personal and Open Technologies” that supports users (from 12 to 25) to develop their inquiry based learning skills by means of:

- a European reference model for inquiry skills and inquiry workflows,
- a diagnostic instrument for measuring inquiry skills,
- smart support tools for orchestrating inquiry workflows including mobile apps, learning analytics support, and social collaboration on scientific inquiry,
- social media integration and viral marketing of scientific inquiry linked to school legacy systems and an open badge system.

**Eight primary test-beds in a European wide approach in 8 European member states**

**1. Food:** Examples of plastics contaminating food have been reported with most plastic types. Different countries might have different problems and solutions. Learners involved in this scenario will be acting as chemical engineers and food scientists.

**2. Biodiversity:** Biodiversity is increasingly recognized as critical to human life. Species are more threatened than ever by human activities like urbanization, climate change, deforestation, agricultural expansion, overexploitation of marine ecosystems. To explore these issues, students will investigate different habitats and carry out fieldwork research. Their inquiry projects could be related to breeding program for endangered species, bird populations in a garden, bug populations in a flower bed, fauna in a pond-ecosystem, other food webs or succession.

**3. Earthquake:** Students will download and format near real-time and historical earthquake data and seismogram displays from various sources (e.g. FORTH's own seismological station, U.S. Geological Survey, Institute of Geodynamics - National Observatory of Athens). Students will create spreadsheets and graphs to explore earthquake magnitude, wave amplitude, energy release, frequency occurrence and location. In a more advanced scenario students could do GIS Mapping and Analysis using free GIS Software.

**4. Sea:** High school students go on ½ year trip across the Atlantic Ocean, on their journey; they have normal class and run the clipper. In addition they explore their environment (water, air, physics on board, astronomy...) in personal projects.

**5. Energy:** Using discussion students should identify disadvantages of the current building from the energy-efficiency point of view. They should try to predict (providing evidence) future energy problems. Forming teams, they will work on developing reasonable ideas for future energy-efficient buildings. Some guidelines to them: What type of new materials for new energy efficient building components with reduced embodied energy to use. What technologies will ensure a high quality indoor environment, keeping in mind Ecology.

**6. School:** The student should provide research on expected changes in the future school. Possible directions: dropping and new courses; the future classroom – real or virtual; new ICTs in education; the role of the teacher; students relationships; new educational approaches; formal vs informal learning, the role of lifelong learning etc. Proposing innovative learning activities, preparing students for new jobs.

**7. Innovation:** The students will reflect their learning environment (or other environments) to determine some of the most pertinent problems, obstacles, “things they do not like”, etc. With the help of a teacher those points will then be contemplated from the view point of what out of that could be changed and what (unfortunately) could not be changed.

**8. Economy:** In recent published Economic Complexity Atlas Slovenia is the tenth country with high Economic Complexity Index (ECI), and Bosnia is ranked on 8th place as

country which has large ECI and small GDP (so it is expected that it will develop fast in next period). It would be interesting to research how these facts can be used for faster economic and social developments.

### How does it work?

weSPOT aims for five main products: a) diagnostic instrument for inquiry skills b) inquiry reference model c) Inquiry workflow services for shared workflow definitions d) mobile clients for inquiry support e) collaboration clients and reflection clients inquiry analytics.

weSPOT will provide students with the ability to build their own inquiry-based learning environment, enriched with social and collaborative features. Smart support tools will be offered for orchestrating inquiry workflows, including mobile apps, learning analytics support, and social collaboration on scientific inquiry. These offerings will allow students to filter inquiry resources and tools according to their own needs and preferences. Students will be able interact to with their peers in order to reflect on their inquiry workflows, receive and provide feedback, mentor each other, thus forming meaningful social connections that will help and motivate them in their learning. From a learner's perspective, this approach will offer them access to personalized bundles of inquiry resources augmented with social media, which they will be able to manage and control from within their personal learning space. Inquiry workflows can be described by graphical representations, whose aim is to help users visualize and orchestrate their inquiry projects. These representations are a key to personal as well as social inquiry based learning. Learners can link diverse steps of their investigation and represent their scientific reasoning by integrating graphically their questions, hypothesis, concepts, arguments and data. Inquiry workflows play an important role as visual strategy and mediating tools in scientific reasoning.

It should be noted though, that there is a significant distinction between the user-centric approach of the Web 2.0 paradigm and the learner-centric approach of weSPOT. This is because a social learning environment is not a just a fun place to hang out with friends, but predominantly a place where learning takes place and it does not take place by chance but because specific pedagogies and learning principles are integrated in the environment.

### What is its pedagogical approach for IBL?

The weSPOT's model aims to provide teachers and learners with the support and the technology tools, so as learners become able to find the optimal level of inquiry to match their needs and be facilitated in the transition from passive towards active learning.

weSPOT will employ a learner-centric approach in secondary and higher education that will enable students to:

- Personalize their inquiry-based learning environment.
- Build, share and enact inquiry workflows individually and/or collaboratively with their peers.

The project focuses on *inquiry-based learning* with a theoretically sound and technology supported personal inquiry approach, supporting four levels of inquiry based learning:

- **confirmation:** students are provided with the question and procedure (method) as well as the results, which are known in advance
- **structured:** the learning goal is to introduce students to the experience of conducting investigations or practicing a specific inquiry skill, such as collecting and analyzing data
- **guided:** the question and procedure are still provided by the teacher. Students, however, generate an explanation supported by the evidence they have collected

- **open:** students have the opportunity to act like scientists, deriving questions, designing and carrying out investigations as well as communicating their results

### **Conclusion**

Some innovative approaches through digital technology have been emerged in formal education to support students learn about science by acting as collaborative open scientists. Based on virtual learning environments for non-formal or informal scenarios, new opportunities have also engaged learners, educators and researchers to interact through their social networks or communities of practices.

This paper discussed tools and environments to promote scientific citizenship, responsible environmental attitudes as well as digital and scientific culture appropriation. These new approaches based on co-inquiry might be an useful strategy for learning about how science is developed rather than focusing only on learning science facts.

Formal education has primarily the challenge of equipping citizens with science knowledge, skills and attitude for developing scientific literacy underlying important and most frequent issues. Different scenarios might enrich learners' motivation and understanding through software tools, mobile devices, and different.

### **Acknowledgement**

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## EDUCATION IN A WORKPLACE FROM THE PERSPECTIVE OF A LEARNING ORGANIZATION

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### Abstract

Challenges connected with the development of the knowledge based economy make contemporary work places enter the path of changes. The process of globalization and the pace of changes in all the spheres of economy functioning caused that the optimal concept of management is a learning organization concept which is based on education and learning treated as tools enabling creation of unique resources of knowledge. Using this thesis success can be achieved only by such work places which faster than others will adapt to the changes by investing in 'learning'. It has to be accepted that employees' education is an essence of the XXIst century organizations and builds a new economy.

This concept was an inspiration to start research which aim was to show employee education in contemporary work places from the perspective of a learning organization. The article presents chosen research results concerning mainly employee education at work places

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**Keywords:** Lifelong learning, education of adults, learning organization

### Introduction

Problems concerning the dilemmas of functioning and development of contemporary companies are of an interdisciplinary character. These problems are considered by such disciplines as: economy, management sciences, sociology, psychology, and pedagogy as well. This article was prepared taking into account the perspective of a sub-scientific discipline – *work pedagogy*, which subject is education of a person in the course of professional life. Such a subject opens a wide area of issues connected with different fields of pedagogical work. One of such issues is *education in work places*, which is connected with the concept of a *learning organization* developed in the management sciences.

The aim of the article is to present chosen results of own research concerning the implementation of a learning organization model by companies, especially in the context of education run by them. In the research, according to the applied methodology, after specifying aims and the subject of the research, a critical analysis of literature was used, a diagnostic survey as well as some statistical methods. Results of the research allowed qualitative and quantitative analysis of the gathered material. The conducted own research, ran within the area of cognitive research, was conducted mainly with the strategy of quantitative research, included also elements of qualitative strategy. Important for the research conduct was triangulation of sources and methods. Based on the theoretical models of a learning organization available in the subject literature questionnaires for employees and employers were prepared. Moreover analysis of work places documentation connected with the area of education was conducted. The research involved 50 work places, 630 employees altogether at the area of one of the biggest cities in Poland - Bydgoszcz (the eight biggest city concerning the number of citizens).

### Work place in the knowledge based economy

The considerations presented in the article should be started by a statement that *work places*, in the literature referred to as *organizations*, are important components of the global socio-economic system. The significance of their role relies on specifying the features of economy and sustaining the basic components of its functioning. The feedback between economy and company decides about the fact that they are defined as 'constitutive' or 'basic' institutions of economy<sup>169</sup>. As P. F. Drucker writes work places are: '*driving force of a well thriving, stable society which values individuals and awards achievement; effectiveness of management is the key factor for their efficiency*'<sup>170</sup>.

Nowadays there are some phenomena happening in the whole global system of economy

as well as in the systems of certain national economies which result from technical, technological and economic changes and these influence functioning of the companies. The most important sources of such changes can be divided into six groups. These are:

1. *Deregulation of economic activity* – liberalization of its rules and at the same time restriction of country's direct interference into companies' functioning.
2. *Contemporary consumer* – an independent individual in its economic choices, more and more well oriented in seeking values that fulfil sophisticated needs concerning matching and comparison of competitive offers.
3. *Global market* – mechanism of needs fulfilment rising in the process of blurring the borders between local, national and world markets, establishing new standards of activity and solutions involving more and more market participants.
4. *IT technologies* – supporting the creation of global market infrastructure and accelerating its development within the market cyberspace.
5. *New sectors of economic activity* – fast growing enclaves of new ideas, products and services, based mainly on knowledge and providing services of a high added value.
6. *Evolution of the character and employment relationships* – raising the flexibility of employment, shift of a meaningful group of employed into the area of high qualified resources being the base of providing individualized services of a high potential of added value<sup>171</sup>.

The signalled sources of changes undergo constant changes and need updating. In the conditions of dynamically changing economy, referred to as *knowledge based economy*, work places as P.F. Drucker points '*act in the world build of bricks*'. Moreover, they are built of them. The bricks that make them are people, products, ideas and real property. These are not ordinary bricks – there are no walls or geographical borders for them, they are also transparent. Everything is visible for everyone all the time. The ability of a company to join the bricks and pieces of information into one whole and at the same time cooperate with a client will decide about the company's future success. These most important trends in the economic activity concern all the companies and branches. They also penetrate borders and touch all the social classes. Business in the known form is vanishing. Companies sell

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<sup>169</sup> W. Jaśkiewicz, *Przedsiębiorstwo w procesie zmiany - kreacja modelu*, [in:] *Socjologia gospodarki: Rynek, Instytucje, Zarządzanie*, ed. K. Konecki, P. Tobera, A. Buchner-Jeziorska, K. Karczmarczuk, W. Dymarczyk, Łódź 2002, p. 185.

<sup>170</sup> E.H. Edersheim, *Przesłanie Druckera. Zarządzanie oparte na wiedzy*, Warszawa 2009, p. 53.

<sup>171</sup> C. Bainbridge, *Designing for Change. Practical Guide to Business Transformation*, New York 1996 as cited in:

C. Suszyński, *Przedsiębiorstwo w rozwiniętej gospodarce rynkowej. Natura współczesnych zmian główne wyzwania cywilizacyjne*, [in:] *Przedsiębiorstwo. Wartość. Zarządzanie*, ed. C. Suszyński, Warszawa 2007, p. 40-41.

experience not the products. There is no competition but there are better solutions and more options which can be joined in more ways<sup>172</sup>.

Shaping of the knowledge based economy which '*is directly based on production, distribution and use of knowledge and information*'<sup>173</sup>, significantly influences the functioning of the work places and the employees. On the highly competitive market it is innovativeness, use of modern technologies and investing in employees that is considered a condition necessary to survive. One of the most important challenges, which work places face, is the requirement to constantly learn even more than the competition does. That is why an important area of changes to be introduced in companies' management seem to be not only the way of organizing and the flow of the basic function – production, but most of all personal function including the educational one which is strongly connected with the social system of the work place. This area of analysis is an important part of reflexions undertook in this article.

On the level of companies the knowledge based economy is personalized by a *learning organization* which as a concept of management was shaped in the 90's of the XXth century together with publishing of P. M. Senge's book entitled '*Fifth discipline. Theory and practice of learning organizations*'. Such organization treats education leading to the growth of education and development of employees as a subordinate thing allowing adjustment to the new challenges of the environment as well as undertaking innovative actions. It results from the assumption that personal development is strongly connected with professional institutions in which the employee undertakes employment and there is a strong bond between individual personal development and the changes happening within the work place<sup>174</sup>. That is why employees in a learning organization by using qualifications and competencies as well as developing new ones take part in creating knowledge for specific use in the everyday organizational practice. Everything serves innovativeness and flexibility in adjusting to the environment needs.

The assumptions being the starting point at supporting the process of learning at the work place are as follows:

1. 'Participants of the organization learn in a natural way while working, however they need help to learn systematically and for the learning to be required.
2. Supporting systems, as well as a positive climate are necessary for the learning to take place where it is necessary.
3. Learning is perceived as valuable from the point of reaching goals by the organization.
4. Organization is able to change in a constant way by learning'<sup>175</sup>.

It is necessary to highlight that the concept of a learning organization is among some researchers controversial. Doubts refer to the subject of learning i.e. whether an individual, group or organization as a system is learning. That is why the literature of the subject involves a couple of definitions which highlight a different determinant of functioning. The central category around which different discussions appear is so called *organizational learning*, which is joining individual and group learning. Some researchers prepared a complex description by creating theoretical models. The most often cited is model offered by P. M. Senge based on five disciplines – rules of organization self-development. These include: systemic thinking, personal mastery, thinking models, building a shared vision of the

<sup>172</sup> E.H. Edersheim, *Przesłanie Druckera. Zarządzanie oparte na wiedzy...*, op. cit., p. 44-48.

<sup>173</sup> *The Knowledge-Based Economy*, Paris: OECD, GD (1996) 102, p. 7.

<sup>174</sup> M. Pedler, K. Aspinwall, *Przedsiębiorstwo uczące się*, Warszawa 1999, p. 52.

<sup>175</sup> B. Garrat, *An Old Idea That Has Come of Age*, „People Management” 21 September 1995 as cited in: J. Batorski, *Organizacja efektywnie ucząca się*, Dąbrowa Górnicza 2002, p. 33.

future, and team learning<sup>176</sup>. Popular is also model prepared by M. J. Pedlera, J. G. Burgoyne's and T. H. Boydell<sup>177</sup> which includes eleven features which according to the authors are presented by companies wanting to change into learning organizations. These features are: 'a learning' approach to strategy, taking part in creating company's policy, innovativeness, financial-economic education, internal exchange, flexibility of payment, flexibility of structures, employees being detectors of environment, learning between work places, climate favouring learning, possibilities of development by everyone<sup>178</sup>.

Referring to considerations by P. M. Senge an assumption was adopted that: '*Organizations learn only by individuals' learning (...) without their learning organizational learning does not happen at all*'<sup>179</sup>. Learning within organization is not a simple sum of learning by everyone and all the groups. Learning is a constant process and not a set of some educational actions<sup>180</sup>. Although it is perceived as a personal belonging, something that a person does individually, learning may also happen between people within space or within relationships. The concept of a learning organization involves all the forms of individual learning however on the whole a pressure is placed on group learning which happens between employees<sup>181</sup>.

The cited concept was an inspiration to start research referring to education in work places which is described further in this article.

### **Development of work places toward learning organizations according to the research**

Starting presentation of the research results, it is necessary to highlight that in the light of the development of the new type of economy the scale of needs referring to undertaking interdisciplinary analysis concerning education within work places is huge.

The research was conducted between October 2009 and June 2010. The main goal was *showing employee education run in contemporary work places in the perspective of a concept of learning organization*. The author formed the main problem as a question: *whether, and if yes, in what scope education completed within work places involves the concept of a learning organization?* Initially a thesis was accepted that education completed within work places to a small extent included the criteria of the presented concept. Before the research was conducted a statement was also accepted that the model of work places most often met in the practice of economic life is still traditional model characteristic for the industrial economy.

The gathered material was analysed according to the features ascribed to a learning organization specified in the literature of the subject. The results allowed forming the following conclusions:

1. At 58% of work places a systematic education was run. Episodic education was found in case of 34% of organizations and 8% of work places lacked it. Work places where education was a permanent part of personal policy, declared that *'they have a strong consciousness of the constant need to raise the level of education and employees' skills, as it is necessary to efficiently fulfil the company's mission'*. In order to do that they run a planned and well-thought education. On the other hand companies which educated employees

<sup>176</sup> P.M. Senge, *Piąta dyscyplina. Teoria i praktyka organizacji uczących się*, Kraków 2006.

<sup>177</sup> M.J. Pedler, J.G. Burgoyne, T.H. Boydell, *The Learning Company: A strategy for sustainable development*, London 1991.

<sup>178</sup> M. Pedler, K. Aspinwall, *Przedsiębiorstwo...*, op. cit.

<sup>179</sup> P.M. Senge, *The leader's new work: building learning organizations*, „Sloan Management Review” 32(1) Fall 1990, p. 145.

<sup>180</sup> As cited in: M. Armstrong, *Zarządzanie zasobami ludzkimi*, Kraków 2007, p. 480-481.

<sup>181</sup> M. Pedler, K. Aspinwall, *Przedsiębiorstwo uczące się...*, op. cit., p. 14-26.

sporadically or did not run education at all justified it as follows: 'lack of such a need', 'lack of financial resources' and the fact that 'not all areas in the company require systematic education'.

2. When work places showed a systematic education it concerned obligatory content without which employees would not be able to perform their work. They treated education as a necessity not a factor enriching the organizational culture and its market value and giving a chance to become a learning organization. Only 60% of work places thought of education as important in the company's policy. Employers estimated the meaning of education in their companies as 'average' (38%) and 'high' (34%). It is worrying that 16% of work places valued it as 'low'. It seems that for this part of companies education was not valuable, nor basic for its development and future. Moreover 62% of the researched companies did not have basic documents connected with the process of education, which confirmed that their strategy of functioning on the market is not consciously adjusted to the learning goals. Education was mainly of an interim character not resulting from the development plan of work places. The main reason for running education was being competitive. The process of education was necessary for efficient completion of economic mission.

3. Work places invested in their own didactic materials (42% of companies) in order to run so called internal education (40%). Such way of educating was used especially due to a necessity of lowering the costs of education and was run by companies' owners and managers and especially trained, experienced employees. 60% of work places used the support of partners among which most often mentioned were educating companies (66%). The character of cooperation with external partners was connected mainly with the need to fulfil company's current needs, and only 16% was of a permanent and constant character. Moreover work places also received financial support to educate employees from Structural Resources and European Social Fund - 60% of the surveyed did not use this possibility.

4. Traditional, most commonly used methods were dominating in the companies, mainly lecture (average grade 3.7), rarely used were activating methods (discussion - average grade 3.1; situational method - 2.6; mind storming - 2.3; simulation - 1.9<sup>182</sup>). Dominating were courses (37% of employees took part in them) and trainings (26%). Their choice was conditioned by a possibility to get knowledge and skills which can be directly used in completing professional tasks. Using modern multimedia and Internet methods and forms of education was still a rare phenomenon (only 12% of companies).

5. Analysing work places' support and their contribution in the costs of education of the employed the author received information that 76% of companies covered the whole of part of costs. The possibility to pay for education from company's resources considered situations when the form and content of education was strongly connected with the profession. It needs to be highlighted that 62% of organizations required signing some contracts which governed the rules of participating in education. Employees were qualified to take part in the process of education according to the needs of the work place and position (average grade 4.7), the second rank was given to the type of performed work and scope of duties (average grade 4.3). The level of qualifications was considered to a smaller extent (3.8) as well as length of work (2.8<sup>183</sup>).

6. According to the employees evaluation education was run without considering the aspirations, expectations or individual preferences of the employed, and the completed educational programmes fulfilled expectation only to some extent. The level of satisfaction from taking part in training was evaluated as 'average' - 31.7%. 'High' and very high' level

<sup>182</sup> N= 630 The surveyed graded according to a scale, where: 5 - meant very often, 4 - often, 3 - sometimes, 2 - rarely, 1 - very seldom

<sup>183</sup> N=50 The surveyed graded according to a scale, where: 5 - a very important factor, 4 - important factor, 3 - average importance, 2 - not important, 1 - unimportant.

of satisfaction was declared by 6.3% and 26.2% of the surveyed, 27% evaluated it as negative. Low level of satisfaction resulted from two things. The first was the motivation systems used in work places which were not according to the needs and expectations of employees.

Lack of relationship between educational activity and strengthening of the position in a company, being promoted or getting a pay raise were often mentioned. The second thing was that employees paid attention to the need of taking part in managing the company which was not completed in a satisfying extent. They declared that all educational activities were their initiative and did not result from the work place activity which resulted from the criteria of informativeness and encouragement to undertake educational activity.

7. The surveyed also referred to the general statements characterizing education in work places being at the same time main assumptions which are the base of the concept of learning organization. The assumptions are specified in the table below.

Table 1. *The relationship of employees to the statements characterizing a learning organization*

Lp.	Specification	Answers according to a scale					Average points	Rank
		5	4	3	2	1		
1.	Each employee at a work place should learn	300	245	55	19	11	4.28	V
2.	People learn from each other	320	245	43	14	8	4.36	IV
3.	Learning allows development	500	110	14	3	3	4.75	I
4.	Learning is a constant process	447	165	5	7	6	4.65	II
5.	Learning is investment not costs	440	123	55	4	8	4.56	III
6.	Employees education is a priority for my work place	74	90	254	154	58	2.95	VI

N=630 the surveyed graded according to a scale, where: 5 – agree completely, 4 – do not agree, 3 – hard to say, 2 – rather disagree, 1 – disagree.

On the base of the received data one can conclude that employees accepted the idea of learning throughout life as they agreed with the statements that 'learning allows development' (rank I) and that it is 'a constant process' (rank II). The analysis of the data allows adding that 50% of the surveyed declared undertaking additional education. Among the surveyed 52.4% declared raising qualifications within self-development. Acknowledged was also the meaning of such assumptions as 'learning is investment not cost' (rank III), 'people learn from each other' (rank IV), 'each employee should learn' (rank V). Lower grades are a bit worrying. One of the basic rules in managing people needs to be reminded at this point which is necessity to invest in employees in order to create an intellectual capital and at the same time raising the knowledge and skills being at company's disposal. It seems that while referring to individual learning, employees analysed them in categories of investment, they disagreed with the statement that each employee should learn. They also rejected the thesis which is the base of the theory of learning in organization, which assumes that learning in the course of everyday activities is performed by people who act in groups and teams. Lowest rank was given to the statement that 'employees' education is priority of the work place'.

7. Another issue which was analysed were the features of work places which favour education. The answers are in the following table.

Table 2. Features of work places favouring the process of employee education.

Lp.	Specification	Answers according to a scale					Lack of answer.	Average points	Rank
		5	4	3	2	1			
1.	Work place concentrates its activities on personal policy	45	13	120	39	37	376	2.96	II
2.	Work place encourages to raise qualifications and professional competencies	70	53	60	117	38	292	3.00	I
3.	There is a free access to information concerning educational offers for employees	79	97	15	110	85	244	2.94	III
4.	All willing employees take part in the process of education	73	110	170	120	98	59	2.89	IV
5.	Work place uses a motivating system supporting employees' education	30	70	133	75	167	155	2.41	VI
6.	Work place promotes team learning	32	42	82	125	139	210	2.29	VII
7.	Employees take part in management and decision taking	21	112	115	80	134	168	2.58	V

N=630 the surveyed graded according to a scale, where: 5 – agree completely, 4 – do not agree, 3 – hard to say, 2 – rather disagree, 1 – disagree.

The answers given by the surveyed show that the researched work places: 'encouraged to raise qualifications and professional competencies' (mean 3.00); 'concentrated their activities on personal policy' so that employees' development was possible' (2.96); 'enabled access to information concerning educational offers for employees' (2.94). To a smaller extent the surveyed agreed with the statement that: 'all willing employees take part in the process of education' (2.89); 'Employees take part in management and decision taking' (2.58); 'Work place uses a motivating system supporting employees' education' (2.41). The lowest rank was given to the feature connected with 'promoting team learning within the work place' (2.29).

9. An important part of the research was also specifying in what way work places 'learn'. It was specified that 'learning ways' of companies involved mainly 'using other companies experience (mean 3.10) and 'using own past experience' (3.16). The least used were – from the perspective of a learning organization – 'creating new knowledge' (2.76) and 'employing experts and systematic problem solving' (2.74<sup>184</sup>).

To continue the presented research results some crucial empirical data needs to be signalled which concerns the process of organizational learning. According to the employers opinion education was mainly directed at individual employees and only than to teams of workers. The level most important from the perspective of a learning organization – the level of the whole work place – where people learn from each other, and the results of this learning are visible in everyday activity – was evaluated as the lowest (the average grade 2.28). The data is specified below.

<sup>184</sup> N=50 The surveyed graded according to a scale, where: 5 – great extent, 4 - great, 3 - average, 2 -small, 1 – very small.

Table 3. *The levels of completing education within work places.*

Lp.	Specification	Organizational, law form			Average of grades
		Average grade			
		Przedsiębiorstwa własności indywidualnej	Spółki	Przedsiębiorstwa państwowe	
1.	Individual employee learning	3.80	3.51	3.80	<b>3.60</b>
2.	Employees team learning	3.10	3.23	3.60	<b>3.24</b>
3.	Learning takes place at on the level of the whole work place	2.70	2.00	3.40	<b>2.28</b>

N=50 the surveyed graded according to a scale, where: 5 – very often, 4 - often, 3 - sometimes, 2 - seldom, 1 – very seldom.

In the context of the results it needs to be highlighted once again that the basic result of learning on the employee level is individual, personal getting knowledge, new skills and the change of attitude. On the level of team the results remain the same however its participants communicate with each other. For the concept of a learning organization the results of learning need to be widespread to be meaningful from the point of view of company's effectiveness.

**10.** The criterion of employees being 'detectors of the environment' remains unfulfilled. Only in case of three work places (6%) some activities based on constant analysis of the closest and distant environment by the employees who have contact with the external environment were noticed. Unfulfilled was also, connected with this criterion, feature referred to as learning between work places. Among the companies which took part in the research only 10% were participants of the Agreements or Clusters. The results of the research showed very weak cooperation with other companies which resulted from the fear of competition. Most of work places did not have contacts with companies within the same branch, did not share knowledge, and rarely undertook shared activities. The analysis of the relationships between the companies and higher schools and scientific-research institutions also proved to be weak (48% of companies did not enter into such cooperation; 34% declared that have only occasional contact).

The presented results of the research allow to say that *education completed in the surveyed work places to a small extent involved the assumptions of the concept of a learning organization*. It can thus be assumed that employee education was understood mainly as the process of raising qualifications and professional competencies of the employees. In such a form 'learning' was the most completely fulfilled task of the personal function. Creating possibilities for individual employees to learn and even investing in their training and education did not allow considering the work places as learning organizations. Activity at this level is equal to learning of the organization as a whole. Learning organization is such an organization which completes and improves the process of organizational learning in which all its members consciously take part.

## Conclusion

The problems highlighted in this article are justified both in the area of social sciences, as well as from the point of view of practical economy and inspire to have an interdisciplinary look at work places as educational institutions. Without doubt competitiveness and innovativeness of companies is nowadays strongly determined by the development of their ability to learn. To sum up the presented considerations one can cite the words of P. M. Senge: 'True learning reaches for the core of what is meant by being a human.'

Through learning we are able to do something we would not be able to do. Owing to learning we change ourselves. Due to learning we perceive the world and our relationship with it. Through learning we develop our creative abilities, we become part of creative life processes'<sup>185</sup>.

### Summary

The aim of the article was to present chosen results of own research concerning the implementation of the model of a learning organization by companies, especially in the context of their employees' education.

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<sup>185</sup> P.M. Senge, *Piąta dyscyplina. Teoria i praktyka organizacji uczących się*, Kraków 2006, p. 19-20.

## **BUDDHIST INFLUENCE ON WINDSCREEN LITERATURE: A STUDY ON STICKER PHRASES POSTED ON THE THREE WHEEL TAXIES IN SRI LANKA**

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### **Abstract**

In this paper, we focused on the Buddhist attitudes conveyed through sticker phrases posted on TWTs in Sri Lanka. The main factor which has been studied in this research survey is the influence of Buddhist attitudes upon the TWT community in Sri Lanka in their selection and posting the above mentioned literature pieces on their taxies. For this purpose, we have gathered a collection of 2291 phrases from 831 TWTs in fifteen towns in Kandy, Colombo, Anuradhapura, and Matara districts representing four provinces out of nine. Only Sinhala and English phrases were considered. We found 619 relevant sticker phrases which conveyed an influence of Buddhist attitudes and were categorized into twelve themes. The analysis of results was done both quantitatively and qualitatively. Impermanency, *karma*, *samsara*, *nirvana*, merits and sins, power of human minds, gods and *Mara* were commonly used Buddhist concepts among these phrases. 'Buddhist benedictory sentences' were the most popularly used theme and Kandy had shown the highest frequency of using the shreds with Buddhist influence.

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**Keywords:** Sticker Phrases, three wheel taxies, Sri Lanka

*Waiting in traffic jams in the morning is not an unusual experience in Kandy. Everyone keeps irritatingly looking ahead. Still one mischief maker has enough space to creep, scaring the other vehicles by showing his own mischievousness. So many faces frown at him. He doesn't care but rather passes everyone showing the post, "I'm naughty because I'm tiny- Stare not at me". (punchi nisaa danga kalaaTa epa ravanna- mqxñ ksid o`. l<dg tmd rjkak). How can one keep frowning at this little mischief maker after reading this post? Three wheel taxies! The little mischief makers! They are everywhere, any time day and night. They are small in size but bigger and stronger as a community. Day by day three wheel taxis have become a common and popular mode of commuter transport in Sri Lanka. This paper discusses a special genre of sticker phrases, which has been posted on three wheel taxies (TWTs). (See annexure 01)*

### **Introduction**

Literature is a living phenomenon, it evolves and reorients. Sinhalese have had a great connection with folk poems where they used to express their innocent ideas in a creative way. Especially, in feudal society, where people were divided into many castes in order to maintain the feudal social system, folk poems were commonly used. In feudal society, 'job oriented folk poems' constituted one of the divisions of Sinhala folk poems which gathered the work experiences of each occupation. A child did not have a free choice of his occupation but it was determined by exposure at birth and was passed through generations by patrilineal

descent. Sometimes people felt a psychological conflict with what they heard from and were taught by Buddhist monks versus what they had been engaged in their occupation. For instance, folk poem was the medium used by the bumble-bee honey collectors to express their fear towards sin of stealing the labor of innocent bees. Canoe rowers and farmers expressed their loneliness through folk poems.

The contents of those poems were influenced and nourished with Buddhist attitudes, a wide range of cultural facts and personal thoughts while they were presented in a most appropriate rhythm. This study is not on Sinhala folk poems, yet this paper focuses on a special genre in modern Sinhala folk expressions. We entitle this genre as 'windscreen literature'. Many commuter and transport drivers all over Asia have a passion for posting divers phrases on their vehicles. Sri Lankan three wheel taxi drivers show a great passion in posting many types of heartfelt sticker phrases on the windscreens of their vehicles. The term 'windscreen', is not limited only to the glass screen fixed in the front and the back of the vehicles, as it is commonly meant. For this presentation the term "windscreen" is used to denote with the meaning of:

“1. A screen for protection against the wind.

2. Chiefly British: *The windshield of a motor vehicle.*”

(<http://www.thefreedictionary.com/windscreen>)

Therefore, the stickers posted in all the sides of the TWT, including the two glass screens (in the front and the back of the taxi) and the rexine screen that covers the roof and the sides, were collected and used in this study.

Time has changed Sri Lankan society and the system, people and their taste. However, we can still see certain similarities in people's cognition and behavior. According to our research instinct, sticker phrases posted on TWTs in Sri Lanka manifest many similarities with Sinhala folk poem tradition. The influence of Buddhist attitudes toward folk expressions is one the common features. This paper focused on the above mentioned influence in both qualitative and quantitative aspects using the data collected with a specific research purpose.

### **Study Population**

In modern days, TWTs also called trishaws, tuk-tuks and wheels, have become a major mode of commuter transport in Sri Lanka. They have become popular due to their availability, affordability and quickness though the comfort may be an issue as compared to that of other types of taxis. Usually, they are used in short distance trips. TWT is a source of self-employment opportunities. This service eases the life of commons in a society.

It is common to notice arguments going on, when the driver suggests a high price at the destination. Some others point finger to TWTs for most of the vehicle accidents. Personally, I have experienced both situations but I felt something unique in them. TWTs easily get you into trouble; on the other hand, whenever you get into trouble, their good hearts are also common to help commuters. In the present Sri Lankan society TWT drivers have been labeled by many financial, social and behavioral facts. They have, therefore, become a kingpin in Sri Lankan society representing a considerable population in the working community. Consequently, the literature which emerged and exists within TWT community is definitely worthy of identifying as a special category in modern folk literature.

In our study, we collected data from fifteen towns in four districts representing four of nine provinces in Sri Lanka.

Kandy District- Katukele, Kandy town area, Katugasthota, Bogambara, Geli-Oya  
 Colombo District- Keselwatta, Petta, Kiribathgoda  
 Anuradhapura District- Anuradhapura town area, Mihintale, Talawa, Thambuththegama, Kekirawa, Tirappane  
 Matara District – Matara town area



Kandy District

Colombo District

Anuradhapura District

Matara District

The selection of these areas for the data collection was attentive due to a few reasons. First, was to maintain a variety between the districts. Colombo is the capital of Sri Lanka; Kandy is from the central hill area; Anuradhapura is one of the busiest Buddhist religious cities in Sri Lanka, and Matara is from down South where a unique sub culture is visible between traditions and modernity favoring tourism. According to our hypotheses our data suggest area-specific differences. In order to study this aspect, we used the area-specific analysis parallel to thematic analysis.

Second, it was hard to find a distinct number of data posted in Sinhala language from Northern and in Eastern provinces as the majority of people who live in those areas use Tamil as their native language. Therefore, we were left with seven provinces out of which we have monitored the survey in four provinces. However, one of the main limitations in data collection was the inability to observe the whole number of TWTs in a park as some of them may have left the park on long hires while the data collection is in progress and not returned to the park even though the data collector may wait hoping for such absent TWTs to return to the park.

### Design of study

This paper focuses on one of the important themes of the principle research done on sticker phrases posted on TWTs. The purpose of the principle study was to determine the variety of themes and the frequency of using them. When the data was analyzed, we have identified the fact that different themes have been used in different frequencies. Stickers with religious influence (Buddhist, Hindu, Christian and Islamic) were found common in our data. In this paper we focus on the influence of Buddhist ideas toward the sticker phrases posted on the TWTs in Sri Lanka.

All the phrases were posted as stickers. Hence at the beginning, we planned to meet the sticker sellers. However, we got to know that in Kandy there were no such shops where they have already printed sticker phrases. Few printed common benedictory phrases were found in two stores but they were for lorries and heavy vehicles. Later, we revealed the fact that these sticker phrases were not ready-made, but they were tailor made according to the personal choice of their customer, the owner or the driver of the TWTs.

We have interviewed a few printing shop workers and learnt that there are separate price rates for TWT sticker printing. One square foot with one color printing costs Rs. 120 to Rs. 135 in December 2012. First, the customer could meet a computer operator working at

the printing office in order to get his phrase(s) typed with a desirable design. The printing cost covers the typing and the designing part as well.

The primary argument was that these phrases were worthy to be called as a separate genre of folk literature and this revelation made the argument even stronger proving that these verses and phrases are original thoughts coming up by individual creation, preference or psychological expressions.

### Data collection

The data was collected by going from one TWT park to another. Some taxis, which have been randomly parked, also contributed a fairly good amount of data. The data was collected using a chart divided into four sections representing the position of the phrases on the TWT (front-inside-back and other). Only Sinhala and English shreds were considered and the total number of TWTs observed was 831. Each TWT was counted as one single unit even though most of them carried more than one piece of phrases. Therefore, a total number of 2,291 pieces of posts has been gathered. We found 619 relevant sticker phrases which conveyed an influence of Buddhist attitudes. Another limitation was marked at this point. The amount of data collected from the four districts was not equal. The range of the data spread out from 151 (from Anuradhapura) to 181 (from Matara) and 213 (from Kandy) to a maximum of 286 (from Colombo).

### Analysis of results

After sorting the relevant sticker phrases on our focus, we categorized all 619 of them into twelve: 1) Buddhist benedictory sentences (divided into five sub categories), 2) Provincial Bodhi wishes, 3) Wishes with gods, 4) General wishes, 5) Statements on Buddhist intimacy, 6) Pali verses, 7) General Statements, 8) Thoughts on Parents, 9) Love, 10), Notices, 11) Career and 12) Jokes. In the analysis, we discussed each of the above themes with a qualitative and a quantitative aspect using MS Excel.

The analysis consists of tables, graphs and descriptions. These tables and graphs were used to illustrate major themes, sub themes and variations of sub themes. Therefore, "theme", "sub-theme" and "variation" are the three levels that the data was placed and discussed. These twelve main themes illustrated a partial distribution toward the first theme, the benedictory sentences. The following table 1 and the related figure 1 clearly summarize the frequency of usage of each thematic. This preliminary numeration is an overall presentation of the data from all four districts.

**Table 1: The distribution of the percentage usage of twelve sub themes**

	Themes	Number of Phrases	Percentage
1	Buddhist Benedictory sentences	451	72.86
2	Provincial Bodhi Blessings	42	6.8
3	Personal Statements with Buddhist influence	36	5.81
4	Phrases about PARENTS influenced by Buddhist attitudes	32	5.17
5	Phrases about Gods	18	2.9
6	Buddhist intimacy	16	2.58
7	General Wishes influenced by Buddhist attitudes	8	1.3
8	Phrases about LOVE influenced by Buddhist attitudes	6	0.97
9	Notices influenced by Buddhist attitudes	5	0.81
10	Pali Verses	2	0.32
11	Phrases about JOKES influenced by Buddhist attitudes	2	0.32
12	Phrases about TWT CAREER influenced by Buddhist attitudes	1	0.16
		619	100%

The data is arranged in a descending pattern in order to convey the idea more clearly. The following figure relates to the above data.

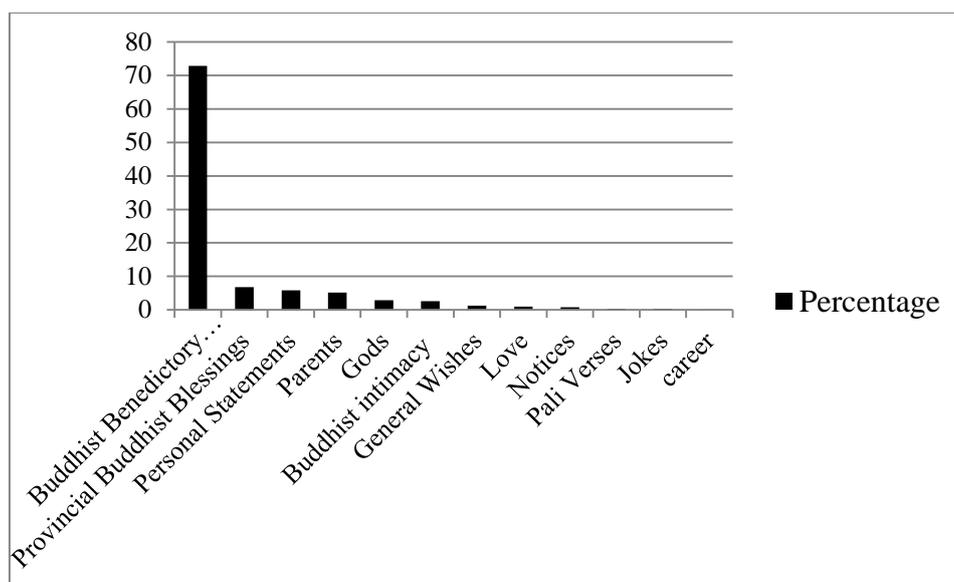


Figure 1: The percentage values of usage of twelve sub themes out of 619 phrases bearing influence of Buddhist attitudes.

(1.1) Ranking first with the highest number of sticker phrases (72.86%), the theme Buddhist benedictory sentences has become worth studying with a special focus. In this case, it is distinguished that the benedictory sentences appeared with few variations. For the convenience of the study, all of the variations were categorized into five sub themes as follows.

- 1.1 Budu saranay! nqÿ irKhs (May the lord Buddha bless you!)
- 1.2 Theruwan saranay!f;rejka irKhs (May the triple gem bless you!)
- 1.3 Provincial Bodhi (tree) blessings
- 1.4 Dalada samindu pihitay! o<od iñ`ÿ msysghs (May the tooth relic bless you!)
- 1.5 Jaya sri maha bodhi pihitay! ch Y%S uyd fndaê msysghs (May the Sri Maha Bodhi bless you!)
- 1.6 Devi pihitay! foú msysghs (May the gods bless you!)

The following table shows the frequency of using each sub theme in benedictory sentence. The numbers represent an overall calculation of data from the four districts.

Table 2: Distribution of the usage of five sub themes of ‘the benedictory sentences’ (in descending order)

	The Benedictory Sentence type	Number of shreds	Percentage
1.1	Budu saranay (May the Buddha bless you)	309	68.51 %
1.2	Theruwan saranayi (May the triple gem bless you)	50	11.08 %
1.3	Dalada pihitay (May the sri Dalada bless You)	39	8.64 %
1.4	Jaya sri maha bo pihitay (May the Noble Sri maha Bodhi Bless You)	32	7.09 %
1.5	Devi pihitay (May the Gods Bless you)	21	4.65 %
	<b>Total of benedictory phrases</b>	<b>451</b>	<b>100%</b>

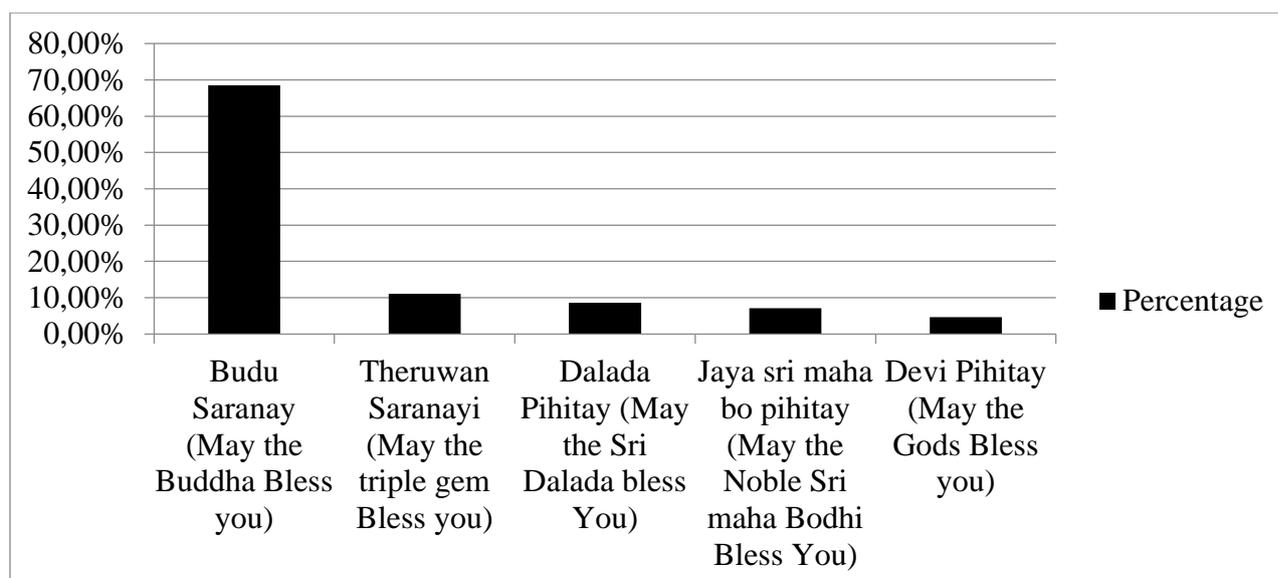


Figure 2: Distribution of the percentage values of the usage of five benedictory sentences.

The benediction “**may Lord Buddha bless you**” (Budu saranay- nqÿ irKhs) reveals the highest number of variations and the highest frequency of usage. Eleven variations of this sub theme are found in our data.

1.1.1 May Lord Buddha bless you!

(Budu saranay- nqÿ irKhs)

1.1.2 May Lord Buddha bless this vehicle!

(mema rathayaTa budu saranay- fuu r:hg nqÿ irKhs)

1.1.3 May Lord Buddha bless to those who travel by this vehicle!

(mema rathaye gaman karana ayata budu saranay fuu r:fha .uka lrk whg nqÿ irKhs)

1.1.4 May Lord Buddha bless to those who scold.

banina ayata budu saranay- nKsk whg nqÿ irKhs)

1.1.5 May noble lord Buddha bless you!

(Sambudu saranay - iinqÿ irKhs)

1.1.6 May noblest lord Buddha bless you!

(Sammaa sambudu saranay- iïud iinqÿ irKhs)

1.1.7 May the blessing of twenty eight Buddhas go to travelers in this vehicle and the hands of the driver of this vehicle (Mema rathaye yanena ayata, riyaduru dethata ata wisi maha budu saranay- fuu r:fha hfkk whg ßhÿre uy;df.a oE;g wgúis uyd nqÿ irKhs)

1.1.8 May Lord Buddha bless the hands of the driver

(Riyarudu dethata budu saranay- ßhÿre oE;g nqÿ irKhs)

1.1.9 May Lord Buddha bless you, who overtake me!

(Ma pasu kara yana obata budu saranay- ud miqlr hk Tng nqÿ irKhs)

1.1.10 May Lord Buddha bless you and May gods help you!

(Budu saranay devi pihitay!- nqÿ irKhs foú msysghs)

1.1.11 Adore Lord Buddha/ My worships to lord Buddha.

(namo buddhaya- kfuda nqoaOdh)

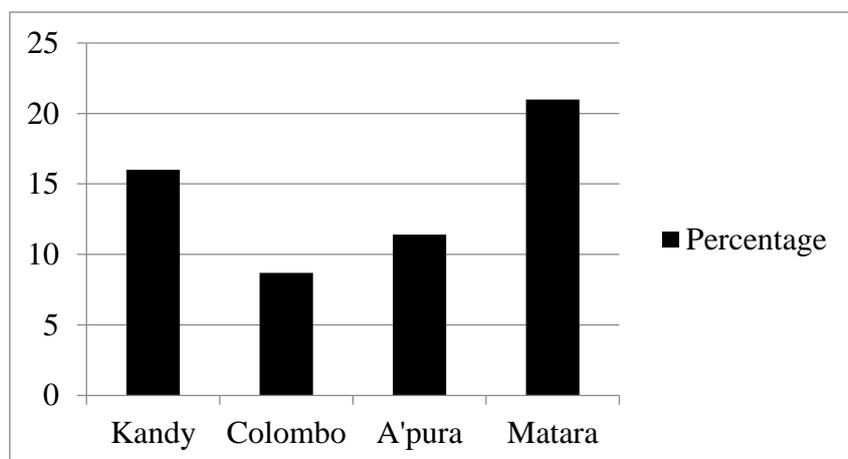
From the above eleven variations, the sub theme “**Budu Saranay!**” (may Lord Buddha bless you) covers 309 out of the total of 619 relevant sticker phrases. This illustrated that, this sub theme was the most commonly used and the most popular idea among Sri Lanka TWT community since nearly 50% (49.91%) of the relevant sticker phrases has been covered with it. The basic or the pure version of the sub theme “*Budu Saranay*” was repeated 208 times

(Kandy-62/ Co-54/A'p-20/M-72) demonstrating that it is the most used Buddhist influenced phrase among the TWT community.

As we were discussing about the popularity of the sub theme *Budu saranay*, it is worth looking at district wise distribution of this particular sub-theme. Table 3 presents the numerical values and the percentages of the usage of the sub theme (1.2) *Budu saranayi* in each district.

**Table 3: Percentage values of usage of the sub-theme *Budu Saranayi* (May the lord Buddha bless you) out of benedictory phrases in four districts**

District	Total number of shreds	Shreds on all varieties of "Budu saranay"	Percentages
Kandy	679	113	16.6 %
Colombo	959	84	8.7 %
Anuradhapura	263	30	11.4 %
Matara	390	82	21.0 %



**Figure 3: Percentage values of usage of the sub-theme *Budu Saranayi* (May the lord Buddha bless you) out of the benedictory phrases in four districts.**

The figure 3 clearly shows that the usage of the phrase "Budu saranayi" out of the total benedictory entries made by the Colombo TWT community carries the lowest figure. Colombo is the capital of Sri Lanka. Those city dwellers interact with many social and economical complexities such as urbanization, capitalization and westernization. Many other external factors may have influenced the TWT community when picking up a phrase of their choice as a post for their taxi. For example: common use of Bob Marley posts and commercial advertisements.

On the other hand, even though Anuradhapura is popular as a city with ancient Buddhist ruins and many Buddhist temples, still the data shows that A'pura ranks third place in using the first benedictory sub-theme *budu saranayi in particular*. However, the data presents in the subsequent tables will show that Anuradhapura has maintained a fairly higher rate of usage of benedictory sentences in common. We will discuss the area-wise usage data later, taking the percentages of overall usage of benedictory sentences in order to get a better generalization towards our focus.

The following sentences of TWT drivers present some of the reasons for them to post phrases about Buddhist benediction.

Colombo 440: "I faced a severe accident at the place where I used to work before. They said I won't be able to recover. However, I believe I was recovered because I practiced worshipping Lord Buddha every day. I post these phrases because I have a strong faith on Buddhism."

Colombo 298: “(I post these benedictions because) I have a strong faith on Buddhism.”

Colombo 299: “(I post these benedictions because) Buddhism is my religion and I work righteously by thinking about its doctrines always.”

The personal experiences and attitudes mentioned in the above ideas, reasoned out why people preferred posting benedictions about Lord Buddha.

(1.2) The second highest usage out of the five sub-themes in Buddhist benedictory sentences was “**may the triple gem bless you!**” According to table 2 and figure 2 this sub theme of benediction shows a remarkable gap from the first sub-theme in frequency of usage. Numerically there is a difference of 259 sticker phrases. The following four variations have been documented under this sub-theme.

1.2.1 May the triple gem bless you! (Theruwān saranayi! - f;rejka irKhs)

1.2.2 May the triple gem bless you! (Thisarana saranay - ;sirK irKhs)

1.2.3 May the triple gem bless all who get into this vehicle  
(mema rathayata ethulu wana siyalu denata theruwan saranayi –  
fuu r:hg we;=¿ jk ish“ fokdg f;rejka irKhs)

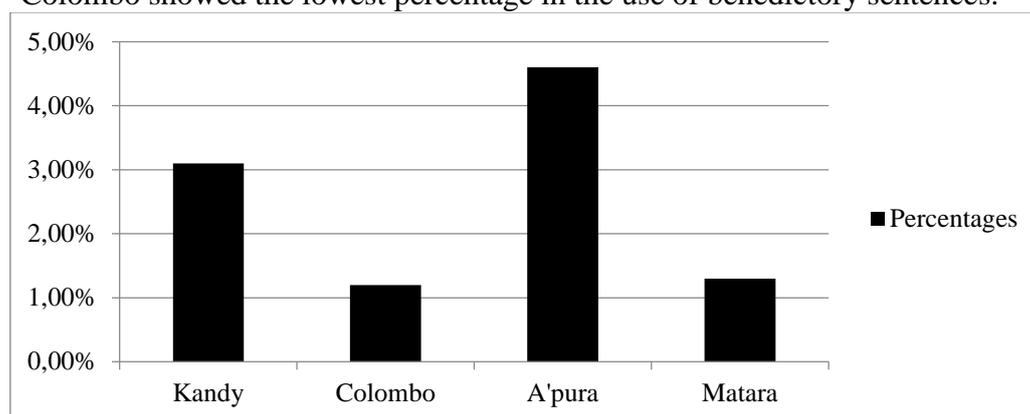
1.2.4 May victory happens with the blessing of all of these three blessings”  
(me thun saranin jayama wewa! -fu;=ka irKska chu fōjd&

The table 4 with the numerical values and the percentages show us that Anuradhapura ranked highest in the second sub-theme while Kandy and Matara follow respectively keeping Colombo at the last.

**Table 4: Distribution Frequency of the usage of the sub theme *Theruwān saranayi* (May the triple gem bless you)**

District	Total number of sticker phrases	Phrases on all varieties of “May the triple gem bless you”	Percentages
Kandy	679	21	3.1%
Colombo	959	12	1.2%
A'pura	263	12	4.6%
Matara	390	5	1.3%
	<b>2291</b>	<b>50</b>	<b>2.18%</b>

Colombo showed the lowest percentage in the use of benedictory sentences.



**Figure 4: Distribution Frequency of the usage of the sub theme *Theruwān saranayi* (May the triple gem bless you)**

An interesting observation between these two benedictions was illustrated with the ranks. Colombo and Kandy have maintained their ranks as the lowest and the 2<sup>nd</sup> respectively in relation to the first and the second sub themes while Matara and Anuradhapura have exchanged each other's ranks. This suggests that the TWT community has a trend of using

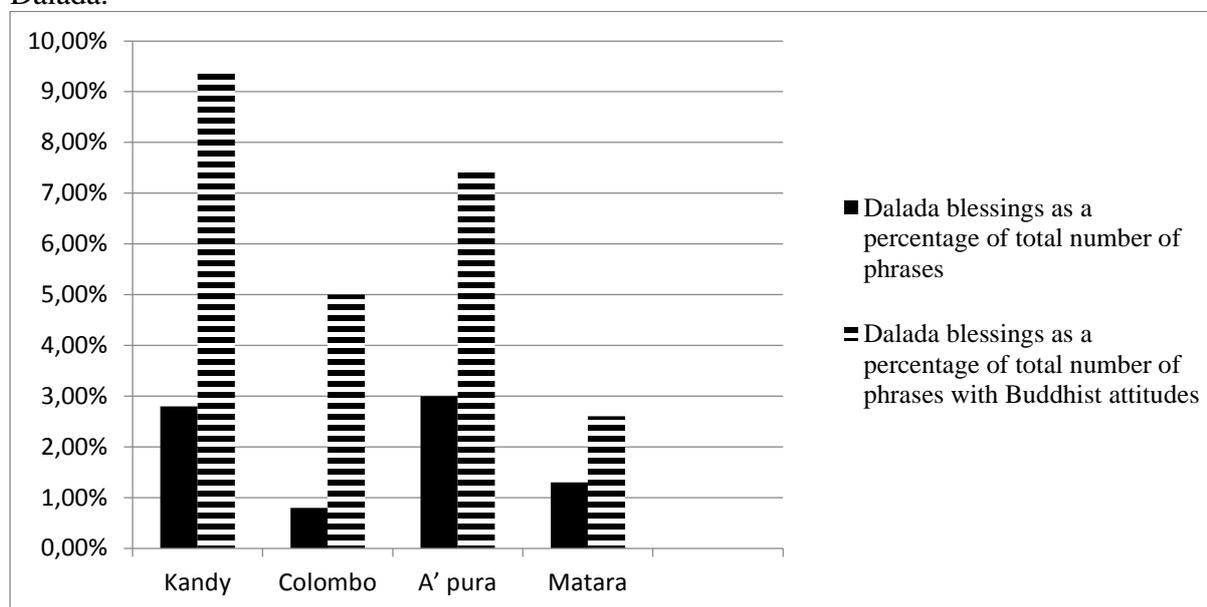
one of the above benedictions. The phrase *Budu saranayi* is popular in Anuradhapura while *theruwan saranayi* is seen in a less frequency and vice versa in Matara. That could be the reason why Anuradhapura and Matara report highest frequencies of each subtheme by turn.

**(1.3) The temple of the sacred tooth relic** is situated in Kandy- Sri Lanka but it is one of the landmarks of the Buddhist community in the world. Thousands of devotees and tourists visit *Sri Dalada Maligawa* daily. The data shows that the blessing upon Sri *Dalada* (the sacred tooth relic) had been commonly used in other parts of the country as same as in Kandy. Numerically, Kandy has documented the highest number of phrases (19) on blessings upon tooth relic. We calculate the percentage values of these numeric figures against the total number of sticker phrases and the total number of phrases with Buddhist attitudes, too, to present in our data tables.

**Table 5 - Summary table on the usage of the benedictory phrases upon the sacred tooth relic**

District	Total number of phrases	Phrases on all variations of Dalada blessings	Dalada blessings as a percentage of total number of phrases	Total number of phrases on Buddhist attitudes	Dalada blessings as a percentage of total number of phrases with Buddhist attitudes
Kandy	679	19	2.8%	201	9.4 %
Colombo	959	8	0.8%	160	5.0%
A' pura	263	8	3.0%	107	7.5 %
Matara	390	4	1.3%	151	2.6 %
<b>Total</b>	2291	39		619	

Though the temple of the sacred tooth relic is situated in Kandy, the data show that the blessings upon Sri Dalada (sacred tooth relic) are used in all four areas. However, Kandy as the city where the sacred tooth relic is currently enshrined, since the beginning of the kingdom of Kandy, showed a higher percentage of using the phrases with blessings upon Sri Dalada.



**Figure 5: Use of the sub-theme "May the sacred tooth relic bless upon you"- Percentages of sticker phrases observed from the four districts**

People from Kandy are proud to have this sacred place in their city and they mostly use this blessing sentence as a special symbol of Kandyans even when they write personal letters. Therefore, it is evident about the psychological preference in choosing this particular benedictory sentence by folk coming from that same area.

Anuradhapura has had many special temples where the sacred tooth relic had been enshrined and worshipped for many centuries in the history well before Kandy. This sacred tooth relic was the prime symbol of Sri Lankan royalty. Finally, the sacred tooth relic was reverentially brought and enshrined in Kandy where it is still resting in the golden shrines with great reverence. Anuradhapura was the first kingdom where the sacred tooth relic had been enshrined for many centuries in several special temples situated in proximity to the royal palace of each king. Ruins of few temples of the sacred tooth relics still remains in the close association with the ruins of some ancient royal palaces. This background could be an influence for the TWT community in Anuradhapura to post phrases depicting the belief on sacred tooth relic.

Time to time, during the historical eras, the sacred Dalada was reverentially taken from kingdom to kingdom in public procession or moved from location to location in hide and secrecy depending on the prosperity or austerity of the situation.

Colombo reports the lowest usage of this sub-theme. The reason can be the same as what we suggested before, that the focus of the people have spread out to many other socio-economic factors other than religious factors.

We found eight variations in this sub-theme as follows:

- 1.3.1 Adore Lord Buddha/ My worships to lord Buddha. Dalada namami o<od kudñ
- 1.3.2 Adore tooth relic/ My worships tooth relic Sri dalada namami Y%S o<od kudñ
- 1.3.3 Adore tooth relic/ My worships tooth relic Namami sri dalada kudñ Y%S o<od
- 1.3.4 May the tooth relic bless you! Sri dalada pihitay Y%%S o<od msysghs
- 1.3.5 May the tooth relic bless you! Sri dalada samindu pihitay Y%S o<od iñ`y msysghs
- 1.3.6 May the tooth relic bless you! Dalada samindu pihitay o<od iñ`y msysghs
- 1.3.7 May tooth relic bless this vehicle. meme rathayaTa dalada samindu pihitay fuu r:hg o<od iñ`y msysghs
- 1.3.8 May tooth relic and Gods bless this vehicle! mema rathayata dalada samindu pihitay devi pihitay! fuu r:hg o<od iñ`y msysghs fou msysghs

The variations were not as vivid as the previous subthemes.

(1.4) Besides the sacred self-relics of Lord Buddha, the worship of the Bodhi trees is another major material cult of Buddhists. The sacred Bodhi tree in Anuradhapura is a propagated branch of the sacred Bodhi tree in Buddha Gaya, India. Branches from the Anuradhapura Jaya Sri Maha Bodhi tree are established in many places around the island. Other than the propagated branches of the sacred Jaya Sri Maha Bodhi, Gatambe, Matara, Kelaniya are few reputed provincial Bodhi beliefs. We found few variations of Bodhi beliefs in our data. In order to have an overall discussion on Bodhi beliefs we combined the data of one sub-theme of the theme one (May the sacred Bodhi tree bless you) with theme two, 'provincial Bodhi beliefs'. The following table summarizes all five relevant Bodhi blessings present in our data.

**Table 6: Distribution of phrases on Bodhi blessing in relation to four districts**

District	Jaya Sri Maha	Kelaniya	Rambukkana	Gatambe	Matara
Kandy	3	-	-	1	-
Colombo	4	3	1	-	-
Anuradhapura	25	1	-	-	-
Matara	-	-	-	-	36

The above table only discusses the numerical values but not the percentages relating to them. However a preference towards each provincial Bodhi belief is visible from each particular area. For instance: the blessing "May Matara Bodhi bless you" has been only used in Matara documenting 36 phrases (9.23% of total shreds from Matara and 1.57% of total phrases). A special higher usage of blessings with Sacred *Jaya Sri Maha Bodhi* was documented from Anuradhapura (25- 9.5% of total phrases from A'pura and 1.09% of total

phrases) where the identical sacred Bodhi tree is living over two and half millennia. Gatambe and Rambukkana Bodhi blessings are mentioned only once as they are popular mostly in that particular area. Phrases on Kelaniya Bodhi had been observed three times as Kelaniya and Kiribathgoda were some of the areas where that data collection had been carried out. Therefore, we can observe that provincial Bodhi beliefs are used in taxi tickers in each area with a preference.

The variations we found in our data on Bodhi beliefs were as follows:

1.4.1 May the noble Jaya Sri maha Bodhi tree bless you!

Jaya Sri Maha Bo samindu pihitay ch Y%S uy fnda iñy msysghs

1.4.2 May the noble Jaya Sri maha Bodhi tree bless you!

Jaya Sri Maha Bodhi pihitay ch Y%S uy fndaê msysghs

1.4.3 May the noble Jaya Sri maha Bodhi tree bless you!

Sri Maha bo samindu pihitya Y%S uyd fnda iñ`y msysghs

Even though there were 32 phrases on sacred Bodhi blessings, they did not appear in many variations. The sentence (1.4.1) was repeated 28 times while the rest was repeated thrice and once accordingly. The provincial Bodhi blessings only reported in four variations as,

2.1 May the Kelaniya Bodhi bless you!

Kelani bo samindu pihitay! le<Ks fnda iñy msysghs

2.2 May Rambukkana Bodhi bless this vehicle!

Mema rathayata Rambukkana bo samindu pihitay!

fuu r:hg rUqlalk fnda iñy msysghs

2.3 May Gatambe Bodhi bless this vehicle!

Mema rathayata gatambe bo samindu pihitay fuu r:hg .egfò fnda iñy msysghs

2.4 May Matara Bodhi bless you!

Matara bo samindu pihitay ud;r fnda iñy msysghs

(1.5) Buddhism is a philosophy. During the forty five year long span of Lord Buddha's preaching, there are occasions of mentioning unique descriptions relating to the existence of real gods. However, it was interesting to see evidence on different beliefs of gods in our set of data. We divided them into two sections, the first section as a sub theme of the benedictory sentences and the other as a separate theme called "wishes with gods". Other than the concept of existence of real gods in Buddhist preaching, the influence of Hinduism has driven many Buddhist to cultivate a belief of different gods. The picture of many Hindu Gods have relations to nature of profession, profession based cast, education and intelligence (God Gana), music (Saraswathie), moral conduct (Paththini) etc. God Kataragama and God Dedimunda for instance are regional beliefs, a concept with direct influence by Hinduism.

1.5.1 God bless you Devi pihitay! foú msysghs

1.5.2 All gods bless you Siyalu devi pihitay ish` foú msysghs

1.5.3 God bless the driver's hands Riyaduru dethata devi pihitay rshÿre oE;g foú msysghs

1.5.4 May you blessed by all the gods. ObaTA siyalu devi pihitay Tng ish,q foú msysghs

1.5.5 God bless this vehicle. Mema rathayata devi pihitay fuu r:hg foú msysghs

1.5.6 May you protected by gods. Devi rekavaranay. foú /ljrKhs

1.5.7 May the driver's hands be protected by gods. Riyaduru dethata devi pihitay rshÿre oE;g foú /ljrKhs

1.5.8 God bless you who travel in this vehicle. Mama rathaye yana obata devi pihitay

fuu r:fha hk Tng foú msysghs

(3) The above variations did not classify any god by name. They were just general blessings about gods. That subjected it to be kept as a separate sub theme. The section below was categorized as the third theme, 'blessings with gods', because those phrases concerned blessings from a specific god.

3.1 God Katharagama, please protect us reka denna surinduni Katharagama

/l fokak iqqβ` ÿks l;r.u

3.2 May god Skanda bless (us)! Kanda surindu pihitay l`o iqqβ` ÿ msysghs

3.3 May god Katharagama bless (us/you) Katharagama devi pihitay l;r.u foú msysghs

3.4 May god Dedimunda bless (us/you) Dedimunda devi pihitay oeäuqKav foú msysghs

3.5 May god Gana bless (us/you) Gana devi pihitay .K foú msysghs

3.6 May goddess Pattini bless (us//you) Paththini meni pihitay m;a;sks uEKs msysghs

3.7 May the righteous goddess Pattini bless (us//you) Sathpaththini meni pihitay i;am;a;sks uEKs msysghs

3.8 May the god Getabaru bless (us) GeTabaru devi pihity .egnre foú msysghs

3.9 May god Saman bless (us)! Saman devi pihitay iuka foú msysghs

3.10 May god Saman bless (us)! Sumana Saman devi pihitay iquk iuka foú msysghs

3.11 May god Vishnu bless (us)! Vishnu devi pihita úIaKq foú msysghs

3.12 May god Sri Vishnu bless (us)! Sri Vishnu devi pihitay Y%S úIaKq foú msysghs

Names of seven gods were found in our data. They were Katharagama, Dedimunda, Gana, Pattini, Getabaru, Saman, and Vishnu. Table 7 and figure 6 summarize the related data.

**Table 7: Distribution of phrases on gods (general wishes and wishes by name of the god)**

No	Wish related to the name of God	Ky	% of total shreds from Kandy	Col	% of total shreds from Colombo	A'pura	% of total shreds from A'pura	Ma	% of total shreds from Matara	Total
1	God Bless	9	1.3 %	6	0.6%	2	0.8%	4	1.0%	<b>21</b>
2	Katharagama	1	0.15%	1	0.1 %	2	0.8%	0	0	<b>4</b>
3	Dedimunda	0	0	1	0.1 %	1	0.4%	0	0	<b>2</b>
4	Gana	0	0	1	0.1 %	0	0	0	0	<b>1</b>
5	Pattini	0	0	2	0.2%	1	0.4%	0	0	<b>3</b>
6	Getabaru	0	0	0	0	0	0	1	0.25%	<b>1</b>
7	Saman	0	0	1	0.1 %	2	0.8%	0	0	<b>3</b>
8	Vishnu	0	0	0	0	0	0	4	1.0%	<b>4</b>
	<b>Total</b>	<b>10</b>		<b>12</b>		<b>8</b>		<b>9</b>		

Numerical values elicited a different aspect compared to the percentage values. All the percentages show the connection between the numbers of phrases from each variation to the total amount found from each area.

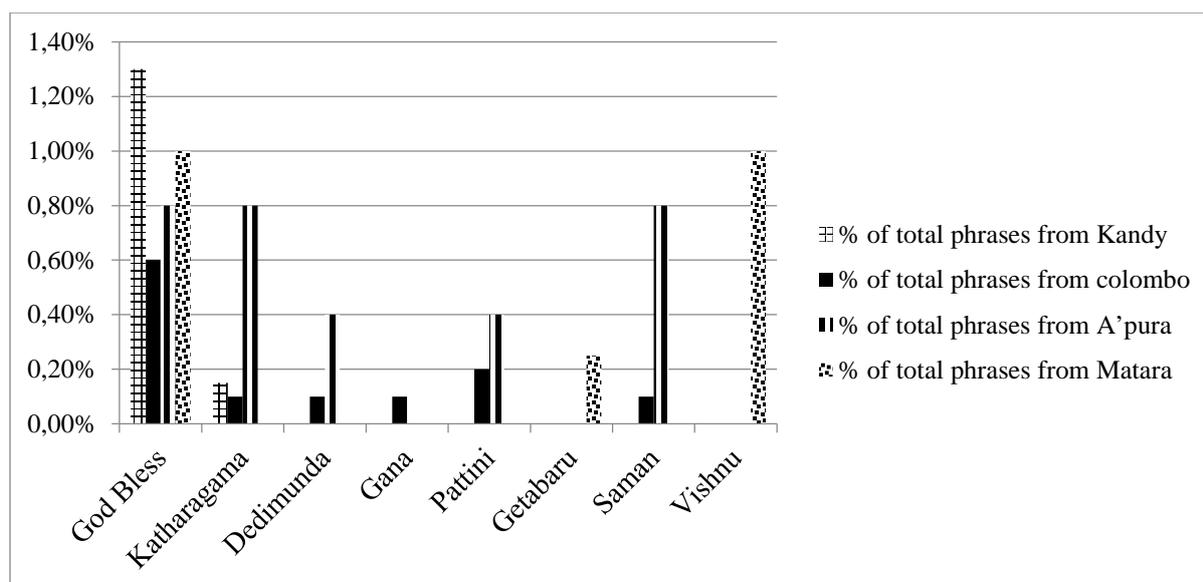


Figure 6: Distribution of phrases on gods (general wishes and wishes by name of the god)

Using six different types of beliefs in gods Colombo reported the maximum number of variety, but they were not used very frequently. Anuradhapura reported phrases of five different types of gods with a higher frequency compared to Colombo. A prevalence of using general wishes on gods (Gods bless you!) is shown from all four districts with a distinct higher frequency.

The following ideas of some of the TWT drivers bring out the connection between posting the sticker phrases about Gods and their beliefs on gods.

Colombo 471: I believe in gods because I have experienced the protection of the gods. So, I post these phrases.

Colombo 408: I use to visit the *devala* to beg for protection. Annually, I am holding a *pooja* (a special ceremony) in order to keep the vow to gods. I post these phrases to keep me thinking of gods always.

Colombo 215: I posted the phrases on gods with the wish “may the gods protect us to return home safely after a long journey!”

These ideas illustrate that safety and protection is the basic expectation of posting the phrases about gods.

(4) Beyond the benediction and blessings with gods, another trend of wishing was visible in our data. This trend consisted in general wishes which show an influence of Buddhist attitudes.

4.1 May the world be healed with the coldness of virtuous Buddhist doctrine (Dhamma)

Sadaham sisilen lowa nehe wewa! ioyi isisf,ka f,dj keyefōjd

4.2 May Gauthama Buddha be my sun and moon!

Gauthama minindu mage hiru sandu wewa f.!:u uqKs`y uf. ysre i`y fōjd

4.3 Our wish is the island of Dhamma

ape pethuma dahama divayinay wfma me;=u oyi Èjhskhs

4.4 May Sri Lanka be the kingdom of Maythri Buddha!

Sri Lankawa Maythri Buddha rajyayama wewa! Y%S ,xldj ffu;%S nqoaO rdcHhu fōjd

4.5 May all beings be released from suffering!

Siyalu sattvayo dukin midethwa! ish` i;ajfhda ylska ñfo;ajd

This did not appear to be a common theme, as only 9 sticker phrases were found for this theme which covered only 0.4% of the total number of phrases. The highest percentage of this type of phrases was reported from Anuradhapura (1.14%) and Kandy (4 shreds),

Colombo (3) and Matara (1) placed 2<sup>nd</sup>, 3<sup>rd</sup> and last places with 0.58%, 0.3% and 0.25 respectively.

(5) Sixteen intimacy sticker phrases with Buddhist attitudes were found with five variations. Theravada Buddhism has established in Sri Lanka even though many life events of prince Siddhartha and Lord Buddha took place in India. Mahawamsa says that once Lord Buddha mentioned God Sakra that Buddhism will be firmly established in Sri Lanka.

“patiThissati devinda lankaayan mama saasanam”

(sakra devendrayeni, mage sasanaya lankavehi pihitanneya)

Mahawamsa

This could be the fact that influenced the folk to select a post with Buddhist intimacy. A total number of sixteen phrases were found with Buddhist intimacy which tries to state the idea that Sri Lanka is the kingdom of Lord Buddha.

5.1 This is the state of Gauthama Buddha. Me gauthama Buddha deshayay  
fi f.!:u nqoaO foaYhhs

5.2 This is the kingdom of Gauthama Buddha me gauthama Buddha raajyayay  
fi f.!:u nqoaO rdcHhhs

5.3 This is the country of Buddha me budunge deshayay fi nqykaf.a  
foaYhhs

5.4 This is country of Gauthama me gauthama deshayay fi f.!:u foaYhhs

5.5 Sri Lanka is the country of Buddha Sri Lankawa budunge deshayay

Y%S ,xldj nqykaf.a foaYhhs

The ideas of intimacy had contributed only an overall of 0.7%. While Matara did not report a single sticker phrase under this theme, Anuradhapura (1.52%) Kandy (0.88%) and Colombo (0.62%) had reported a total of 16 phrases as 4:6:6 respectively.

(6) Pali verses are another trend we found in our data. Pali (Magadhi) is the original language in which Lord Buddha preached his doctrine more than 2600 years ago. Most Buddhists in Sri Lanka learn Pali verses from their families, schools and dhamma schools (Sunday schools). However, gradually young people begin to understand the practical value of these verses when they grow older and experience the difficulties and differences in the human life.

6.1 Avoid all evil- cultivate the good and the truth  
sabba paapassa akaranan- kusalassa upa sampada iín mdmiai  
wlrKx l=i,iai Wmiimod

6.2 One who lives with Dhamma is protected by Dhamma  
dhammo have rakkathi dhamma chari.

Oifuda yfō rlaL;s Oiupđ

6.3 The attachment with Buddhist doctrine (Dhamma) wins among all the other  
attachments and desires. - sabba rati matha dhamma rathi jinathi iín r;S u: Oiu r;S ōkd;s

Each Pali verse is found only once in our data, both 6.1 and 6.2 from Colombo and 6.3 from Kandy showing up a 0.2% and 0.15 respectively.

(7) A variety of twenty two phrases were found for the theme ‘general statements’ which show an influence of Buddhist attitudes. The concepts discussed in Buddhism such as *Impermanency, samsara, nirvana*, desires, understanding the mind and the death.

7.1 Sometimes I just look and understand my feelings. (Phrases was in English)

7.2 Happiness is a state of mind (Phrases was in English)

7.3 True happiness is found in giving (Phrases was in English)

7.4 **Buddha's way** (Phrases was in English)

7.5 The men will never be satisfied. (Phrases was in English)

7.6 Don't tell them to change you (Phrase was in English)

7.7 The only thing in this world is “**losing**”

Lowa ethi ekama de ahimi viima pamanayi

f,dj we;s **tlu foa wysñ ùu muKS**

7.8 You are the truth, **father Lord Buddha**.

sathya obay budu piyanani i;H Tnhs nqy mshdKks

7.9 **Samsara** is fearful; **Nirvana** is elegant.

Sasara biyakaruya- nivana piyakaruya iir ihlreh - ksjk mshlreh

7.10 Qualities of **Lord Buddha** remain in the world for ever.

Budu guna lowa sada rende nqy .=K f,dj iod /f`oa

7.11 Life that travels on the path of **Samsara**.

Sansaara maavathee – piyamanina jiivithee ixidr udjf;a mshuksk Ôúf;a

7.12 Living with **maara**

maruwaa samaga vaasee urejd iu. jdfia

7.13 **Lord Buddha**, we feel we are lost.

Api asarana welaa wage hithata denenawa

wms wirK fj,d jf.a ys;g oefkkjd- nqy yduqyrefjka

7.14 In a silent jungle cave- in a pleasant loneliness- my heart also feels- the comfort in a Buddha's heart

nihanda vana guhaawaka- sonduru huda kalaavaka- budu sithaka ethi suwaya- mahadatath denenawa

ksy`v jk .=yjdj- fid`yre yqol,djl- nqy is;l we;s iqjh uyog;a oefkkjd

7.15 Don't ever bundle **desire**, as we die, yes we die

epaa aashaa podi badinnata-merenewvaa api -merenevaa

tmd wdYd fmdÈ n`Èkakg-uefrkj d wms uefrkj d

7.16 Even a pond filled with flowers becomes just a pit one day.

malak piri vilak uwath- kalakadii- palak nethi valak ve

u,la msß ú,la jqj;a l,l§ m,la ke;s j,la fõ

7.17 **Mind** is the strongest among everything.

Siyalu deta wadaa sithay balavath ish` foag jvd is;hs n,j;a

7.18 Beautiful everything heals you for a while but at the end brings you sadness.

Lassana hema de- mohothata suwa de- ehi kelavara duka de

,iaik yeu foa fudfyd;l iqjfoa tys fl<jr yl foa

7.19 What can not be achieved by a human?

minis lowakata labannata beri jayak mokaddo

ñksia f,djlg ,nkakg neß chla fudloafoda

7.20 If you behave your self- the **gods** will also worship your name

hitiyoth hondata hedi- deviyoth namata vandi

ysáfhd;a fyd`og ye§- foufhd;a kug j`§

7.21 Around the immovable mind, there is **merit** but not waste

nisala hitha asala- kusala misa netha kasala

ksi, ys; wi, l=i, ñi ke; li,

7.22 Reputation of **Lord Buddha** is limitless.

budu guna ananthay nqy .=K wkka;hs

All the phrases except 7.20-22 had been used only once. The phrase 7.20 was used twice in Kandy and Anuradhapura. A four time repetition of the phrase 7.21 was found in Kandy, Anuradhapura and twice in Matara. The single use of 19 above sentences suggested that they were personal choices or thoughts which the owners or the drivers wanted to post on their TWTs. Out of all phrase only 1.57% (36 shreds) represented the theme 'general statements'. A rhythm and some sound patterns such as alliteration and assonance were visible in the original Sinhala verses. Using of a rhythmic language and parts of speech has added a literary value to these statements. Moreover, this reminded us the characteristic of

'rhythmic language' used in most of the literature work in Sinhala- Buddhist literature and in Sinhala folk poems.

(8) "Gedara budun amma" (Mother, the living Buddha at home) is a very common and popular phrase among Sinhala Buddhists, the blessing "amma budu wewa!" (May my mother become Buddha) as well. These phrases are also repeated in many Sinhala poems, songs other literature genres. Parenthood and maternal- paternal love are popular themes in Sinhala literature. Our data elicits the fact that this trend has been imitated even in windscreen literature.

8.1	Adore the parents	<i>namaami demapiyan</i>	<i>kudñ foudmshka</i>
8.2	Adore the parents	<i>demaapiyan namaami</i>	<i>foudmshka kudñ</i>
8.3	Worship father's feet	<i>piithu paadan namaami</i>	<i>mS;= mdox kudñ</i>
8.4	Worship mother's feet	<i>maathu paadan namaami</i>	<i>ud;= mdox kudñ</i>
8.5	May the mother become Buddha!	<i>amma budu wewa!</i>	<i>wiud nqÿ fõjd</i>
8.6	May the parents become Buddha.	<i>demaapiyan budu wewa!</i>	<i>foudmshka nqÿ</i>

*fõjd*

8.7 The one and only living god I have seen on this world is you, my mother

Melowa dutu ekama deviyan ee mage amma

*fuf,dj ÿgq tlu fõhka ta uf.a wiud*

8.8 The meritorious face I saw in the Samsara is 'mother'

*sansare maa dutu me ruwa pinbara amma*

*ixidf<sup>3/4</sup> ud ÿgq fi rej msxnr wiud*

8.9 My world and my universe is the mom, the living Buddha in home

*mage lokaya, mage wishwaya – gedara budun amma.*

*uf. f,dalh uf.a úYajh f.or nqÿka wiud*

8.10 Mother, this samsara is not enough for me to tell your virtuousness

*amme obe guna mahima kiyannata mata me sasara madi*

*wifí Tfn . =K uysu lshkag ug fi iir uÈ*

8.11 I haven't done enough merits to pay you back for the milk you gave me

*oba pew kiriwala naya arawannata amme madi mama pin keruwa*

*Tn fmõ lsßj, Kh wrjkakg wifí uÈ uu mska flrejd*

8.12 You are my mother for the next birth too

*mathu sansareth obay mage amma*

*u;= ixidfr;a Tnhs uf. wiud*

8.13 Mother, samsara is not enough to pay you back for showing me the way and advising me

*niveradi maga penna- guruharukam dunna- obata thiyene naya gewanna- sasarama madi*

*amma ksjerÈ u. fnkacd - . =reyreli ÿkacd - Tng ;sfhk Kh f.jkak iiru uÈ wiud*

8.14 Mother and father, you are the people who know our suffering next to lord Buddha

*budun langata apage duka danne- mawuni payanani oba pamanay*

*nqÿka < .g wmf.a ÿl okafka uõks mshdKks Tn muKhs*

8.15 Mother, this samsara is not enough for me to tell your virtuousness- I will make this world nicer by telling the word "mother"

*pewu kiriwala naya gevanna sansarema vandimi- amma yana vadana kiyaa, okaya heda karami*

*fmõlsßj, Kh fjkak ixidfru j`Èñ- wiud hk jok lshd f,dalh yev lrñ*

8.16 Having mixed with the fragrance of flowers in the Bodhi compound, the fragrance of mothers' milk is breezing

*bo maluwe mal suwandaka petali- amma pewu kiri suwanda gala enne*

*fnda u¿fõ u,a iqj`ol meg,S wiud fmjq lsß iqj`o .,d tkafka*

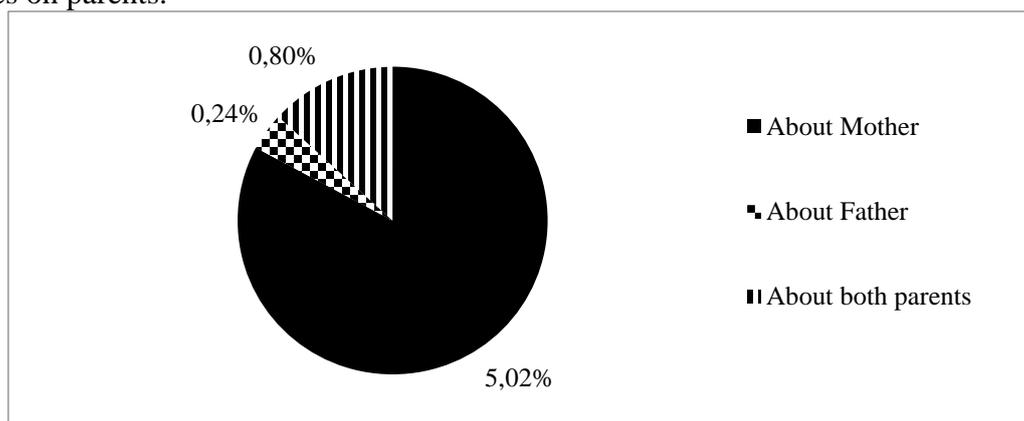
Most of them address, recall, worship or bless their mothers. We determined three sub themes emerged in our data as worshipping the parents, wishing parents (to become Buddha) and praising parents (for their righteousness and lovingness). Another interesting fact we noticed was that 9 of these shreds were quotations from popular songs about parents (8.8 - 8.16).

Out of the 16 different phrases, eleven were about mother (4, 5, 7, 8, 9, 10, 11, 12, 13, 15 and 16), four were about both parents (1, 2, 6, and 14) and only one was about father (3). This observation suggested that there is a trend of discussing and appreciating the mother's love and caring more than the father's through the windscreen literature of the TWTs. This opinion was even strengthened with the percentage values.

**Table 8: Distribution of shreds on parents in the four districts**

District	About mother		About Father		About both parents	
	Number of shreds	Percentage	Number of shreds	Percentage	Number of shreds	Percentage
Kandy	4	0.6 %	1	0.14 %	2	0.28 %
Colombo	13	1.35 %	1	0.1 %	0	0
Anuradhapura	6	2.3%	0	0	0	0
Matara	3	0.77 %	0	0	2	0.52 %
		5.02%		0.24%		0.80%

The above numerical values are clearly brought out through the following two figures as they separately illustrate the cognitive behavior of the TWT community in selecting their phrases on parents.



**Figure 7: Distribution of the sub themes - phrases on mother, father and both parents**

According to figure 7 the majority of the phrases on parents were about 'mother' while the phrases about "father" had contributed only 0.24% for the total number of phrases. *Itivuttaka nipatha* has introduced parents as Brahmans, the first devas, the first teachers and those worthy of gifts from the children. No supremacy could be attributed to due respect to the mother or father. However, according to our opinion, Buddhists are more influenced by the story which says how the *bodhisattva* was blessed by his mother for saving her life by sinking in the ocean. On the other hand, almost all in the TWT community (except very few) are males- sons who have a special psychological bond to their mothers. Mother is very close to a child from the conceiving and by feeding with milk, and giving love and care. Usually, the mother's love is tenderer and she expresses her love to the child often and open. Mothers are not showing dominancy on their children whereas fathers usually attempts to express or indicate dominancy over the children. Fathers may feel inward shyness to show tendency in front of their children. On an average the children exhibit some degree of fear to their fathers in comparison to fearless approach to their mothers. When the children's behavior becomes irritating the fathers usually turn rough on them contrast to the mother's reaction of bearing

kindness and compassion towards them. As result of above all human care, the children enjoy the physical and psychological sensation of the mothers. The society talks more and often about the love and affection of the mothers. Despite the fact that any doctrine might preach equal status of the concepts of mother and father, many human beings bear some sort of bias towards the mother's affection. These are few of the un-spoken facts relating to the topic. This is the practical justification to the explanation as to why the number of phrases on appreciation of the mother is always more than that for the father.

Therefore, we suggest that these facts may be responsible for the greater percentage of posting the phrases about mothers than fathers.

The following figure illustrates the district wise distribution of the phrases on parents.

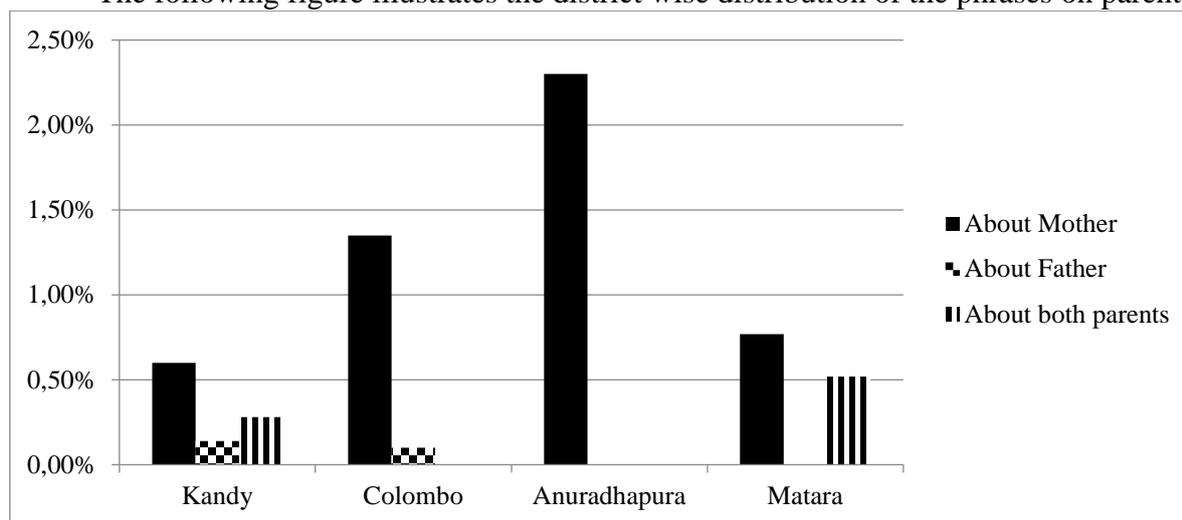


Figure 8: Area wise distribution of the data on three sub themes

The highest percentage of using the phrases about mothers has been documented from Anuradhapura while Kandy reported the wider variety, by posting about mothers, fathers and both together.

The driver of the only TWT in Colombo which carried a sticker phrase about father came up with the reason why he wanted to post a phrase about father.

**Colombo 305 :**

*“I wanted to talk about father because not many people talk about him.”*

*^;d;a;d .ek ljqr;a jeäh l;d lrkafk ke;s ksud&*

The following opinions bring out two contrast ideas of folk.

**Colombo 363:**

*“(I posted about parents because) I am looking after my parents according to the religion”*

*wd.u wkqj fouömskag fyd`Èka i,lf.k bkak ksud*

**Colombo 450:**

*“Some post ‘may the mother become Lord Buddha’. Does it mean anything can happen to the father? So, I don’t post anything. He is my only trust (pointing out an image of Lord Buddha)”*

*iuyr tjqka wüud nqj fōjd lsh,d .ykjd' t;fldg ;d;a;g fyk .y, .sh;a lula kE"@ tal ksud lsisu fohla uu .ykafka kE' uf. tlu úYajdih fuhd' ^nqykaf.a rEmhla fmkajhs&*

These live expressions show the different aspects of the folk towards selecting and posting the sticker phrases about the parents on their TWTs.

(9) A larger proportion of the three wheel community is represented by the young generation. Therefore, ‘love’ is not a strange theme to be found in our data. However, as our main focus for this paper lies on the influence made by Buddhist attitudes towards the TWT phrases, we only discuss about the phrases marked with love as a mixture of Buddhist ideas.

- 9.1 Impermanent Chaya *anithya Chaya* wks;H Pdhd  
 9.2 The fair younger sister, I don't know whether I have done merits to make you mine  
*Sudu nangi mage venna pin kalaada manda!*  
*iqy kx.S uf.a fjkak mxsl<do ukaod*  
 9.3 Can we expect an eternal love in this impermanent world?  
*Asthira loke isthira aalayak balaporoththu viya hekida?*  
*wiaOr f,dafla iaOr wd,hla n,dfmdfrd;a;= úh yelso@*  
 9.4 Is there a bad karma affect both of us?  
*Api dennata me wenne kaumayakda uruma?*  
*wms fokakg fi fjkafka lreuhlao Wreu*  
 9.5 Please tell my darling, in this life are you created for me?  
*Me bhavaye ma venuwen- oba mewwe- denwath kiyanna mage raththaran*  
*fi Njfhha ud fjkqfjka Tn ueofō oekaj;a lshkak uf.a r;a;rka*  
 9.6 Let us be together till we go with the walking stick  
*Serayatiyen api yanena thura- sansare api ekaTa imu*  
*ierháfhka wms hfkk ;=rd- ixidf¾ wms tlg buq*

None of them were found from Colombo but two from each area reporting 0.51%, 0.3% and 0.2% in Matara, Kandy and Anuradhapura respectively. A remarkable difference cannot be observed among the areas. On the other hand, as love is a universal theme, area differences would not be a reasonable point to be discussed. However, some of the principle concepts discussed in Buddhism such as impermanency, merits, *samsara* and rebirth can be seen in these sticker phrases about love.

(10) It is an important trend to see how these phrases are used to communicate about certain Buddhist occasions and charity. One TWT driver had mentioned that he only posted the phrases on meritorious deeds.

Data number: Colombo/455

I "I only post about meritorious acts" (pin sidda wena dewal witharay gahanne - *msx isoaO fjk foaj,a ú;rhs .ykafka* )

As he said, he had only posted a sticker phrase about a blood donation campaign.

- 10.1 *Poson* splendor in Seethawaka (*Sithavaka pura poson asiriya- is;djlmqr fmdfidka wisβh&*)  
 10.2 Donate a drop of blood *Le bondak dan denna - f,a i`ola oka fokak*  
 10.3 The Vesak journal of Sri Buddha anniversary  
*Sri sabuddha Jayanthi wesak kalapaya Y%S iinqoaO chka;s fjila l,dmh*  
 10.4 Let's destroy Dengue and save lives  
*Dengu nasamu- divi surakimu fvx.= kiuq Èú iqrlsuq*  
 10.5 Depositing of relics And exhibiting the relics of Lord Buddha in Nagadeepa  
*Nagadeepa Punya bhumiye thempath karanu labana mani mandala anuruwa saha sarwancha dhathu pradarshanaya*  
*kd.šm mqKH N+ñfha ;eim;alrkq ,nk uKsuKav, wkqrej iy i¾ajf Od;= mqo¾Ykh*

This type of sticker phrase was only found from Matara – 0.77% of total phrases (3, 4 and 5) and Colombo – 0.2% of total phrases (1 and 2). All the five notices were found only once in our data.

(11) There was only one phrase that mentions about their job experience, with a Buddhist aspect.

- 11.1 Righteously and devotionally (Righteously and slowly)  
*dehemen – semen oeyefuka fifuka*

Usually, the phrase "dehemen – semen" is used to mean that rulers of a country have to rule the country in righteously and religiously. But here it is used with a different

interpretation as the word “*semen*” also means slowly. This ironical interpretation suits their job very well as they have to charge righteously and drive slowly and carefully.

(12) In one hand it is argumentative about the ethics to make funny phrases referring to religious concepts. However, according to our opinion ‘irony in a language’ is able to compromise the religiousness, ethics and humor.

12.1 Ghosts scream when gods give

deyyo denakota bhuuthayo ke gahanawa fohsfhda fokfldg N+;fhda lE .ykjd

12.2 Oh when will I be able to reach *Sri Pada*, told a centipede

Kawada yayda siri pade... hekarellek kiweya. ljob hhsó isÍmdfoa yel/,af,la lSfõh

Gods and demons is one of the concepts discussed in Buddhism. In this case, the creator of this phrase may be expressing his own experience. When one is helped by good people, some disdain it; when one receives good, some become jealous of it. This could be one way to get the irony of this phrase. *Sri Pada* is one of the most religiously valued places in Sri Lanka. It is being worshiped not only by Buddhists but also the other devotees. Climbing up this holy mountain and reaching the holy peak are not easy. May be this person tries to convey the decimation against social hierarchy by saying ironically the inability for him to achieve top positions in the society.

## Conclusion

We named the sticker phrases posted on three wheel taxies (TWTs) as a special genre of windscreen literature similar to folk expression in general. It is clearly visible that Buddhist attitudes have influenced this new genre of folk expressions. The TWT community in Sri Lanka shows interest in selecting and posting their expressions in many themes.

However, many of these themes illustrate an influence of Buddhist attitudes. Benediction is the most popular theme which showed the influence of Buddhist attitudes. The Buddhist cults such as worshipping Bodhi tree and relics of Lord Buddha were also emerged through these phrases.

The data revealed a significant presence of Buddhist influenced phrases as 27% of the total sticker phrases (619 of 2291 phrases) showed an influence of Buddhist attitudes. Those phrases were not only about benedictions; gods; or Buddhist cults but they also represented a variety of several other themes such as parenthood, love, noticing the social events, jokes and aspects about their own occupation (as a three wheeler taxi driver). However, benedictory theme covered a remarkable percentage (72.86%) of total relevant phrases (619) while jokes and career related phrases documented a least influence by Buddhist attitudes.

According to the data, the ratio between the numbers of Buddhist influenced sticker phrases per TWT was documented as 0.94 in Kandy, 0.83 in Matara, 0.71 in Anuradhapura and 0.56 Colombo. Colombo, the capital city, showed the least usage of Buddhist influenced sticker phrases. The decentralization of the focus towards religiousness due to many psychological complexities in urban atmosphere and the city mentality could be possible reasons for this circumstance. Anuradhapura, the city with ancient Buddhist ruins, had recorded the third most use of Buddhist influenced sticker phrases. Anuradhapura city is focused and high lighted with a religious and archeological value, so thousands of national and international pilgrims as well as foreign tourists visit this city every day. According to these circumstances it is reasonable to suggest that the presence of social and individual consciousness on Buddhist culture and Buddhist attitudes caused by the archeological facts present around in Anuradhpura area, as the major stimulus to report a fair percentage of sticker phrases exhibiting Buddhist influence. However, it is worth to remind the fact that data from Anuradhapura district was collected not only from the areas around the main religious and archeological sites but also from the towns situated away from them. Therefore, it is possible to suggest that the widening of the boundary of the areas in data collection may

have an impact on the findings. Data in Matara was mostly collected from the town area where the major Buddhist temples are situated. This may be a possible reason for Matara to show up with a higher use of Buddhist influenced sticker phrases on the TWTs even though Matara is an area partially known for tourism too. Living in the hill -up -country, having an internationally reputed 'temple of tooth relic' and many other historically and religiously reputed Buddhist temples around, folk in Kandy may have reported the highest use of Buddhist influenced sticker phrases on their TWTs. The social and individual consciousness which is mainly caused by the natural location of the city and with a less exposure to industrialization (machinery and tourism) and urbanization compared to Colombo and Matara, is a possible suggestion for the highest use of Buddhist influence on the sticker phrases appear in Kandy area.

There is a great deal of influence of the psychological back ground of the person who selects the sticker phrases. Religious tendency, belief, expectations, pride, love, sarcasm, jovial, loneliness, solitary, evil eye, bless of the gods are some of the psychological factors that drive a person to pay preference to his selection of the phrase for the sticker.

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#### **Annexure 1:**

- 1) A three wheel taxi park in Sri Lanka
- 2) A TWT posting *budu saranayi* on the glass shield
- 3) A TWT posting *budu saranayi* on the steel body
- 4) A TWT posting *budu saranayi* inside, just in front of the driver and facing him
- 5) A TWT posting *theruwan saranayi* on the glass shield
- 6) A TWT posting "*raththaran amma*" (golden mother)
- 7) A TWT posting different types of sticker phrases on the back
- 8) A TWT posting different types of sticker phrases on the back

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# LA CRUZ Y EL WATESINK: SINCRETISMO TRANSCULTURAL DE LA IDIOSINCRASIA MAYA Q' EQCHI' EN RITUALES Y COTIDIANIDAD

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## Abstract

The cross, main identification symbol of the Christianity nowadays, has taken different shapes along the story. On the other hand, it has not been always the most representative element of this religion. Still, it has monopolized the representation of the Christian religion, an authentic synecdoche of this credo and symbol of demarcation as far as another believes are concerned.

At present, and as a result of difficult mechanisms of transculturality, and as an answer to conservation, different rites and pre-Columbian rites, as the watesink, show the presence of the Mayan identity. Diverse rituals conjugate facets of Mayan and Christian cultures, and they refer, in turn, to divergent significances, product of the syncretism.

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**Keywords:** Mayan-q'eqchi', cross, syncretism, *watesink*, cultural survival

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## Resumen

La cruz, principal símbolo de identificación del cristianismo en la actualidad y que ha tenido diversas formas a lo largo de la historia, no siempre ha sido el elemento más representativo de esta religión, como sabemos. Sin embargo, se ha alzado con el monopolio de la representación religiosa cristiana, una sinécdoque de de este credo y símbolo de diferenciación respecto de otras creencias.

En la actualidad, y como producto de complejos mecanismos de transculturación y respuesta de conservación, distintos ritos y creencias precolombinas, como el *watesink*, dan muestra de la presencia de la identidad maya entre los q'eqchi'es y otros pueblos del interior de Guatemala. Tanto en los distintos ritos, que conjugan aspectos mayas y cristianos, como en la cotidianidad, la cruz se ha tornado en un elemento clave que remite a significaciones encontradas producto del sincretismo.

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**Palabras clave:** Mayas-q'eqchi'es, cruz, sincretismo, *watesink*, supervivencia cultural.

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## Introducción

Los ejercicios de transculturación que han tenido espacio en América durante la Conquista y posterior periodo colonial han producido una eficaz trasferencia cultural desde la considerada como hegemónica, hacia la percibida como sometida o débil. No obstante, en ese proceso de deculturación inevitable que procede del sometimiento y la imposición, no sólo se han conservado elementos procedentes de la cultura originaria, sino que se ha procedido a una neoculturación que posee claramente rasgos y elementos procedentes de ambas culturas en contacto. Como indica Rama (1986), la transculturación expresa “el proceso transitivo de una cultura a otra, porque éste no consiste solamente en adquirir una cultura, sino que implica también necesariamente la pérdida o desarraigo de una cultura

procedente con la creación de nuevos fenómenos culturales (neoculturación) (pp. 32-33). Según Malinowski (1963) la transcultura implicar "Un proceso en el cual emerge una nueva realidad, compuesta y compleja" y como consecuencia, "una realidad que no es una aglomeración mecánica de caracteres, ni siquiera un mosaico, sino un fenómeno nuevo, original e independiente" (p. XIII). Es cierto que los procesos de transcultura resultan conflictivos. Como indica Ianni (2000), los procesos de constante intercambio desde facciones asimétricas y desde la diversidad y la desigualdad provocan tensión, lucha, pero al mismo tiempo, acomodación, pérdida de elementos e incluso trasfiguración.

En sí, la transcultura no resulta sencilla puesto que, a pesar de que un pueblo domina sobre otro, la infiltración de complejos culturales o rasgos definidos, requiere de un tiempo prolongado para llegar a completarse. Y en la mayoría de las ocasiones, sólo se alcanza a lograr una desnaturalización de la cultura subyacente sin lograr una plena asimilación. En palabras de Ianni (2004), "la transcultura genera procesos de diferenciación, reafirmación de identidades, recuperación de tradiciones, de invención de identidades" (p. 116). No podemos soslayar que, como resultado, en una aparente eliminación de la cultura originaria, no se provoca sino una conservación de aspectos procedentes de ésta, lo que garantiza al menos la posibilidad de que éstos no queden arrasados. El pueblo aparentemente vencido por la fuerza de la imposición, desarrolla un proceso particular individual y social de supervivencia que lo lleva a la acomodación y adaptación a la nueva e impuesta cultura hegemónica. La adaptación, como forma de asimilar la situación, conlleva la conservación de los elementos fundamentales de la cultura, en la comunicación, cosmovisión y tradiciones en general. Aunque socialmente se manifiestan las formas culturales nuevas impuestas y probablemente, percibidas como lícitas, en el inconsciente personal y colectivo se conserva la cultura originaria y se ponen en práctica en los contextos y entornos íntimos, familiares o en el seno de los clanes. De ahí la posibilidad de que estos elementos puedan sobrevivir y transmitirse de generación en generación hasta llegar a la actualidad.

En el caso de la religiosidad maya, y concretamente, la q'eqchi', la presencia de ritos, creencias y elementos culturales previos a la imposición del cristianismo son aún palpables, a pesar de la normalización de la liturgia católica y su integración como parte de la vida de este pueblo, instalado en el norte de Guatemala. La celebración cristiana religiosa está salpicada de momentos celebrativos y elementos que provienen de épocas pasadas, y dan cuenta de los modos diversos de adaptación que la cultura sometida ha tenido que desarrollar para lograr sobrevivir en un contexto de imposición hostil que podría haber acarreado una destrucción de la identidad cultural originaria.

Aunque es emergente la religiosidad maya tradicional, como culmen de la reivindicación de la identidad indígena, lo habitual en Guatemala en el momento actual es que el cristianismo, bien en forma de catolicismo tradicional o en sus diversas variantes evangélicas, es la manifestación religiosa más habitual. Entre los mayas q'eqchi'es, que habitan en zonas altas de la Verapaz y en los colindantes departamentos de Izabal y Petén, la integración de elementos religiosos en el rito establecido, en especial, en la liturgia católica, parece haberse tornado en una realidad natural aceptada tanto por el pueblo, que la vive desde su cotidianidad, como por parte de la institución. Este sincretismo es en parte bastante excepcional, en la medida en que ha conservado muchos elementos procedentes de la cultura precolombina gracias a las excepcionales condiciones socio-culturales que ha atravesado este colectivo indígena y debido, en gran medida, a los diversos procesos de inculturación que ha llevado a término, con matices, un sector importante de los actores de la evangelización a lo largo de los siglos. La Verapaz, en sí misma, ha sido, como expresa Akkeren (2012) un espacio de paso entre las llanuras del Petén, la capital guatemalteca y la gran ciudad de Kaminaljuyú. Por tanto, durante siglos ha constituido un espacio de asentamiento de

importantes núcleos sociales y culturales, y a su vez, de arraigo cultural. Este hecho ha contribuido sobremanera a la conservación de tradiciones y la reminiscencia de aspectos identitarios destacados. Sus orígenes coloniales, estrechamente conectados con el destino de su cacique Juan Matalbatz, o Juan Aj Pop B'atz (Kistler, 2007), recuperando su denominación originaria, explican en sí mismos el mantenimiento de la idiosincrasia y cosmovisión que son propios de este pueblo, y la conservación sincrética-trascultural de ritos como el watesink, al que posteriormente haremos referencia.

La cruz es el elemento central de la creencia cristiana. No sólo preside la celebración, sino que es la referencia inmediata para el ser-religioso debido al contenido que subyace. La ruptura de nivel a la que hace mención Mirceas El'ade (1981) al referirse al paso de lo profano a lo sagrado, se produce en el creyente al dotarle sentido a un símbolo, que para el ajeno a la vivencia de fe, puede carecer de sentido. Puede que éste fuera en parte el punto de arranque de los q'eqchi'es antes del proceso de evangelización que tuvo lugar en los siglos XVI y XVII. Sin embargo, en cierta medida, la cruz ya poseía una significación para los mayas de las tierras altas de Guatemala, puesto que estaba presente en la cultura precolombina, aunque con una connotación distinta a la impuesta por los misioneros. Por todo ello, en la actualidad, y en gran medida, al contemplar la cruz, la ruptura de nivel a la que hacíamos referencia posee una doble vertiente, referida tanto a la normativa hegemónica establecida mediante el proceso de transculturación, esto es, el cristianismo, como al contenido previo a éste. Así, la cultura maya, la religiosidad y la cosmovisión previa a la Conquista se hallarían presentes de igual modo. Esto viene a ratificar que, entre todos los elementos simbólicos de la religión cristiana, tanto cotidianos como culturales, la cruz concentra un sincretismo medular, por ser fundamento de la religión cristiana y a su vez, de la cosmovisión maya.

En lo referente al pueblo q'eqchi', objeto de nuestro análisis, y que habita en los departamentos de Alta y Baja Verapaz, Izabal, Petén, básicamente, constituye una de las más de veinte etnias mayas que perviven en la actualidad, y que conserva, como otras muchas, lengua, cultura y tradiciones ancestrales, y cuya identidad, debido a los procesos de presión por parte de los conquistadores, y a su vez, por diversos factores internos y externos, ha permanecido en cierta medida ligado a su identidad. Aunque Cambell (1977) sugiere que ya, hacia el periodo Preclásico, sobre el siglo IV antes de Cristo, es, en el momento de la llegada de los españoles y su posterior sometimiento cuando los q'eqchi'es se concentran en una delimitación geográfica similar a la actual, estando en contacto directo con otros subgrupos de lengua distinta, aunque con los que se produce una interacción e influencia mutuas (Sapper, 1985). Debido al proceso de conquista a priori pacífica, y el papel que llevaron a término desde el primer momento instituciones y cofradías; y a causa también de distintos condicionantes como el aislamiento de la zona, así como las relaciones interétnicas, gran parte de las creencias, tradiciones, costumbres y formas de vida se han mantenido hasta la actualidad. Los procesos de transculturación como respuesta de adecuación y supervivencia han jugado un papel vital. PONER AQUÍ EL NUMERO DE QECHIES EN LA ACTUALIDAD.

### **El proceso de transculturación de la identidad q'eqchi' y cristianismo.**

El proceso de transculturación que ha atravesado el pueblo q'eqchi', con la imposición de agentes externos para generalizar la cultura hegemónica, ha dado, como resultado inevitable, la supervivencia de determinadas creencias y aspectos propios de la identidad. Aunque se imponen determinados modos de aculturación y deculturación, teniendo como consecuencia una *neoculturación* más o menos agresiva que contiene elementos previos, en el caso maya q'eqchi', la pervivencia de elementos, creencias y vivencias previas a la conquista castellana no ha acabado con muchos de los signos de identidad

precolombinos. La instalación del cristianismo y los distintos periodos que componen diacrónicamente el proceso de evangelización han conllevado la consecución de un sincretismo que esconde sobremanera una integración relativamente armónica de ambos credos. Esta realidad no siempre ha sido de esta forma, y a menudo, el encuentro entre elementos de las dos culturas alcanza un punto de fricción considerable en la confrontación de la celebración. Teniendo en consideración a Jesús Tapuerca, no hemos de olvidar que aunque el cristianismo se conciba como encuentro de culturas, “abundantes datos de la realidad histórica niegan y contradicen dicho aderto” (2009, p. 49).

En primera instancia, y en la Conquista, la presión sobre los pueblos indígenas se tornó en una realidad dura y rotunda. En el caso del pueblo q'eqchi', hemos de tener en cuenta que su aislamiento y condiciones específicas han permitido la supervivencia de ciertos aspectos de su cosmovisión. Éste puede interpretarse como el momento clave de acción-reacción de la cultura e identidad maya en general, y q'eqchi' en particular. En el caso de la región de la Verapaz, de mayoría q'eqchi', el proceso de imposición fue precedido por una profunda resistencia. No obstante, la labor de los dominicos resultó crucial para la anexión pacífica del territorio (Akkeren, 2002).

Un segundo momento crucial es el llevado a cabo por Acción Católica, quien impuso sus criterios para terminar con la denominada *costumbre* en los años cincuenta, por medio de la presión de la religión cristiana y para eliminar los reductos culturales y religiosos tildados de ser peligrosos y casi heréticos (Bastos y Camus, 2003). Sin embargo, en los años sesenta en el seno de la propia Iglesia por el Concilio Vaticano II, la publicación de la *Pacem in Terris* de Juan XXIII y la “inauguración” macabra del conflicto guatemalteco, la cuestión eclesial se transformó sobremanera, dando espacio a nuevas preocupaciones, un giro social que trató de encarnar en espíritu evangélico desde una óptica de mayor autenticidad. Por otro lado, la *Conferencia de Medellín* de 1968 propició la concreción de cambios muy específicos en el seno eclesial que conllevaron una búsqueda de la opción por los pobres. Aunque la iglesia en 1954 apoyó a terratenientes, ultraderechistas e intereses estadounidenses para derrocar a Arbenz y su política revolucionaria (Figuroa Ibarra, 2006, p. 396), su perspectiva cambió en pocos años. Los sectores más progresistas desembocaron a menudo en posiciones cercanas o identificadas con los sectores populares.

Un tercer momento en el proceso adaptativo de transculturación llegó de la mano de los gobiernos represores y el auge de las masacres. La entrada en escena del Enfrentamiento Armado y el posterior genocidio favorecieron las políticas contrarias al asociacionismo y la libertad de expresión en términos identitarios. Por ello, quienes el trinomio identidad maya-reivindicación-autoridad comenzó a verse como negativo y cargado de connotaciones subversivas por parte de los aparatos de poder más radicales. Como afirma la CEH (Comisión Esclarecimiento Histórico 1999), en un corto espacio de tiempo, la Iglesia cambió su postura de los espacios más conservadores hacia la opción por la construcción de la justicia y la lucha por los desfavorecidos. En consecuencia, este hecho hizo que la propia institución fuera objeto directo de miras y se relacionara a menudo con los grupos de guerrilleros. Masacres y políticas diversas de represión, tales como las de tierra arrasada marcaron un distanciamiento de identidades propias. Los mayas temieron seguir el cumplimiento de su *costumbre* por temor a ser perseguidos. De esta manera, los ritos celebrativos se redujeron y se marcaron diferencias entre un oficialismo externamente considerado como correcto, y una esencia cultural muy reprimida. A su vez, y ante la presión de gobierno y brazos armados de éste, la Iglesia llevó a cabo un cambio de opción, centrándose en posiciones de integración de ritos, en un sincretismo y respuesta de transculturación ante la combinación de aspectos del cristianismo y tradicionales mayas. Como indica Cuesta Marín (2001) “este cambio doctrinal y pastoral chocó con la estrategia contrainsurgente que acabó considerando a los católicos como aliados de la guerrilla y por

tanto sujetos a persecución, muerte o expulsión” (27). Con el recrudecimiento radical del conflicto, antes y durante el denominado *quinquenio negro*<sup>186</sup> (Prudencio García, p. 40) la represión contra los miembros de la jerarquía y los líderes de las comunidades se tornó en una realidad de mayores consecuencias. La intervención de Acción Católica en la formación de laicos en las comunidades, su difusión del asociacionismo y la denuncia de situaciones de violación de los derechos humanos conllevó la represión más feroz entre finales de los setenta y principios de los ochenta. Con los gobiernos de Romeo Lucas y Ríos Montt las relaciones entre estado e Iglesia se tornaron en complejas y trágicamente dificultosas. En dos años, más de veinte sacerdotes y religiosas fueron asesinados, algunos de nacionalidades distintas de la guatemalteca. Más de doscientos tuvieron que abandonar el país. Treinta centros de capacitación fueron clausurados y más de setenta parroquias quedaron sin sacerdotes (Cuesta Marín 27-28).

Todas las medidas represoras, incluyendo masacres, presiones y amenazas previas, torturas y violaciones, y como culminación, el asesinato masivo, bien selectivo o generalizado, llegaron a su punto máximo durante los gobiernos de Romeo Lucas y Ríos Montt (CEH, 1999). Las denominadas políticas de “tierra arrasada” surgieron como medidas de erradicación tanto de personas como de todo lo relacionado con éstas. Se alzó en una manera eficaz y definitiva de terminar con la cultura, tradiciones y formas de vida de las comunidades mayas (Cuesta Marín 2001 28-33). “tierra arrasada” supone, de igual modo “esencia arrasada”. El apego del indígena a la tierra, madre de todos los vivientes según su cosmovisión, y la eliminación de todo aquello que supone su vida es sinónimo de supresión de la identidad maya desde la raíz. De esta forma no sólo se genera el horror, sino que también se pierde el elemento base que pueda suponer una subversión de lo que se pretende imponer. El miedo se ha constituido en un recurso de eficacia para manejar masas de población en una dirección específica. No obstante, y a pesar de este proceso trifásico de presión aculturativa, con resultado de transculturación y sincretismo no han podido terminar con la esencia de un pueblo que surge y reivindica con fuerza la licitud de su milenaria identidad. En sí, la situación que ha atravesado el país, en especial, durante las duras décadas del conflicto, ha conllevado que se conserven elementos procedentes de la cultura tradicional, en consonancia con la vivencia y celebración católica. Producto de la transculturación y de los diversos modos de aculturación se ha logrado un sincretismo que protagoniza gran parte del panorama religioso actual. Éste combina aspectos diversos que se añan sin aparente contradicción. Es cierto que la situación ha conllevado cambios en la cultura maya tradicional, debido a los mecanismos de adaptación que se han desarrollado como medio de supervivencia. No obstante, gracias a esto, se han conservado aspectos, rituales y elementos de la cosmovisión previa a la llegada de los europeos. Al igual que la lengua, elementos cruciales de la cultura precolombina han perseverado y aún se conservan en la actualidad. El cristianismo, aunque de forma paradójica, ha contribuido por complejos mecanismos de adaptación a la perseverancia cultural y celebrativa de los *q'eqchi'és*, con la contribución eficaz de la integración, en el esqueleto de la cultura e idiosincrasia impuestas, de un fondo configurado a base de creencias, tradiciones y manifestaciones del pueblo.

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<sup>186</sup> Más del 90% de las violaciones de los derechos humanos conocida se dio en el periodo comprendido entre 1978 y 1984 (CEH, 1999). El tristemente denominado “quinquenio negro” tuvo como deshonrosos protagonistas a Romeo Lucas y a Ríos Montt. En este periodo ocurrieron algunas de las masacres más cruentas y episodios como el asalto a la embajada española, que en gran medida contribuyó a conferir una dimensión de mayor internacionalización al enfrentamiento.

### **La cruz: entre el cristianismo y la tradición maya precolombina**

En la actualidad, la cruz es un símbolo que existe en diversas tradiciones culturales y religiosas desde la Antigüedad, como dan fe de ellos diversas civilizaciones, desde Babilonia hasta Egipto. De esta manera, también entre los mayas tuvo su trascendencia y simbología.

La cruz cristiana encierra en sí un contenido teológico significativo. Como señala Mirceas Eliade (2001) el Gólgota es para gran parte de la tradición cristiana el centro del mundo, el *axis mundi*, la cima de la montaña cósmica. Allí fue creado Adán y del mismo modo, sepultado. La muerte de Jesucristo en la cruz está relacionada con este hecho, puesto que el nuevo Adán, el nuevo hombre que es Jesús, hijo de Dios, muere sobre el lugar de la primera creación y su sangre recae sobre el cráneo de éste, culminando el acto salvífico. En cierta medida, la cruz mira al cielo y a la tierra, y une ambas realidades ontológicas, cuestión muy familiar en la cosmovisión maya.

Si procediéramos a analizar la intensa arqueología maya, podríamos vislumbrar a priori la trascendencia del símbolo cruz, presente en diversos templos e inscripciones, presentes en el conjunto Palenque (De la Garza, 2005). La rica simbología que presenta la cruz puede darnos cuenta de la representación tanto del microcosmos al que se refiere, como del macrocosmos al que se dirige en maya en su oración y que engloba la totalidad de la tierra y de la vida. Y siguiendo las representaciones de la Cruz Foliada de Palenque<sup>187</sup>, podremos vislumbrar una serie de elementos que pueden servirnos de referencia para comprender con más precisión su naturaleza. El maíz, elemento sagrado entre los mayas, y clave en la creación del hombre por parte de los Formadores según aparece en el Popol Vuh (Bogin, 2001), es la pieza clave de la figura. Es el centro, y al mismo tiempo, en un complejo juego de vida y muerte, se torna en el elemento capaz de dar vida. La caña de maíz aparece como eje de referencia, y para que surja la vida, debe ser decapitada, puesto que la “mazorca de maíz cortada de la planta, vinculada además con la tierra como la proveedora de vida” (Nájera, 1987, p. 89) hará brotar nueva vida. Resulta interesante resaltar esta cuestión, no sólo para poner en relieve la importancia de este símbolo en la tradición maya, sino para manifestar las posibles convergencias que manifiestan con el elemento simbólico cristiano, en sus facetas más ontológica y soteriológica. Pero la cuestión trasciende estas consideraciones para instalarse en una perspectiva más globalizadora respecto de la cultura y la vivencia maya, esquemas que aún pueden extrapolarse sobremanera en la actualidad. De esta manera, y como señala Cruz Cortés “se adopta que el hombre está hecho de barro como forma de conciliar el cristianismo y la tradición prehispánica” (p. 57). Pero, a pesar de esto, “se cuestiona y modifica” puesto que “si bien la sustancia inicial es la tierra y el agua, el hombre maya actual es incompleto. Deberá buscar la sustancia que mantenga la carne y nutra sus músculos” (p. 57).

El elemento simbólico cruz se alza con un protagonismo único en lo referente a los conceptos fundamentales de la perspectiva ontológica de los mayas referida a su visión del cosmos. Se relaciona directamente con otros elementos de trascendencia como el cuadro y la pirámide, de los que parece no poder desligarse. Los textos mayas clásicos, y las interpretaciones que sobre éstos se dieron en primera instancia, muestran la concepción de un universo integrado en tres grandes ámbitos: el primero de ellos se hallaba constituido por el cielo y su subdivisión en trece estratos; por otro lado, estaría la tierra, pensada como una plancha de forma cuadrada; y por último, el inframundo (De la Garza, 1998). Respecto a la tierra, y como aún podemos observar en la cosmovisión subyacente de los mayas actuales,

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<sup>187</sup> La representación antropomórfica del dios del maíz es frecuente en el periodo clásico maya. Manifiesta la intrínseca relación que existe en su cosmovisión entre el hombre y el elemento clave, esto es, el maíz. Como se manifiesta en el propio Popol Vuh, la creación del hombre, a base de harina de maíces blanco amarillo, amasado, y la aparición de los cuatro hombres primigenios es el fundamento de la cosmogonía maya (Navarrete Linares, 1996).

ésta se encuentra dividida en cuatro sectores o rumbos, esto es, las cuatro esquinas, con una simbología cromática asociada (rojo, negro, amarillo y blanco), y tanto una ceiba como un ave, un tipo de maíz o frijol asociado a cada extremo, unos animales. La cuadruplicidad determina la salida y puesta del sol, el ciclo estacional, y por extensión, la concepción cíclica del tiempo (Rivera Dorado, 1985, pp. 192-218). Las nociones de espacio y tiempo, por consiguiente, se hallarían inexcusablemente ligadas.

En la concepción actual, el sincretismo determinado por los distintos modos de transculturación adaptativa ha permitido conectar todas las creencias tradicionales a los ritos religiosos actuales, en el contexto de un cristianismo aparentemente muy arraigado y mayoritario. Incluso la plasmación de la cuadruplicidad se ve reforzada por la presencia de un elemento básico y símbolo primordial entre los mayas: el centro del mundo, representado por la ceiba verde<sup>188</sup>, denominada *Gran Madre Ceiba*, que atraviesa los tres niveles cósmicos comunicándolos. Esta imagen del árbol como *axis mundi* (Elíade 1979, p. 71) constituye uno de los aspectos simbólicos más extendidos en las distintas cosmovisiones. En el caso de la cultura q'eqchi' y otros grupos mayas de la región, el apego a la tierra y el mismo sistema de roza han condicionado la relación entre el hombre y el medio, la persona-comunidad y los elementos con los que se relaciona. Los lugares sagrados y la posición central de la ceiba determinan la orientación y la dirección. De ahí la concepción de las cuatro esquinas de la tierra o cuatro puntos cardinales. El plano terrestre, como se muestra en los rituales celebrativos mayas en general, y q'eqchi'es en particular, se distribuye alrededor de cuatro puntos, hacia los que se dirige la invocación que pedir que la bendición. Como producto del sincretismo, y efecto de un profundo ejercicio de transculturación, se combina la creencia tradicional precolombina con la actual, de índole cristiana. El elemento central, el árbol, recoge las dos significaciones asociadas, esto es, la ceiba como árbol sagrado, y el misterio cristiano, Jesucristo, como elemento central de la cruz. El centro del universo o *axis mundi* de la cosmovisión maya no choca así con el principio cristiano más arraigado. La integración de las ideas mayas pre-cristianas del centro del universo y de la confluencia de los dos ejes del mundo, no tendrían dificultad para integrar la religiosidad impuesta, si bien esta realidad simbólica aludiría a dos significados simultáneos que con el tiempo se han instalado sin aparente contradicción en la cultura maya-q'eqchi' actual.

No se puede considerar el centro fuera de la relación con la intersección de los ejes mencionados. El centro sería, como hemos señalado, la matriz central que serviría de punto de referencia y unión del Cielo, de la tierra y del inframundo. Recordamos que en la cultura y religión maya antigua las referencias cosmogónicas y teogónicas ineludibles estaban constatadas por el Corazón del Cielo y Corazón de la Tierra, Uk'ux kaj y Uk'ux'Ulej (Nájera Coronado 2004), según aparecen en el mismo Popol Vuh. La cruz, el eje del mundo apuntaría al cielo, a la tierra y al inframundo, al igual que ocurre con la figura salvífica cristiana del Redentor, que se dirige en la cruz hacia el cielo, en el soporte de madera en el que es crucificado, insertado en la misma tierra, y con todo el contenido escatológico que se refiere al vencimiento del muerte, por lo que su contenido apunta a un inframundo, si bien el *Xibalbá* maya encuentra dificultades de identificación con las realidades cristianas referidas a la muerte. En cualquier caso, los misioneros, en sus diferentes etapas de evangelización hallaron ciertas ventajas en la identificación de realidades culturales ontológicamente dispares, pero que pueden encontrar ciertos puntos de convergencia (Ak'utan, 2001). En ambas perspectivas, el Centro es el espacio real o metafórico en el que se produce la *ruptura de nivel* al que hace referencia Mircea Elíade para describir el paso de lo profano a lo sagrado. Este en sí ya supone un nexo de unión que se materializa en la celebración cristiana católica, repleta a su vez de elementos mayas integrados en la liturgia.

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188 El "árbol nacional" es en la actualidad uno de los símbolos de Guatemala.

En lo referente a su nivel de contenido más teológico, como indica Navarrete, para diversos grupos mayas de la actualidad, la sangre derivada de la cruz tiene un carácter más que redentor, material creador o fertilizante, acorde con la tradición maya. En la época precolombina, resultaba común ofrecer sangre como sacrificio para atraer lluvias y garantizar cosechas, puesto que se pensaba que la planta del maíz, central en la cosmovisión maya, estaba compuesta de la sangre y los huesos de los dioses (Navarrete, 1996). Los entresijos de esta combinación estructural de cosmovisiones aún se hallan vigentes hoy día:

Pues sí, que sufrió el Señor en cruz. Mucha sangre, y por eso ya hoy sí que tenemos nuestras cosechas, pues. Y somos pobres, pues, pero tenemos para no tener tanta hambre pues. Y rezamos, y tenemos las cosas y crece milpa ahí (Salvador Coy, comunicación personal, julio de 2011<sup>189</sup>).

### **La cruz en la celebración maya-q'eqchi' y en su cotidianidad**

Como indican De Ceuster y Hatse (2004) la cruz es “la raíz y el tronco, *xe'etoon* (lo que también significa antepasados”, es el Primer Árbol, el Árbol Verde, *Rax Che'*, el ombligo de todo el cosmos” (p. 73). Por tanto, en este árbol, que aparece reflejado no sólo en la cultura cotidiana y en el reducto que ha quedado producto de la transculturación, sino también en documentos como el Códice de Dresde, se encarna la visión de la cruz junto con esos principios precolombinos que aún se hallan arraigados y forman parte medular de la cosmovisión y pensamiento q'eqchi'es. La ceiba verde es, a su vez, el *axis mundi* al que referíamos con anterioridad, y una manera palpable de presenciar y concretar físicamente la deidad que se halla en el cerro y en el valle y que se encarna en *Tzul-Taká*. Debemos comprender y concebir la cosmovisión maya q'eqchi' desde el sentido de pertenencia del hombre a la naturaleza, y fundado en la creencia, respeto y veneración al *Kawa Tzul Taká*, esto es, el señor del Cerro y Valle. La divinidad, antropomorfizada del *Tzul-Taká* supone el punto máximo de veneración y la referencia primordial de la identidad q'eqchi' y ha sobrevivido al impulso de la presión externa cristiana por un proceso de hibridación muy ágil. Los trece cerros de la cosmovisión q'eqchi' se corresponden con las creencias ancestrales de los mayas en general, quienes veneraban a los *Awás* o señores, en clave panteísta, esencia del original Corazón del Cielo y de la Tierra que aparecen en los textos y documentos que aún conservamos (Akkenen, 2012/ODHAG, 2006).

*Kawa Tzul-Taká*<sup>190</sup> o el Señor del Cerro y del Valle no sólo es digno de respecto, contemplación y dueño de todo cuanto existe, incluidos el hombre y su destino, sino que además, se le dirigen en súplicas y peticiones, puesto que puede conceder dones o castigos en función de la observación de las leyes que rigen su orden. Se ha identificado con el Dios cristiano a esta deidad ancestral, aunque mantiene un estatuto ontológico particular y destacado. Por otro lado, el sincretismo y la identificación han permitido la pervivencia de este elemento cultural q'eqchi' tan relevante.

Con anterioridad a la explicación del *watesink* en sí mismo, hemos de hacer referencia al centro de la celebración religiosa q'eqchi': el denominado *mayejak* (literalmente, “acción de gracias”). El término en sí, procedente del q'eqqhi' *mayej*, esto es, “ofrenda” (Caal, 1996) es llevado a cabo por los “mayejanel” o curanderos específicos, que pueden ser tildadas de auténticas autoridades comunitarias (CIAFIC, 2006, p. 37-38). La celebración se prolonga durante varios días, y a nivel general, tiene lugar dos veces al año de forma ordinaria, coincidiendo con la siembra, para pedir perdón al *Tzul-Taká* por los posibles daños que puedan causarse a la tierra, y sobre todo, para dar gracias por los dones ofrecidos, en petición de prosperidad y abundancia. En cualquier caso, y aunque se correspondería con una

<sup>189</sup> Entrevista personal, en Senahú, Alta Verapaz.

<sup>190</sup> Cada cerro de la cosmovisión tiene asociado un señor de Tzul-Taká.

situación extraordinaria, ante cualquier evento inesperado de la comunidad que suponga un punto de conflicto extremo o de acción de gracias específico, también puede tener lugar la celebración de este evento religioso.

Además de los rituales que se hallan presentes en el *majejak*, en lo referente a oraciones, ofrendas, comida, reverencias y exvotos a la Madre Tierra, y otros símbolos, uno de los aspectos que goza de importancia, y en relación a la cuestión que estamos tratando, viene de la mano de la oración a las cuatro esquinas de la tierra. En las celebraciones mayas tradicionales, y en la mayoría de las puramente mayas exentas de sincretismo, en el contexto del refloreCIMIENTO del movimiento, el sacerdote, tras limpiar el espacio celebrativo, dibuja en él el círculo cósmico. Dentro de éste, se plasma una cruz, cuyos extremos señalan las cuatro esquinas o puntos cardinales. Este aspecto se ha mantenido en la celebración sincrética q'eqchi'. Y tras esto, se procede a colocar todas las ofrendas en el altar, a modo de exvoto. Con posterioridad, se invoca al espíritu y se agradece a Dios, toda la naturaleza, al cosmos y a los antepasados, de gran relevancia en la cosmovisión q'eqchi'. (Morales Sic, 2004, cap. 2).

En relación a la integración de la cruz como elemento de sincretismo, hemos de destacar la forma y el fondo de la oración. Ésta se ejecuta dirigiéndose con candelas de cera pura encendidas, a las cuatro direcciones, al centro sagrado o *axis mundi* (Preuss, 2000, pp. 11-12). El este y el oeste son puntos clave en la dirección de las oraciones, puesto que conectan la vida y la muerte (p. 12). Cada esquina, a la que se invoca entre candelas y un continuo sahumar de *pom*<sup>191</sup> se halla asociada a un color, poniendo en relieve la simbología cromática respectiva. De esta manera, el rojo, relacionado con el este, es el color del sol, por ser la esquina de la que nace el astro rey; el negro se sitúa al norte y el blanco al sur, en directa referencia a los espacios por los que el aire entra y sale; por su parte, el oeste tiene asociado el color amarillo, la representación de la muerte (Hernández Bonilla, 2004, pp. 97-98). En el centro, se sitúa el copal con el pom, exhalando humo constantemente como símbolo de lo etéreo, que surge del centro del mundo, del *axis mundi* al que hacíamos referencia, para subir al cielo, cubriendo los tres planos o niveles que están presentes en la cosmovisión, y que son cruzados por un único eje.

Es nuestra costumbre, así pues. Y la usamos para nuestra creencia. Rezamos a Dios. Y también nos recordamos de todas nuestras costumbres, de nuestros antepasados. Nos recordamos de respetar. Nos recordamos de todo que somos. Somos indígenas, pues. No somos animales. Tenemos una cultura, mucha cultura en nuestros pueblos. Somos eso (Ricardo Xo, comunicación personal, agosto de 2011<sup>192</sup>).

### **La celebración del *watesink*.**

En relación metonímica con el *majejak*, bien por estar integrado en éste, o por ser un rito celebrativo complementario, el *watesink* encierra un gran contenido sincrético, y por supuesto, la presencia de la cruz como elemento clave entre dos culturas, sujeto a su vez a una interpretación y vivencia simbólica que recoge significados llenos de sentido procedentes de ambas.

*Watesink* o *Cwatesink*, como lo transcribe Agustín Estrada Monroy (1993, p. 276), significa literalmente “dar tortilla” (De Ceuster y Hatse, 2001, p. 209), y procede de los términos q'eqchi'es *wa* (tortilla) y *tesink* (dar a otro), aunque genéricamente se traduce por “dar de comer y alimentar a la naturaleza” (Chitop Cabrera, 2002, p. 19), debido a las implicaciones, la forma y la finalidad misma de la celebración ritual.

<sup>191</sup> Incienso ritual para celebraciones mayas.

<sup>192</sup> Comunicación personal en San Juan Chamelco, Alta Verapaz. El entrevistado es actualmente sacerdote de etnia q'eqchi'. Ha sufrido los rigores del etno-genocidio y es consciente de los procesos de transculturación.

Tal y como señala Estrada Monroy (1993), para los q'eqchi'es supone una ceremonia imprescindible en la vida comunitaria, pues resulta totalmente necesaria a la hora de inaugurar cualquier construcción. Pero si tratamos de comprender la verdadera esencia del *watesink* podremos entender con mayor precisión las implicaciones que éste tiene en cuanto a su dimensión de sentido e implicaciones sincréticas. Recreando lo expresado en el Popol Vuh sobre la creación en la cosmovisión maya, el *watesink* rememora y recrea el acto de Creación que el propio hombre ejerce cuando inaugura un espacio que va a ser habitado o utilizado por él, en especial, en el caso del propio hogar (pp. 276-277). Esta realidad también se haya contenida entre las verdades que el cristiano percibe como auténticas, ya que para éste, la Creación de Dios continúa y el hombre sigue esta tarea por su obra. El sincretismo religioso, de nuevo, encuentra facilidad por analogía o convergencia. Cuando el indígena procede a erigir su hogar, en la intencionalidad de fondo y la ejecución del acontecimiento en sí, que trasciende a lo material, se hallan presentes los principios básicos de la creencia y cosmovisión contenidos en el Popol Vuh y que impregnan la vida, y tanto teología como teleología del q'eqchi'. De esta forma, se determinan con exactitud, las cuatro esquinas que componen la vivienda y la orientación exacta de ésta, tal y como ocurriera en la creación. Toda esquina queda marcada, al igual que el centro de ésta. Las cuatro esquinas de la tierra, los cuatro puntos o direcciones vuelven a hacerse presente, desde el microcosmos que no es sino una representación del macrocosmos del que es parte y con el que forma unidad indisoluble (Ak'kutan, 2002).

Todos los elementos se preparan con afán, desde la música y la comida, hasta las candelas, el incensario y el pom, las hojas de ocote y los ornamentos para el altar, hasta las mujeres que proclamarán las oraciones pertinentes adecuadas a la ocasión.

En el contexto eclesial de Guatemala en general, y de las comunidades indígenas en particular, los ministerios están bien delimitados y su importancia no puede ser puesta en tela de juicio, puesto que responden a las necesidades y las expectativas comunitarias, y de igual modo, suplen las carencias de sacerdotes, dada la demanda y la fuerte vivencia religiosa y el sentido profundo de pertenencia al grupo espiritual (Tapueca, 2009). Por ello, la jerarquía está delimitada, y los ancianos adquieren un papel protagonista, reflejo de la idiosincrasia maya-q'eqchi' tradicional. Por ello, cada miembro tiene su papel en lo ceremonial, desde la persona que se encarga de sahumar con pom, hasta los que tienen como cometido recitar las oraciones pertinentes para la ocasión, que son fundamentalmente cristianas, pero que guardan un sincretismo muy demarcado.

Las oraciones, fundamentales para la ocasión, abren el espacio central de la ceremonia: el sacrificio del ac'ach<sup>193</sup>, el pavo con el que se hará el caldo posterior y cuya sangre será utilizada para la bendición de la casa.

En el horcón o pilar central de la casa, se sitúa el *joom* o guacal en el que se vierte la sangre del animal. Tras determinadas oraciones rituales, agradecimientos al señor Tzul-Taká por haberse podido consagrar el sacrificio, se sahumá el lugar y el guacal con la sangre, símbolo de bendición y al mismo de tiempo, de plegaria. El ilonel (Parra Novo, 2005, p. 123) es el encargado de llevar a término toda la ceremonia junto al dueño de la casa.

La culminación del rito procede de la colocación de las candelas y de las cruces sangrientas. El dueño de la casa lleva una candela encendida en la mano izquierda. Dos invitados lo acompañan con el hisopo y las nueve candelas a encender. En cada una de las esquinas de la vivienda hacen una cruz con el hisopo empapado en sangre, y a su vez, fijan una candela encendida. De igual modo, ejercen esta acción con las vigas y pilares de la casa. Posteriormente, realizan una oración de acción de gracias ante el señor de Tzul-Taká.

<sup>193</sup> En la Gramática y Diccionario de DIGEBI para la lengua q'eqchi', aparece con la grafía *ak'ach*.

La ceremonia del *watesink* continúa con el reparto de la comida sagrada y el baile de los tres sones (Estrada Monroy, pp. 284). Tras la toma de la bebida del boj, se ejecuta el baile final de la ceremonia, hasta la madrugada.

La presencia de la cruz, en esta ceremonia, se manifiesta en varios de sus momentos cruciales. Primero, en la presencia sempiterna de las cuatro esquinas o rumbos del mundo, y el centro o axis, paráfrasis del macrocosmos y del acto de creación. En segundo lugar, por el agradecimiento a Tzul- Taká por los dones recibidos, hecho que combina la creencia cristiana y la maya tradicional. Y por último, el impregnar, tras el sacrificio, las paredes y horcones con sangre y la señal de la cruz supone un producto de la transculturación que se incluye, en la creencia y vivencia cristiana, con la religiosidad y pensamiento precolombinos.

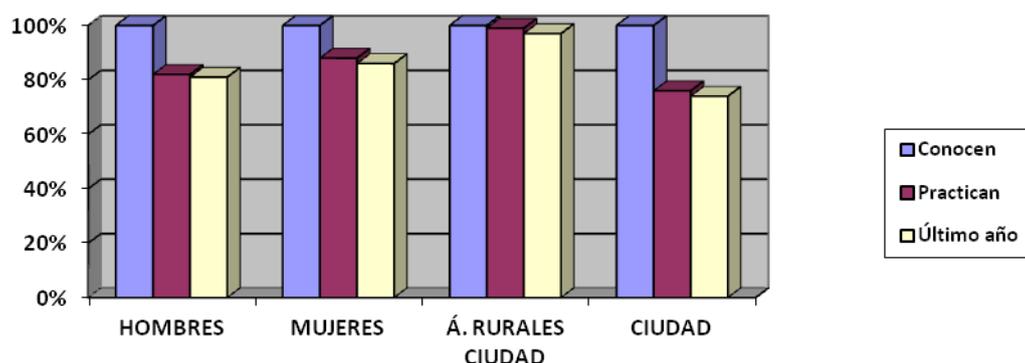
### Conclusiones

El sincretismo, consecuencia de la transculturación respuesta adaptativa de supervivencia ha dado como resultado la instalación de elementos procedentes de ambas culturas, en una combinación armónica que ha permitido la supervivencia de una cultura milenaria. El carácter sincrético envuelve las prácticas religiosas q'eqchi'es así como su cotidianidad. La confrontación con la modernidad y la presión cultural y religiosa occidental no han logrado desplazar creencias y costumbres de un pueblo, cuyas prácticas están vivas en las comunidades, con una gran implicación de todos sus miembros. El *watesink*, y su relación con la cruz cristiana, ha supuesto en sí un ejemplo de supervivencia, en cierta medida, puesto que la celebración actual supone todo un proceso de reinención del antiguo ritual maya, debido en gran medida a la filosofía de inculturación eclesial, y al mismo tiempo, gracias a la relevancia en este colectivo de la conservación cultural. Siguiendo a Bengoa (2000, pp. 129-130) podemos destacar que en aquellas regiones y pueblos en los que la identidad étnica se encuentra bien arraigada, es posible dar un salto cualitativo y entablar un diálogo con la modernidad. La adaptación impera por la necesidad de supervivencia, dado que esta fórmula es la única de preservar la propia identidad. La lectura que los participantes hacen de cada elemento supone una referencia inevitable a la cosmovisión tradicional, a los antepasados y a todas las creencias mayas aún vigentes de una manera u otra. Esto no choca de ninguna forma con la religión actual más generalizada. La identidad continúa su camino de reconstrucción. La relevancia no sólo de la cultura, sino de los elementos identitarios que forman parte de la realidad del país puede contemplarse bajo múltiples perspectivas, pero una de ellas es, sin duda, la posible relevancia que determinados ritos pueden tener en la cotidianidad de un pueblo. Como muestra de ello, y a modo de conclusión, ofrecemos los resultados de tres sondeos realizados in situ y que no sólo forman parte del trabajo etnográfico de campo realizado, sino que ponen en relieve la permanencia por distintos medios de transculturación de formas rituales milenarias.

### Tabla 1. ¿Conoces el watesink? ¿Lo has practicado en los últimos meses?

Do you Know the *watesink*? Have you recently participated of it?

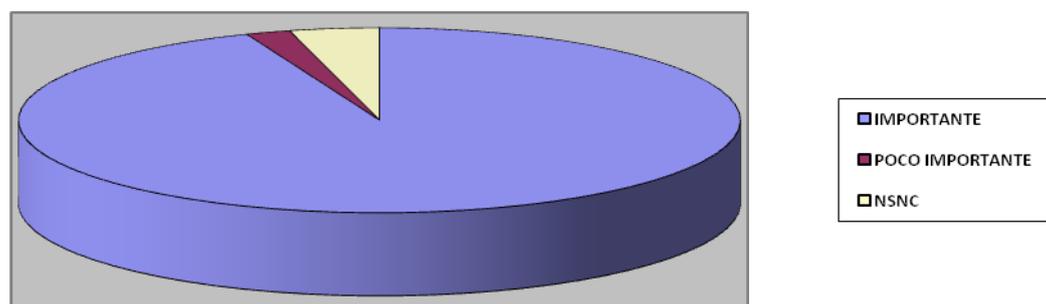
Encuesta realizada a 334 sujetos mayas q'eqchi'es en las localidades de Senahú, Cobán y San Juan Chamelco (Alta Verapaz); y Purulhá (Baja Verapaz). Julio y agosto de 2010. Encuestados sobre si conocen, practican o han practicado en el último año el *watesink*.



Entre los mayas q'eqchi'es entrevistados, casi la totalidad practican el *watesink*, en especial en las zonas rurales. Las mujeres parecen más dispuestas a su celebración y la mayoría de ellas reconocen abiertamente haberlo celebrado el último año. No obstante, tenemos dos sesgos cruciales que debemos destacar. Por un lado, la reacción del maya a hablar sobre lo que concierne a la costumbre ante un extraño, por mucha cercanía que mostremos ante ellos y a pesar del contacto directo. Por otro, en el caso de la población urbana, el proceso de ladinización, y el decoro sobre su origen.

### Gráfico 2. Sobre la importancia de practicar el *watesink*.

About the importance of the practice of the *watesink*

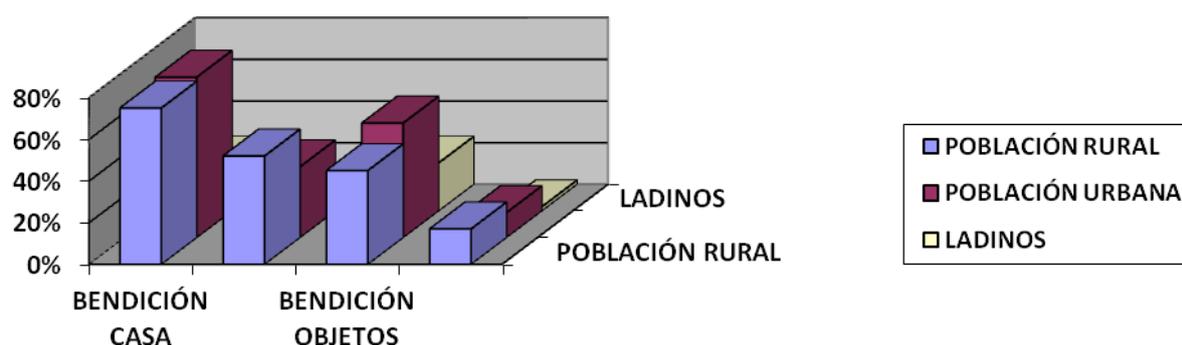


La mayor parte de la población maya-q'eqchi' rural considera fundamental la celebración del ritual. Si bien no todos lo profesan.

### Gráfico 3. Finalidad del *watesink*

Finality of the *watesink*

Encuesta realizada a 276 sujetos mayas q'eqchi'es en las localidades de Senahú, Cobán y San Juan Chamelco, Santa Cruz; (Verapaz) y Purulhá (Baja Verapaz); y a 120 ladinos (bien autoconsiderados totalmente como tales, o de origen maya pero que han renunciado totalmente a las costumbres indígenas). Julio y agosto de 2010. Se les ha preguntado para qué han participado del *watesink*. Muchos han participado por causas diversas, y por eso en los resultados, coinciden una mayoría en la participación. Por otro lado, los ladinos, reacios a identificarse con prácticas mayas, han confesado en una minoría haberlo hecho, pero por invitación o cortesía, casi nunca por convicción. La población rural participa ligeramente más de los rituales que la urbana, puede que por mayor arraigo de la *costumbre*. El margen de no-participantes puede proceder de la falta de comprensión de las preguntas de encuesta/entrevista, o de ser afines a algunas iglesias evangélicas que prohíben aún estas prácticas.



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## **INFLUENTIAL INDIVIDUALS ON SOCIAL NETWORKS: AN EXAMPLE OF FACEBOOK IN GEORGIA**

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### **Abstract**

The paper analyzes a unique dataset with information on the demographic characteristics and behavior of Georgian users of Facebook. Based on this representative data, we construct a network of 2589 Facebook users and 4473 connections among them. The data also include the behavior of a subset of the respondents with respect to the opportunity to exert influence over their social contacts. We study the data using tools of Social Network Analysis. The major aim is to characterize the identity of influential individuals on Georgian Facebook. The main conclusion is that young women occupy key positions in the network and possess disproportionately high structural power, which provides them unique opportunity to influence others' behavior and control the flow of information from various parts of the network.

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**Keywords:** Social Network Analysis, Facebook, Influence

### **Introduction**

Social interaction among individuals has always been important. The recent rise of the Internet and social networking websites presents a unique opportunity to analyze detailed data on social interactions. Activities on social networking sites leave trails that researchers can use to reconstruct subjects' social networking experience. Political involvement is high in modern electronic social networks (Rainie and Smith 2012). This makes the study of electronic social networks particularly important.

It has been long known that social networks are constructed on the basis of homophily. This implies that users with similar political views are friends, whereas users with differing political views are not. This consideration has raised important concerns about the formation of "echo chambers" online (Manjoo 2008, Sunstein 2009). "Echo chambers" refer to the phenomenon that each person only encounters opinions that are in line with his own. Therefore, his opinion is reinforced and it is never challenged.

However, a recent large-scale Facebook study (Bakshy et al. 2012) concludes that echo chambers are rare. The study concludes that even if social networks are based on homophily, diverse ideas can penetrate these networks. Few, personally unimportant links, so called "weak ties" (Granovetter 1973), allow information to navigate through social networks easily. These links are instrumental for eliminating the "echo chambers" in social networks. In addition, Gentzkow and Shapiro (2011) find that the Internet is not becoming more segregated over time, which would be the case if "echo chamber"-like behavior existed.

Another Facebook study (Backstrom et al. 2011) performs the analysis of attention-paying behavior. The authors distinguish between viewing and communication behavior. Viewing behavior can be considered to be passive attention paying, similar to the consumption of news. By contrast, communication behavior can be viewed as active attention paying, similar to the generation and diffusion of news. Backstrom et al. (2011) find important systematic differences across age and gender profiles. For example, they observe that older users are more passive and that they disperse their viewing behavior across a greater number of friends than do younger users. They also find that males' attention is balanced across genders. However, females devote 60% of attention to other females.

In the current paper, we analyze the social networking activities of Georgian Facebook users. We collected unique data through a Facebook application that allows us to analyze certain aspects of online social networking behavior, including influence one user has over another. Unlike Backstrom et al. (2011), who utilize constructed measures of attention, we can directly observe influence in the present data, as users were explicitly motivated to influence each other to install the application. In light of the high political involvement on Facebook and absence of "echo chambers" identification of the profile of a typical influential user is a particularly important endeavor. Any successful attempt to influence the public opinion should target these individuals in first place.

## **Main Text**

### **Data Collection Process**

Our work uses an original dataset describing the behavior of Georgian Facebook users. To collect the data we developed a simple Facebook application. Upon installation the application was granted access to the user's profile including the network of friends. We were interested in users' demographic characteristics (age, sex etc.) and social network (number of friends, identity of friends etc.).

The application was designed to extract the information about the user's friend list as well as get the answers to four direct multiple-choice questions:

1. How did you learn about the application?
2. How many times do you go on Facebook per week?
3. How many minutes do you spend on Facebook during one visit?
4. Which age group do you belong to?

The application installation procedure was started by 5629 users, however only 2589 of them completed the installation procedure and answered our questions (response rate of 46%). Our dataset consists of the answers of these 2589 Facebook users.

Once users completed our questionnaire, the application provided the opportunity to invite user's friends to install the application. They were presented with a list of their Facebook contacts and could choose an unlimited number of people to invite to install the application. People who were invited by their friends to install the application had the option to report this in the first question of the questionnaire. If they chose this option, they were presented with a list of their Facebook friends and asked to select the person who invited them. This gave a selected friend one credit. To encourage the invitation behavior, we offered valuable gifts to the top three referrers (1st place: iPad, 2nd place: iPod Nano, 3rd place: iPod shuffle). This information was clearly communicated to the users on the final screen of the application.

The invitation mechanism served a double purpose. Firstly, it helped to diffuse the application and collect more data. Secondly, it served as the influence exercise. The user only received the credit if her friend explicitly chose her as the referrer. As all of the users sent invitations to a large number of friends and response from friends was limited, each response can be interpreted as the exercise of influence. If user A did not respond to the invitation to

the application from user B (given that user A is not yet a user of the application), we can infer that B does not have sufficient influence over A. By contrast, if A has responded (and explicitly chose user B as the source), we can infer that B has influence over A. Influence in this context must be interpreted as the power of persuasion.

Not to compromise the representativeness of the sample by using only one referral channel, we devised a paid Facebook advertisement campaign that targets all Georgian adult Facebook users. This campaign reached multiple corners of Georgian Facebook networks and, therefore, significantly improved the representativeness of the sample. The application was also diffused by users receiving information on their walls as their friends installed it. The application was launched on December 25, 2010 and ran through January 31, 2011.

### Data description

During the data collection period, 5629 users installed the application, but only 2589 users responded to the questionnaire. We detect 4473 friendship links between the 2589 users in the database. Furthermore, we detect 1552 acts of influence, which is defined as a user acting on the invitation to install our application by her Facebook friend.

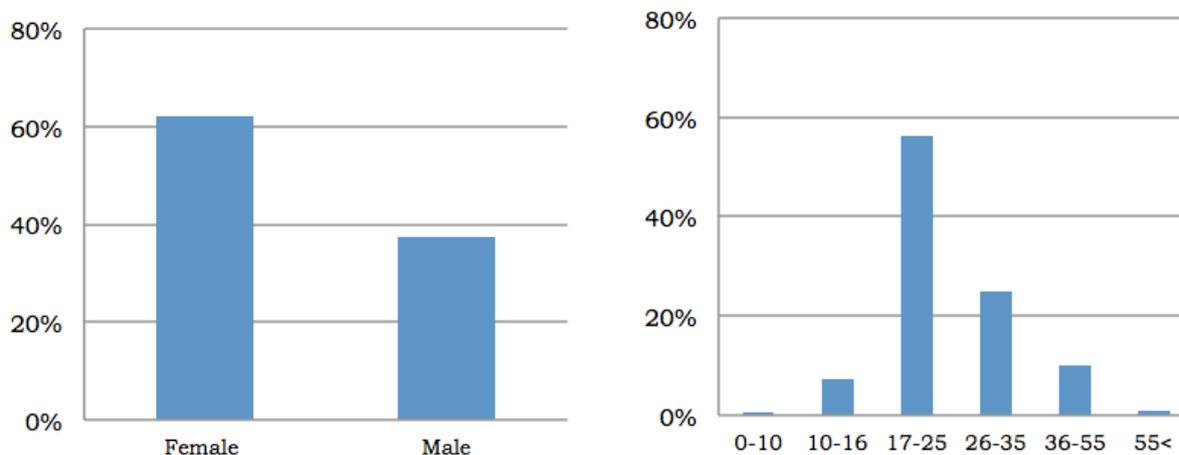


Figure 1: Gender (left) and age (right) breakdown of Georgian Facebook users.

A quick glance at our data reveals that a general Georgian Facebook user profile is similar to that of a general user in developed countries. For example, female users comprise 62% and male users 38% of the Georgian Facebook users. This result is in line with the findings from data on US Facebook users.<sup>194</sup> Furthermore, the distribution of user age profiles, presented in the right panel of figure 1, closely follows the user age distribution in the United States.<sup>195</sup>

Figure 2 reports on the frequency and intensity of Facebook usage in Georgia. It plots the distributions of visitation frequency (per week) and duration of stay during each visit (in minutes). The data suggest that the average Georgian Facebook user spends a considerable amount of time on Facebook.

In order to get an idea about the representativeness of our sample we look at the frequency distribution of referrals to our application. It turns out that 60% of respondents were referred to the application by their friends, 33% found the application through the advertising campaign that did not target any particular demographic group. Therefore, we can be sure that we do not over-sample few clusters of Facebook friends.

<sup>194</sup> Source: [www.insidefacebook.com](http://www.insidefacebook.com)

<sup>195</sup> Ibid.

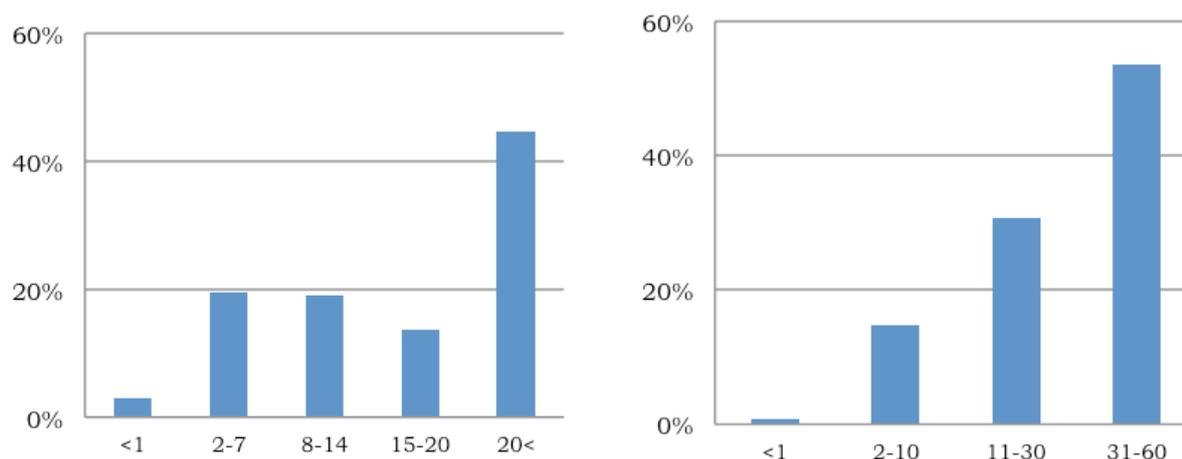


Figure 2: Facebook usage frequency (left) and intensity (right).

### Network architecture

The current paper investigates Georgian Facebook users. These users constitute a sub-network of the much larger network that includes all Facebook users. It is interesting to observe how the sample relates to its umbrella network. Note that we have limited information about our subjects. For example, we detect only the links between the two users who are in the dataset.<sup>196</sup> These connections comprise a very small portion of the subjects' connections. However, we have information on the number of friends that each subject has on Facebook. This directly corresponds to the number of connections in the global Facebook network. The number of connections each person has is referred to as the degree of a node.

The overwhelming evidence suggests that many real-life networks have particular structures. If the connections through nodes were formed randomly, the degree distribution of nodes would be normal (Erdos and Renyi 1960). Therefore, the degree of the large majority of the nodes would be very close to the mean of the degree distribution, and there would be few extremes (i.e., nodes with very low and very high degrees). However, empirical evidence suggests that many networks are characterized by a scale-free nature (Barabasi and Albert 1999, Barabasi 2003). Nodes with an extreme degree occur at a much higher frequency than is predicted by the normal distribution. The distribution that best approximates the degree distribution in social networks is the log-normal distribution (Ebel et al. 2002), whereas other types of real-life networks are best described by the power law distribution (Border et al. 2000). Various studies have found that the global Facebook network conforms to the log-normal degree distribution (Backstrom et al. 2011, Bakhty et al. 2012).

The left panel of figure 3 presents the distribution of the number of friends of our subjects. Note that the number of friends in the dataset corresponds to the degree of the user in the global Facebook network. Each marker on the graph shows how many people have the given number of connections. The right panel of figure 4 presents the cumulative distribution of the number of friends. This plot shows the share of users with a degree that is equal to or greater than the user under consideration. Plots are on a log-log scale to easily identify the log-normal distributions. Both the density and cumulative density distributions of the log-normal distribution have a linear right tail on the log-log scale.

Figure 3 confirms the representativeness of the data with respect to the global Facebook network. The right tail of both distributions is approximated by the straight line.

<sup>196</sup> In principle, we also detect links to individuals outside the dataset. However, as we do not have access to the profiles of those individuals, we cannot understand the representativeness of the detected links. Furthermore, many of the individuals outside the dataset are foreigners. Therefore, we discard this information.

This implies that users with very few and very many friends are frequent. This, again, points to the representativeness of our sample.

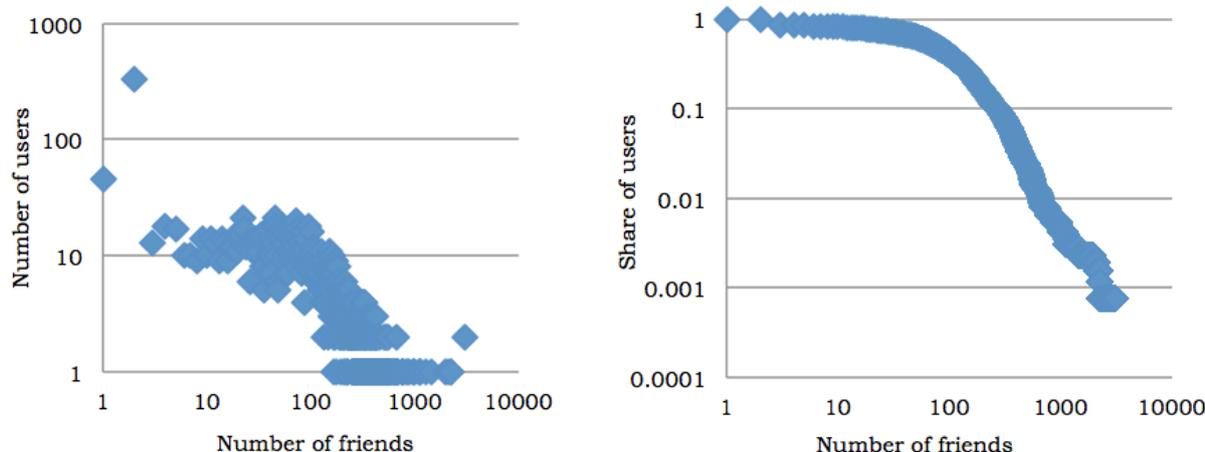


Figure 3: Degree (left) and cumulative degree (right) distributions in the global Facebook network.

In figure 3, we presented the degree distribution of our sample in the global Facebook network. Now we present the characterization of the Georgian Facebook users' network that has been constructed from the data of 2589 respondents (nodes) and friendship linkages among them. It turns out that the degree distribution of this network is also positively skewed and possesses a heavy right tail. The average degree in the network is 3.45, and the mode is 1. The skewedness is due to 8 users in the data with a degree above 30.

To determine how the local network relates to the anticipated social network structures, we plot the distribution on a log-log scale, as presented in the left panel of figure 4. We plot the cumulative distribution in the right panel of the same figure. As demonstrated, the local Facebook distribution conforms to the log-normal distribution.

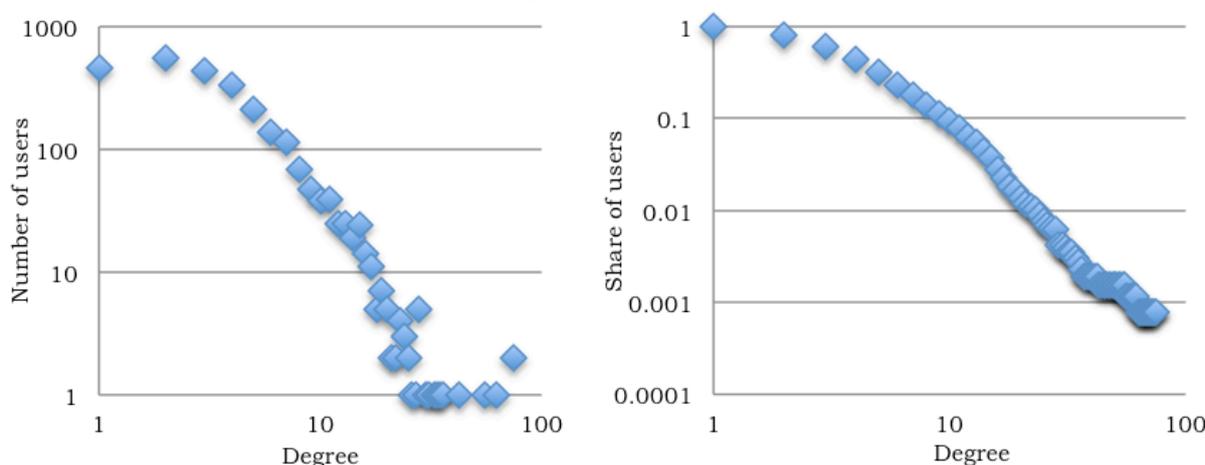


Figure 4: Degree (left) and cumulative degree (right) distributions on a log-log scale.

An important characteristic of interaction in the social networks is the distance between two nodes (people). If two people are connected to each other, they can easily affect each other's choices. However, if two people are not directly connected, they can have some influence over each other's opinions and choices through common friends. In this case, a person can affect a friend of her friend. This generalizes over the social distance that is measured by the minimum number of links that one needs to go through in order to reach node B from node A in the network. It is intuitive that the potential influence is inversely related to the social distance. However, as long as there exists at least one route to reach node B from node A, A can potentially affect the opinion of B.

In this respect, two network characteristics are important. One such characteristic is the *diameter of the network*. The diameter of the network is the length of the longest route between two nodes in the network, where route is defined as the shortest possible path between a given pair of nodes. As the network contains some isolated nodes (nodes that are not linked to any other node), this distance cannot be calculated. In other words, the diameter of the network is infinite. This means that information (or influence) cannot originate from any node and reach all the other nodes of the network. However, there is heterogeneity in the importance of the nodes. Typically, the nodes that are isolated are socially less active and cannot assert their influence. They are members of virtually any network that is created from the data with some degree of random sampling. In this case, we concentrate on the so-called giant component of the network. This approach disregards isolated nodes and small isolated interconnected groups of nodes. The giant component consists of nearly 73% of the respondents in the network. It consists of 1889 nodes and 4145 links. The average degree in this sub-network is 4.39. As this is a connected network, the diameter is finite by definition. In this case, the diameter is 18. Therefore, the longest path from one node to another in the network is through 17 other nodes. This number is quite high for such a network and implies that the Georgian Facebook network can handle significant diversity in opinions and behavior and does not require absolute conformity among the users.

The other important characteristic that measures the reach of influence in the network is the *average shortest path length* between the nodes. It is the average distance between two users on Georgian Facebook. The average shortest path length measures the distance between two randomly chosen users. This measure was pioneered by Stanley Milgram, who observed that randomly selected pairs of people were surprisingly close to each other in social space (Travers and Milgram 1961). He termed this phenomenon as the Small World. This phenomenon has been confirmed to characterize both social and physical networks (Wagner and Fell 2001) and comprehensive models have been created to explain its emergence (Watts and Strogatz 1998). The most well-known incarnation of the Small World phenomenon is six degrees of separation (Watts 2003). Starting with Milgram's experiment and ending with The Kevin Bacon Game,<sup>197</sup> it has been observed that the average shortest path length in many diverse social and physical networks is about 6. Surprisingly, this does not depend on the size of the network. The current network conforms to six degrees of separation. The average path length in the Georgian Facebook network is 6.01, indicating that information (and influence) can reach most Georgian Facebook users quickly regardless of where in the network it originates.

### **Central players in the network**

In the previous section, we characterized the network of Georgian Facebook users. In this section, we take a micro approach and attempt to characterize the individuals' power and position in the network. As the study is anonymous, we cannot name the individuals who occupy special positions; however, many interesting conclusions can be drawn. There are three important node centrality measures in networks: degree centrality, closeness centrality and betweenness centrality. Before discussing the analysis of the data, we outline each of the three measures.

*Degree centrality* is measured as a given user's number of friends. As the number of friends increases, the number of people the user can directly influence increases. Therefore, we expect that nodes with a higher degree centrality are powerful players in the network. In the data, we observe two such measures. One measure is the degree in the global network,

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<sup>197</sup> <http://www.thekevinbacongame.com>

which is measured as the number of friends on Facebook. The other is the degree in the local network, which is measured as the number of friends in our dataset.

*Closeness centrality* measures how close the node is to all other nodes in the social network. This is measured in terms of social distance (similar to the shortest path length and the diameter). As closeness to all other users increases, the assertion of influence, directly and indirectly, becomes easier.

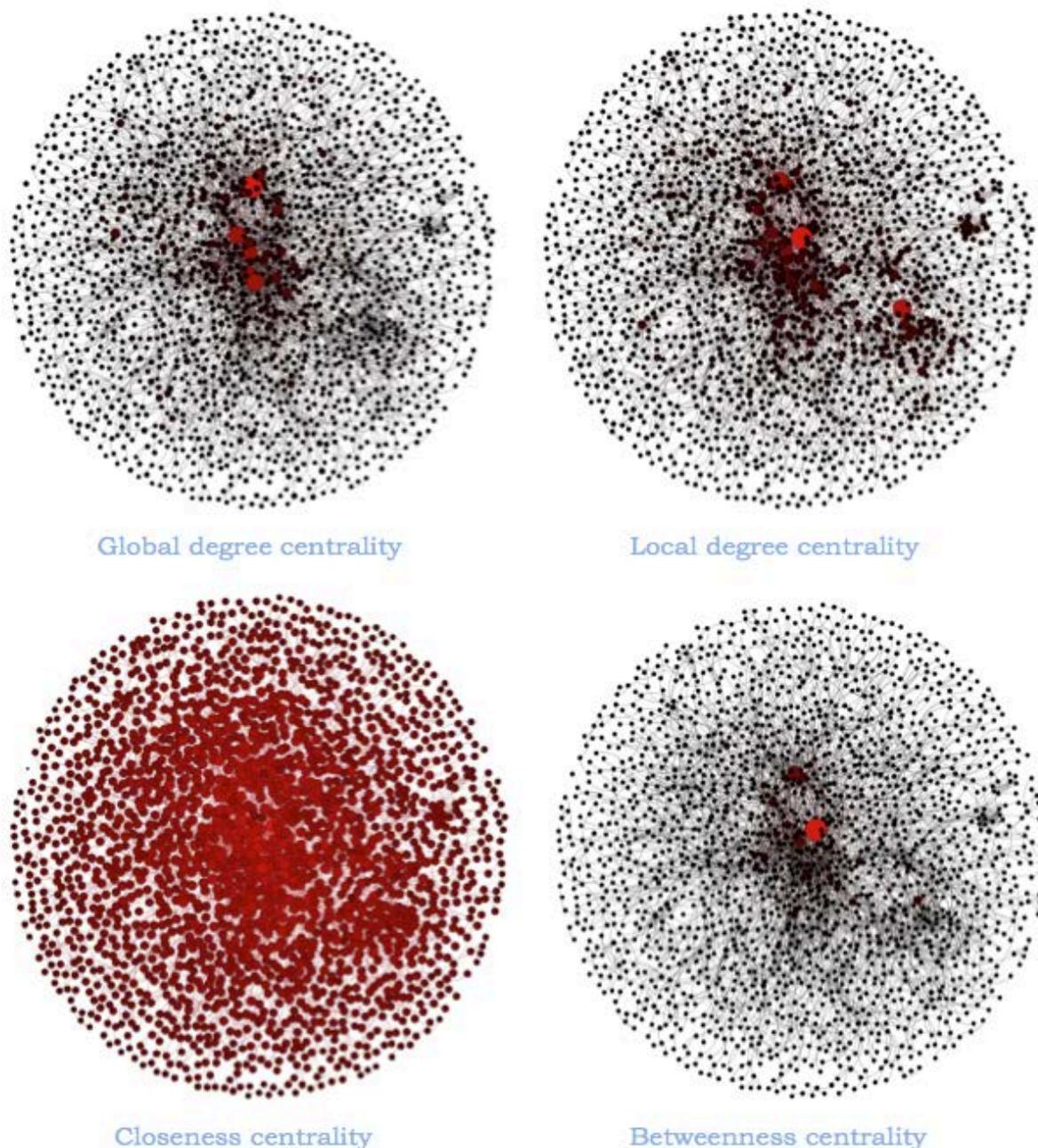


Figure 5: Illustration of node importance with respect to the centrality measures.

*Betweenness centrality* measures how important the node is in terms of connecting other nodes to each other. In other words, it relates to the number of shortest paths between all of the pairs of users that go through a particular node. For example, if the node lies on the only route between the two large components in the network, its betweenness centrality is high due to its crucial importance for passing information from one part of the network to the other. This idea relates to the structural holes and “weak ties” (Granovetter 1973). Nodes with high betweenness centrality bridge the holes that would constitute the structural divide

between substantial parts of the network. Therefore, they carry the important auxiliary function of aiding in the spread of information and influence of other people.

Figure 5 illustrates the user importance distributions across several measurements in the giant component of the network. In each panel, the color and size of the node corresponds to the centrality of the node with respect to the appropriate indicator. The upper panels illustrate the degree centrality distributions. Degree centrality is calculated with respect to two networks. The left panel concerns the global Facebook network, for which degree centrality is measured as the number of friends the user has on Facebook. The right panel concerns the local network, for which degree centrality measures the number of friends each user has in our sample. The lower panels illustrate the importance distributions with respect to closeness and betweenness centralities in local network.<sup>198</sup>

As we can see, there are a handful of people who possess disproportionate power on Georgian Facebook with respect to each of the measures, closeness centrality being an exception. However, in order to understand whether those people actually use their power we have to focus on the analysis of the data generated by the influence exercise. Recall that the application allowed users to send invitations to their Facebook contacts. It also allowed newcomers to state which friend referred them to the application. We interpret each disclosed referral as the act of influence. We state that user A has exercised influence over user B if B has listed A as the referrer to the application.

All of the exercises of influence are recorded in the data; hence, we can clearly identify people who have influenced others (A-type nodes) and those who have been influenced (B-type nodes). We label the former nodes as influencers and the latter nodes as followers. Note that one node can be both an influencer and a follower. Furthermore, a node can be neither an influencer nor a follower.

We detect 932 influencers and 1552 followers. The difference between the two populations is quite interesting. Figure 6 contrasts the gender and age profiles of influencers, followers and the general Georgian Facebook user population. A closer analysis of the difference between Facebook usage and intensity variables across gender and age profiles reveals important differences. It turns out that females are engaged in the influence exercise more actively. Females influence their social contacts more than do males. Their friends also influence female users more; however, this difference is small.

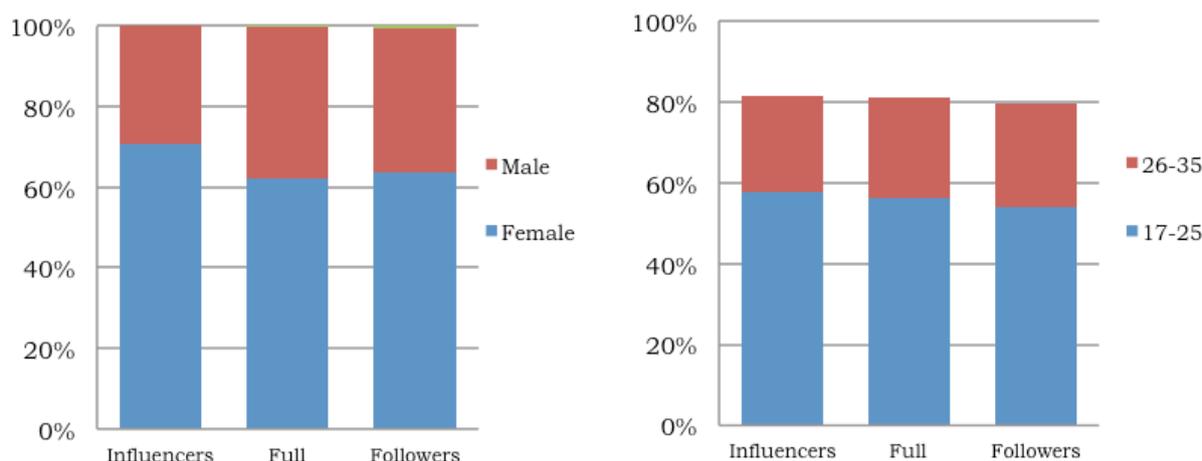


Figure 6: Comparison of gender (left) and age (right) profiles.

There are no stark differences by age. However, 17-25 year olds seem to be overrepresented in the population of influencers and underrepresented in the population of

<sup>198</sup> Given the limited information in our dataset, these measures cannot be calculated for the global network.

followers. Thus, young Facebook users are more eager (or able) to influence others and more reluctant to follow.

To accurately characterize the profile of influencers and followers, we perform two-sided t-tests on the mean difference with respect to various network measures between influencers and the full population and between followers and the full population. Table 1 presents p-values for these tests. As shown, followers are practically indistinguishable from the general Facebook user population. However, influencers are statistically different from the average Georgian Facebook user. Influencers have a large number of connections and occupy positions that allow them to control the diffusion of information from other nodes.

	Number of friends	Degree centrality	Closeness centrality	Betweenness centrality
Full vs. Influencers	0.03	0.00	0.06	0.00
Full vs. Followers	0.86	0.00	0.24	0.85

Table 1: Test of mean difference in key characteristics. The values presented are the p-values of two-tailed t-test on mean difference with unrestricted variance.

We have identified the central players in Georgian Facebook. These players can potentially be powerful in influencing the public opinion held by the social network users. We have also identified the users who have influenced the actions of other users. Below, we attempt to understand how these two groups of users are related to each other. In other words, we examine whether users who are potentially powerful have used their power during the exercise.

In general, the number of connections that a user has is a good predictor of the user's general power in the network. In this respect, we identify two types of powerful users. The user is *globally powerful* if she commands a high rank in terms of total number of Facebook friends. By contrast, the user is *locally powerful* if he commands a high rank in terms of connections in our sample. A user can be both globally and locally powerful. To contrast the groups of influencers with the groups of locally and globally powerful users, we must truncate the power ranking. To avoid problems due to the difference in sample size, we limit the size of the powerful user population to the size of the population of influencers. This method solves the truncation issue.

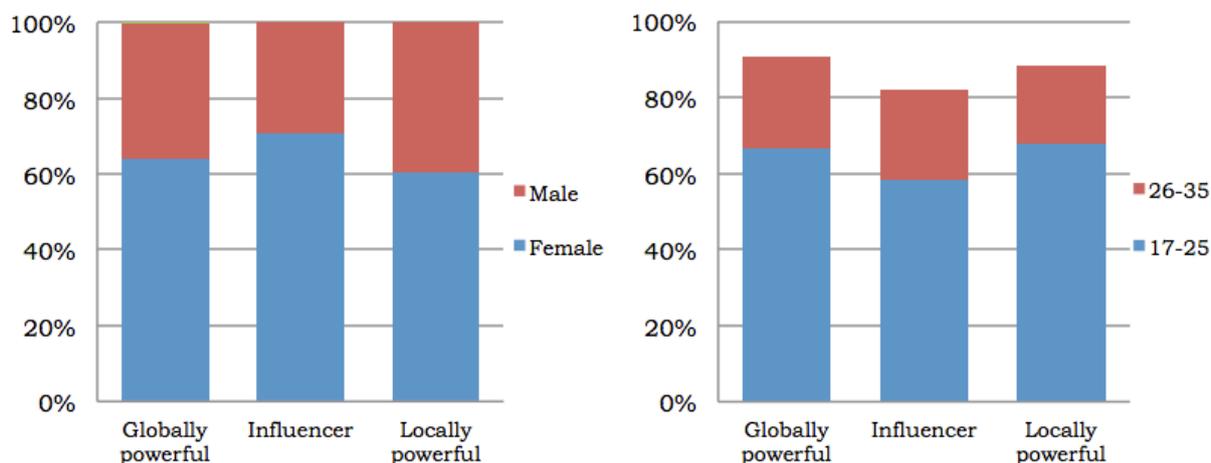


Figure 7: Comparison of gender (left) and age (right) profiles of powerful users with those of influencers.

Figure 7 presents the gender and age profiles of the influencers and the globally and locally powerful users. Females are overrepresented in sample of influencers; thus, they perform better relative to the power that they possess. By contrast, 17-25 year olds are underrepresented in the sample of influencers, suggesting that young Facebook users underutilize their power in the network.

	Number of Friends	Degree centrality	Closeness centrality	Betweenness centrality
Influencers vs. globally powerful	0.00	0.00	0.28	0.01
Influencers vs. locally powerful	0.00	0.00	0.04	0.00

Table 2: Test of mean difference between actual and potential influencers. The values presented are the p-values of two-tailed t-test on mean difference with unrestricted variance

Our data permits us to go one step further and test the mean difference between the basic network measures across populations. Table 2 presents the p-values of these t-tests. A somewhat surprising result is that nearly all influencers' characteristics statistically differ from those of both globally and locally powerful users. Thus, in the current exercise, the choice to influence social contacts has been determined by characteristics other than the power of the user. This is understandable because the true reason behind the influence exercise was not significant from the individual's prospective. Furthermore, it was deliberately not communicated to the respondents to promote behavior in the environment that is similar to that in the natural environment.

### Validity of results

There are two major shortcomings to the research presented in this paper. The first is the fact that we cannot identify users' motivation to accept the invitation coming from a friend. Due to this the analysis of power of individual users is somewhat speculative. We cannot determine whether powerful people will use their power to influence the public opinion in the social network when there are more important questions at stake. In presence of a motivation that will trigger the effort of key players in the network, the outcome may be different from the one observed in the present study.

The second shortcoming that affects the reliability of the results is shared among all studies that analyze only a portion of a network. The current network is only a sub-network of the full Georgian Facebook network. Therefore, despite the representativeness of the sample, the user characteristics are definitively miscalculated. However, the important issue is whether this miscalculation is systematic and, therefore, compromises the results. We believe that the miscalculation is not systematic for two reasons. First, numerous tests throughout the paper demonstrate that the sample is representative of the general Georgian Facebook user population in many ways. Most important, it is representative in terms of network structure. We can expect to find the log-normal degree distribution in the full Georgian Facebook network, and we find this distribution in the sample. Second, this particular structure implies the network characteristic of scale-freeness, which emphasizes the importance of the rankings with respect to certain network characteristics rather than the values of the node-specific characteristics.

### Conclusion

Two important conclusions result from our analysis. Firstly, we conclude that the demographic characteristics of Facebook users in Georgia are similar to those of users in developed, populous and better-researched countries. Young female users dominate Georgian Facebook. We also conclude that the social network in Georgia conforms to the well-known phenomenon of six degrees of separation.

Secondly, and more importantly, we find that young female users are more active on Facebook. Young females who occupy strategic positions on Georgian Facebook possess disproportionately large power. With respect to our influence experiment, we find that young

people (counting both gender together) have underutilized their power. Conversely, females have “over-reacted” compared to the average Georgian Facebook user.

### **Acknowledgement**

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## **PLAYAS Y MANEJO APTITUD RECREATIVA EN PLAYAS TURÍSTICAS DE MANZANILLO, COLIMA, MÉXICO**

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### **Abstract**

Coastal areas, in particular the beaches are natural sites visited by tourists and population. The beaches are so important in the productive processes in each region specially, the role it plays in the socioeconomic development of the coastal tourist town; make it necessary to ensure its permanence in conditions that satisfy the demands and expectations of users. In other words, the beaches would be quality. Therefore, the objective of this job is to evaluate the variation of the recreational aptitude in Manzanillo, Colima beaches, with bases of aesthetic quality, bacteriology and biophysical attributes. We evaluated 16 different activities in the emerged and submerged zones of six beaches localized in the bays every two months. San Pedrito beach presented the major annual recreational aptitude, resulting suitable for 11 activities. In the Santiago bay, Miramar beach north zone resulted suitable for 12 activities. Salagua located in the Manzanillo bay showed the worst recreational quality.

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**Keywords:** Aptitude or vocation recreational beaches, quality recreational tourist beaches

### **Introduction**

Las playas son zonas de esparcimiento muy concurridas en los periodos vacacionales y fines de semana largos, de allí que la presión de usos de la sociedad del ocio, concentrada en estos periodos, genera impactos ambientales significativos. Ello plantea la necesidad de compatibilizar la funcionalidad de estos espacios, frecuentados de forma masiva, con los problemas de conservación y estabilidad de las playas.

La ampliación de la oferta turística aumenta los requerimientos por parte del usuario, que demanda cada vez más y mejores servicios. Sin embargo, el hecho de hacer funcionales los espacios litorales para satisfacer la frecuentación masiva ha traído consigo serios problemas de conservación y estabilidad de los sistemas litorales (Roig, 2003).

Esta situación en Manzanillo, ha preocupado y viendo la necesidad de cumplir con los lineamientos normativos para la conservación y aprovechamiento de los recursos naturales; se busca un enfoque de respeto a las políticas de planeación de la actividad turística que es la segunda actividad económica del municipio y es necesario que las autoridades locales y estatales se comprometan a mantener un ambiente más sano, mejor conservado, auténtico, natural y además con un alto nivel en la calidad para lograr competitividad en el mercado. Motivos por los cuales el objetivo de la presente investigación fue conocer la variabilidad temporal de la aptitud o vocación recreativa de seis playas de Manzanillo, Col., durante el 2007-2008.

## Metodología

El puerto de Manzanillo, Colima cuenta con dos bahías; la primera de ellas de igual nombre, considerada la más importante económicamente hablando debido a la gran actividad portuaria que en ella se lleva a cabo. Tiene una extensión de 7.1km y limita al noroeste con Punta Santiago y al sur con Punta Ventanas; se comunica directamente con las lagunas costeras de Cuytlán y San Pedrito. Esta última soporta al Puerto Interior y en ella se localizan cuatro playas: San Pedrito, Brisas, Playa Azul y Salagua, siendo las dos primeras las más utilizadas recreativamente. La bahía de Santiago, asume la mayor actividad turístico-recreativa, abre al sur y es de menor dimensión que la de Manzanillo, limita con las Puntas de Juluapan y Santiago, que alcanza entre sí una distancia aproximada de 4.5 km. Por el lado oeste se comunica con la Laguna de Juluapan. En ella se sitúan las playas Audiencia, Santiago y Miramar.

Para este trabajo se realizaron seis salidas de campo bimensuales a las seis principales playas de las bahías: San Pedrito, Brisas, Salagua, Audiencia, Santiago y Miramar, en donde se fijaron 10 estaciones de manera representativa en cada una de ellas, de acuerdo a la extensión y la frecuencia de visitantes en la parte sumergida (zona de bañistas), con la finalidad de coleccionar muestras de agua y transportarlas al laboratorio para determinar el NMP de bacterias enterococos fecales/100 ml y 10 estaciones en la zona emergida (arena) de la playa (Figura 1), para clasificar y cuantificar la basura marina o costera y evaluar la calidad estética de la misma y determinar la aptitud recreativa, que es definida como la compatibilidad que tiene las playas para el desarrollo de un tipo específico de actividades recreativas evaluando ciertos atributos biofísicos y ambientales (Enríques-Hernández, 2003).

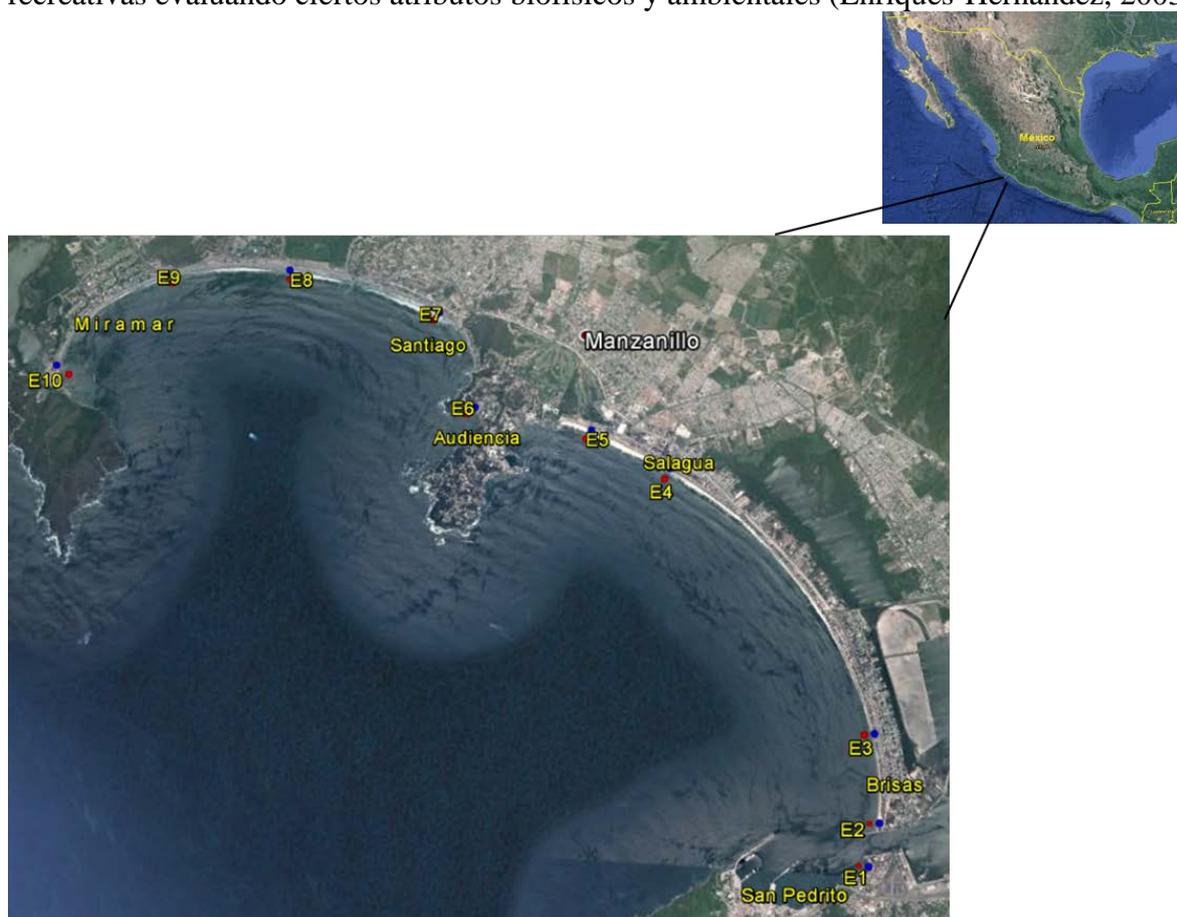


Figura 1. Área de estudio y localización de las estaciones de muestreo en las playas más importantes de Manzanillo y en el mar.

La metodología de este trabajo fue dividida en las siguientes tres secciones:

### A. Trabajo de Campo:

i) *Determinación de la Calidad Estética*, se clasificó y cuantificó la cantidad y tipo de basura marina o costera presente en la playa en un área de 600 m<sup>2</sup> que corresponde a la unidad de muestreo o transecto de acuerdo a la metodología propuesta por Velander y Macogni, 1999 (Figura 2).

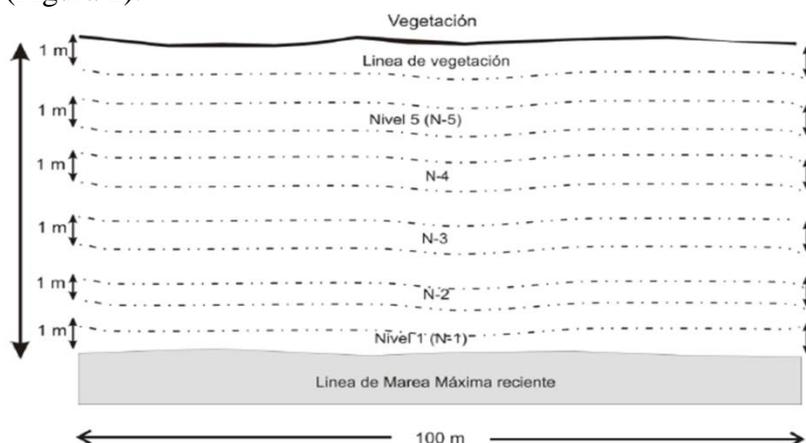


Figura 2. Unidades de muestreo (transectos).

ii) *Determinación de la Calidad bacteriológica del agua de mar*, las muestras se colectaron en bolsas de plástico estériles de 100 ml, en puntos donde la profundidad del agua tenía 1 m. La muestra se colectó contracorriente a 30 cm de profundidad y posteriormente se transportó al laboratorio en hielo y se mantuvieron de 1 a 4°C antes de su análisis.

iii) *Determinación de la Aptitud o vocación recreativa de la playa*, se llevó a cabo de manera visual, valorándose los criterios o atributos físico-geomorfológicos y biológicos como amplitud de la playa, pendiente, accesibilidad, si la playa es un sitio de arribo, anidación y alimentación de aves y/o tortugas, temperatura del agua, rango de marea, corrientes de retorno, biota béntica en la parte sumergida de la playa entre otras; propuesto por Enríquez-Hernández (2003) y modificado por Laureano-Nieves (2005).

### B. Trabajo de Laboratorio:

i) *Calidad Bacteriológica del agua de mar*, para cuantificar en NMP de bacterias enterococos fecales se usó el método de sustrato definido (Enterolert®), dicha metodología es descrita en el Manual de Métodos Estandarizados de la American Public Health Association (APHA, 1995) para agua de mar y aprobada por la American Society for Testing and Materials # D-6503-99.

### C. Procesamiento de datos:

i) *Determinación de la Calidad Estética*, los tipos de basura marina o costera se reclasificaron con base a los indicadores de estado: Desechos Naturales, Sintéticos y Riesgosos, propuestos por Silva-Iñiguez y Fischer, 2003. Una vez evaluados los indicadores de estado, se determinó la calidad estética, comparando dichos valores con los establecidos por Silva-Iñiguez *et al.*, 2004 para las playas de Manzanillo, Col. (Tabla I).

Tabla I. Calidad estética para playas de uso recreativo en Manzanillo, Col., con base en Indicadores de Estado propuestos por Silva-Iñiguez, *et al.*, 2004.

CALIDAD ESTÉTICA	Sintéticos	Naturales	Riesgosos
Excelente	0 - 277	0 - 735	0 - 10
Buena	278-553	736 - 1469	11 - 20
Regular	554-830	1470 - 2204	21 - 30
Mala	831-1106	2205 - 2938	31 - 40
Pésima	1107 - 1383	2939 - 3673	41- 50

ii) *Determinación de la Calidad Bacteriológica del agua de mar*, los valores de NMP de enterococos fecales/100 ml obtenidos fueron comparados con los establecidos por la Secretaría de Salud (SS, 2004), para agua marina de uso recreativo con contacto primario (Tabla II).

Tabla II. Calidad bacteriológica de agua de mar para uso recreativo con contacto primario (Secretaría de Salud, 2004).

RANGO (NMP/100)	CALIDAD BACTERIOLÓGICA
0 - 40	Limpio sin riesgo sanitario
41 - 200	Aceptable
201 - 500	No recomendable
> 500	Riesgo Sanitario

iii) *Determinación de la Aptitud o Vocación Recreativa de playas*, los valores cualitativos de los criterios o atributos evaluados *in situ* de cada playa propuestos por Enríquez-Hernández (2003) para determinar la aptitud recreativa de la misma, se compararon con los valores cualitativos óptimos propuestos, para determinar qué actividades son factibles a realizar en cada una de las playas estudiadas sin correr riesgo a los usuarios.

La regla de decisión fue: para que una playa sea apta para cierta actividad recreativa, esta deberá cumplir positivamente con al menos el 50% más uno de los parámetros o criterios óptimos establecidos (Laureano-Nieves, 2005), por ejemplo:

Actividad recreativa propuesta	Criterios, atributo o características necesarias para cada actividad.	Valores cualitativos		Proporción cumplida	Decisión 50% + 1
		propuesto	medido		
1. Baños de Sol y Caminatas	- Material de la berma	MA - A	MA (+)	4:5	Apta
	- Ancho de la parte emergida de la berma en marea baja	MA - A	A (+)		
	- Color del material que constituye la berma	MA - B	B (+)		
	- Presencia de material ajeno a la berma	MA - A	MA (+)		
	- Sitio de arribo, refugio, alimentación y anidación de tortugas y/o aves.	MA	B (-)		
2. Kayak	- Exposición al oleaje	MA - A	MA (+)	1:3	No Apta
	- Corrientes de retorno	MA - A	B (-)		
	- Biota bentónica en la parte sumergida de la playa	MA	B (-)		

## Resultados

### Calidad Estética

Durante el periodo analizado se clasificaron y cuantificaron un total de 23831 objeto/600m<sup>2</sup> variando la densidad de 21.77 a 17.95 objetos/m<sup>2</sup> en las playas de las bahías. Aportando las E1 y E3 ubicadas en las playas de San Pedrito y Brisas 4376 y 3214 objetos/600m<sup>2</sup> respectivamente; lo que favoreció el 58% de la basura marina total de la bahía de Manzanillo. De igual forma las E7 y E10 en las playas de Santiago y Miramar aportaron 2981 2593 y objetos/m<sup>2</sup> contribuyendo así con el 73% del total de la basura costera en la bahía de Santiago (Figura 3).

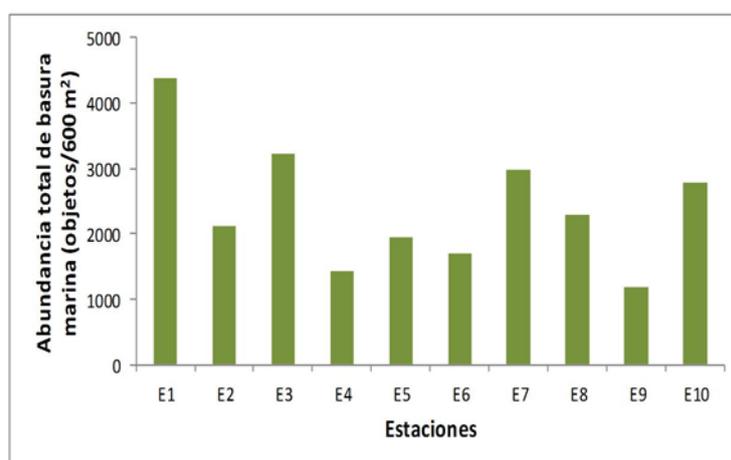


Figura 3. Abundancia total de basura costera en las playas de Manzanillo, Colima, México, durante 2007-2008.

Los tres tipos de basura marina que predominaron en las playas ubicadas en la Bahía de Manzanillo fueron desechos naturales, madera y plástico, aportando el 60% del total de objetos. En cambio, en las playas de la Bahía de Santiago fueron plástico, papel y desechos naturales aportando el 71%.

Las playas de Salagua (E4) y Audiencia (E6) presentaron durante el 2007-2008 excelente calidad estética, seguidas por Salagua (E5), Miramar (E9) que mostraron excelente y buena calidad. En cambio, Santiago (E7) presentó pésima calidad durante todo el año, esto se debió a la gran cantidad de pedacería de vidrio, residuo que es riesgoso para la integridad física del usuario (Tabla III).

Las playas de las bahías durante los meses de agosto de 2007 (M-2) y abril de 2008 (M-6), se vieron afectadas en su amplitud o dicho de otra forma se erosionaron por causas de fenómenos hidrometeorológicos como mar de fondo o marejadas, impidiendo realizar el muestreo por amplitud de playa menor a 6 m.

Tabla III. Variación de la calidad estética en las playas de Manzanillo, Colima, México, durante 2007-2008 (donde: S: Sintéticos; N: Natural; P: Peligrosos).

PLAYA (ESTACIÓN)	CALIDAD ESTÉTICA					
	M-1 (S:N:R)	M-2 (S:N:R)	M-3 (S:N:R)	M-4 (S:N:R)	M-5 (S:N:R)	M-6 (S:N:R)
<b>BAHÍA DE MANZANILLO</b>						
San Pedrito (E1)	<b>Pésima</b> 1227:382:11	Excelente 269:399:4	Excelente 241:8:8	Excelente 421:95:2	Regular 816:210:13	Excelente 161:109:0
Brisas (E2)	Regular 644:143:12	Excelente 227:86:1	Excelente 76:40:2	Excelente 180:31:3	Regular 565:48:1	Excelente 57:1:9
Brisas (E3)	Regular 746:133:18	Excelente 2413:13:1	Excelente 182:33:3	Excelente 284:38:8	<b>Pésima</b> 1390:25:9	Excelente 96:21:1
Salagua (E4)	Excelente 58:110:0	Excelente 208:407:5	Excelente 170:51:0	Excelente 90:33:8	Excelente 75:55:3	Excelente 97:58:1
Salagua (E5)	Excelente 147:98:2	Excelente 250:156:1	Buena 329:140:7	Buena 101:35:1	Excelente 89:223:5	Excelente 273:96:1
<b>BAHÍA DE SANTIAGO</b>						
Audiencia (E6)	Excelente 47:195:1	Excelente 186:239:7	Excelente 164:700:4	Excelente 116:20:2	Excelente 6:0:0	**
Santiago (E7)	<b>Pésima</b> 368:40:188	<b>Pésima</b> 353:160:111	<b>Pésima</b> 346:7:112	<b>Pésima</b> 225:71:74	<b>Pésima</b> 726:104:96	**
Miramar (E8)	Excelente 76:32:1	<b>Pésima</b> 275:27:50	Regular 436:35:27	Regular 257:63:10	Excelente 213:23:7	Regular 634:101:27
Miramar (E9)	Excelente 173:70:9	*	Excelente 112:52:2	Excelente 84:9:0	Excelente 196:59:4	Buena 388:16:8
Miramar (E10)	Buena 319:280:1	Regular 561:47:3	Excelente 320:38:1	Excelente 273:3:6	Excelente 256:5:1	<b>Mala</b> 435:4:40

\* No existía playa, \*\* playa angosta < 5m

### Calidad bacteriológica del agua de mar

En la figura 4 se observa que durante el periodo de junio del 2007 a abril del 2008 las estaciones E1 y E3 ubicadas en las playas de San Pedrito y Brisas se encontraron todo el año aptas para uso recreativo con contacto primario y la E2 en Brisas únicamente en el muestreo 2 (M-2), rebasó el límite máximo permisible (500 NMP de enterococos fecales/100 ml) (SS, 2004). En cambio, la playa de Salagua presentó la mayor abundancia de bacterias de enterococos (1009 NMP/100 ml; E5, M-3).

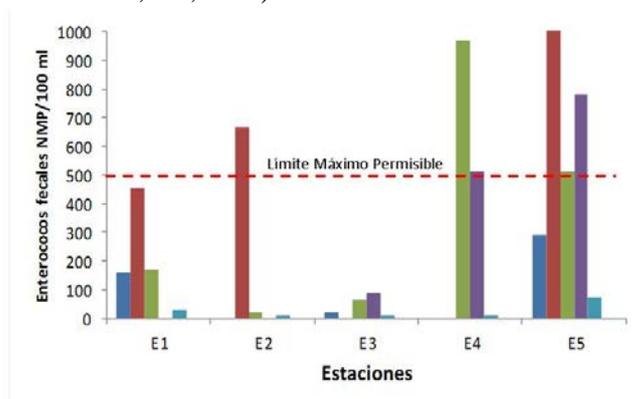


Figura 4. Abundancia de Enterococos fecales (NMP/100 ml) presentes en agua de mar en la zona de bañistas de las playas ubicadas en la Bahía de Manzanillo, Colima, México, durante 2007-2008.

La abundancia de enterococos fecales en las playas de la bahía de Santiago fue menor y en ningún muestreo rebasó el límite máximo permisible. Lo que esto implica, es que el agua en la zona de bañistas de las playas Audiencia, Santiago y Miramar en sus 5 estaciones durante junio de 2007 a abril de 2008 fue apta para practicar buceo, nado, baño, snorkel y todas las actividades con contacto primario (Figura 5).

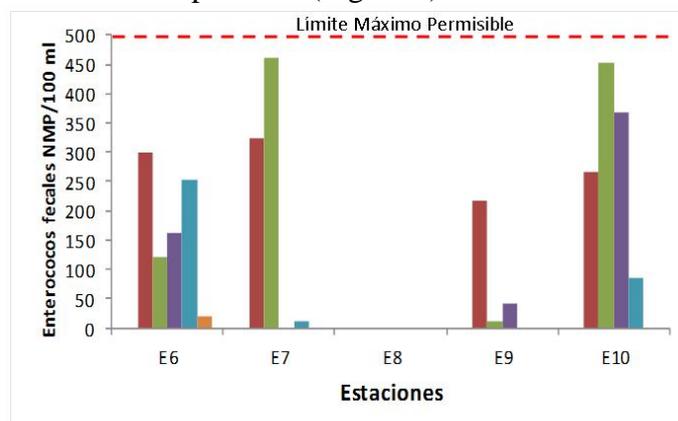


Figura 5. Abundancia de Enterococos fecales (NMP/100 ml) presentes en agua de mar en la zona de bañistas de las playas ubicadas en la Bahía de Santiago, Colima, México, 2007-2008.

### Aptitud de uso recreativo en la playa

a) En la parte emergida de la playa

En las playas de la bahía de Manzanillo varió de 3 a 6 actividades en la parte emergida (Tabla IV). San Pedrito y Brisas (E3) fueron las más aptas (6:8), seguida por Salagua (E5) que es apta para 4:8 y Brisas (E3) fue la playa con menor aptitud recreativa 3 de 8 actividades.

En cambio la aptitud de uso recreativo anual de las playas ubicadas en la bahía de Santiago varió de 1 a 6 actividades en la parte emergida (Tabla IV), siendo Miramar la playa con mayor vocación recreativa desde la parte central hacia el norte (E8) y (E10), resultado ser aptas para 6 de 8 actividades. En cambio, Audiencia playa de bolsillo resultó con menor

aptitud en esta bahía (3 de 8 actividades), únicamente fue apta todo el año, para paseo a caballo (Tabla IV).

b) En la parte sumergida del agua.

San Pedrito mostró la mayor aptitud recreativa acuática, en donde se puede practicar: natación, snorkel, kayak, sky y sky-jet durante todo el año y en ciertas temporadas es apta para buceo. Brisas (E3) fue apta para buceo, surf, windsurf y sky-jet; no obstante, el surf no puede practicarse debido a la amplitud de la zona de rompiente. Salagua (E4) y Salagua (E1) no presentan vocación recreativa acuática (Tabla V).

La aptitud de uso recreativo de las playas ubicadas en la bahía de Santiago fue muy variable (Tabla V). Miramar (E10) fue la más apta (6:8 actividades), seguidas por Audiencia (E6) con 3:8 y Santiago (E7) con 1:8 actividades. Por el contrario, Miramar (E8) y (E9) son transectos peligrosos durante ciertas temporadas, impidiendo que se realicen actividades recreativas acuáticas de manera segura.

## Discusión

La influencia humana en el funcionamiento de la costa es un factor primordial, esto debido a su capacidad que ha tenido de modificar la morfología y del funcionamiento del litoral causando desequilibrios; no olvidando que, la zona costera ha pasado por ciertos momentos desde ser un área sin importancia económica a un bien con alta estima social y económica. En donde la ampliación de la oferta turística aumenta los requerimientos por parte del usuario, que demanda cada vez más y mejores servicios (Roig, 2003; Secretaría de Turismo de la Nación, 2005). Las características físico-geomorfológicas como tamaño de sedimento, amplitud de la zona de rompientes y la pendiente fueron algunas de las causas que causaron la disminución de la aptitud recreativa en las playas evaluadas en Manzanillo.

De igual modo, las corrientes de retorno, que en ciertas épocas del año llegan a ser muy frecuentes en ciertos puntos de algunas playas, las convierten en riesgosas para algunas actividades acuáticas como nadar, bañarse y snorkelar entre otras; como fue el caso de las playas Villas San José, Playa Los Cocos y Playa Linda ubicadas en Tapachula, México en donde también se reportó que el potencial recreativo fue bajo/medio debido al oleaje y a la presencia de corrientes de retorno (Barrio-Ramos, 2012). La calidad bacteriológica, también influyó en ciertos puntos y en algunos muestreos, debido a las descargas de las cuencas fluviales sobre todo en los representativos de épocas de lluvias (M-2 y M-3), y descargas de los ríos hacia las playas; caso concreto Salagua y Santiago. Como se ha reportado por Chiroles y Col., 2007 en playas cubanas; Quintana-Saavedra (2013) en el agua de mar del golfo Morrosquillo y Ballesteros et al. (2013) en playas del municipio Puerto Colombia, Atlántico.

De acuerdo con Roig (2003), el hecho de hacer funcionales los espacios litorales para satisfacer la frecuentación masiva ha traído consigo serios problemas de conservación y estabilidad de los sistemas litorales, caso concreto el incremento de basura marina o costera que se presenta en todas las playas y en particular la presencia de residuos sólidos de construcción (Brisas E3), que hicieron que la calidad estética disminuyera. Además, aunado a esto las lluvias, vientos, mareas, corrientes costeras y afluentes de ríos o cuerpos de agua costeros que transportan la basura que son depositados arrojados en ellos de manera consciente o inconsciente y aunado a esto la falta de vigilancia y control sobre las construcciones frente de playa que dejaron material de construcción sobre la playa. Lo cual coincide con lo reportado por Barrio-Ramos, 2012 en playas de Chiapas, México con potencial recreativo medio debido a la presencia de residuos sólidos en playas que se localizan en áreas naturales protegidas.

Tabla IV. Actividades recreativas idóneas para realizar en la parte emergida de cada una de las playas de las Bahía Manzanillo y Santiago, Colima, México, durante 2007-2008.

PLAYAS ACTIVIDAD PROPUESTA	SAN PEDRITO (E1)						BRISAS (E2)						BRISAS (E3)						SALAGUA (E4)						SALAGUA (E5)					
	M1	M2	M3	M4	M5	M6	M1	M2	M3	M4	M5	M6	M1	M2	M3	M4	M5	M6	M1	M2	M3	M4	M5	M6	M1	M2	M3	M4	M5	M6
<b>BAHÍA MANZANILLO</b>																														
1. BAÑOS DE SOL	√	√	√	√	√	√	√	√	√	√	√	√	X	X	X	X	X	X	√	X	√	X	√	X	X	X	√	X	√	X
2. CAMINATA	√	√	√	√	√	√	√	√	√	√	√	√	X	X	X	X	X	X	√	X	√	X	√	X	X	X	√	X	√	X
3. COLECTA DE CONCHAS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√	X	X	X	X	X	X	X	X	X	X	X	X	X
4. PASEO A CABALLO	√	√	√	√	√	√	√	√	√	√	√	√	√	X	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
5. PASEO EN MOTO	√	√	√	√	√	√	√	√	√	√	√	√	X	X	X	X	X	X	√	√	√	√	√	√	√	√	√	√	√	√
6. PRÁCTICA DE DEPORTES	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7. FOTOGRAFÍA	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
8. AVISTAMIENTO DE AVES	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
<b>BAHÍA SANTIAGO</b>																														
PLAYAS ACTIVIDAD PROPUESTA	AUDIENCIA (E6)						SANTIAGO (E7)						MIRAMAR (E8)						MIRAMAR (E9)						MIRAMAR (E10)					
	M1	M2	M3	M4	M5	M6	M1	M2	M3	M4	M5	M6	M1	M2	M3	M4	M5	M6	M1	M2	M3	M4	M5	M6	M1	M2	M3	M4	M5	M6
1. BAÑOS DE SOL	√	√	√	√	√	X	√	√	√	√	√	X	√	√	√	√	√	√	√	X	√	√	√	√	√	√	√	√	√	√
2. CAMINATA	√	√	√	√	√	X	√	√	√	√	√	X	√	√	√	√	√	√	√	X	√	√	√	√	√	√	√	√	√	√
3. COLECTA DE CONCHAS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4. PASEO A CABALLO	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
5. PASEO EN MOTO	√	√	√	X	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	X	√	√	√	√	√	√	√	√	√	√
6. PRÁCTICA DE DEPORTES	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7. FOTOGRAFÍA	√	√	√	X	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
8. AVISTAMIENTO DE AVES	√	√	√	X	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

Tabla V. Actividades recreativas idóneas para realizar en la parte sumergida de cada una de las playas de las Bahía Manzanillo y Santiago, Colima, México, durante 2007-2008

PLAYAS ACTIVIDAD PROPUESTA	SAN PEDRITO (E1)						BRISAS (E2)						BRISAS (E3)						SALAGUA (E4)						SALAGUA (E5)					
	M1	M2	M3	M4	M5	M6	M1	M2	M3	M4	M5	M6	M1	M2	M3	M4	M5	M6	M1	M2	M3	M4	M5	M6	M1	M2	M3	M4	M5	M6
<b>BAHÍA MANZANILLO</b>																														
1. NATACIÓN	√	√	√	√	√	√	X	X	X	X	X	X	X	X	X	X	X	√	X	X	X	X	X	X	X	X	X	X	X	X
2. SNORKELEO	√	√	√	√	√	√	X	X	X	X	X	X	X	X	X	X	X	√	X	X	X	X	X	X	X	X	X	X	X	X
3. BUCEO (Contemplación de paisajes sumergidos)	√	√	√	X	X	X	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	X	√	√	√	√	√	√	X
4. KAYAKISMO	√	√	√	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5. SURFING	X	X	X	X	X	X	√	√	√	√	√	X	√	√	√	√	√	√	X	X	X	√	X	√	√	√	X	√	√	X
6. WIND SURFING	X	X	X	X	X	X	√	√	√	√	√	X	√	√	√	√	√	√	X	X	X	√	X	√	√	√	X	√	√	X
7. SKY	√	√	√	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8. SKY JET	√	√	√	√	√	√	√	√	√	√	X	√	X	X	√	√	√	√	√	X	√	X	√	√	X	X	√	X	X	X
<b>BAHÍA SANTIAGO</b>																														
PLAYAS ACTIVIDAD PROPUESTA	AUDIENCIA (E6)						SANTIAGO (E7)						MIRAMAR (E8)						MIRAMAR (E9)						MIRAMAR (E10)					
	M1	M2	M3	M4	M5	M6	M1	M2	M3	M4	M5	M6	M1	M2	M3	M4	M5	M6	M1	M2	M3	M4	M5	M6	M1	M2	M3	M4	M5	M6
1. NATACIÓN	√	√	√	√	X	X	X	√	√	√	√	X	X	X	√	√	√	√	X	X	√	X	X	X	√	√	√	√	√	√
2. SNORKELEO	√	√	√	√	X	X	X	√	√	√	√	X	X	X	√	√	√	√	X	X	√	X	X	X	√	√	√	√	√	√
3. BUCEO (Contemplación de paisajes sumergidos)	√	√	√	√	√	√	√	√	√	√	√	√	X	√	√	√	X	√	X	√	√	√	√	√	√	√	√	√	√	√
4. KAYAKISMO	√	√	√	X	X	X	X	X	X	√	√	X	X	X	X	X	√	X	X	X	X	X	X	X	√	√	√	√	√	√
5. SURFING	X	X	X	X	X	X	√	√	√	X	X	X	X	X	√	X	X	X	X	X	√	X	X	X	X	X	X	X	X	X
6. WIND SURFING	X	X	X	X	X	X	√	√	√	X	X	X	X	X	√	X	X	X	X	X	√	X	X	X	X	X	X	X	X	X
7. SKY	√	√	√	√	√	√	X	X	X	√	√	√	X	X	X	√	√	√	X	X	X	X	√	√	√	√	√	√	√	√
8. SKY JET	√	√	√	√	√	√	√	X	X	√	√	√	√	√	X	√	√	√	√	X	√	√	√	√	√	√	√	√	√	√

## Conclusion

Las playas Miramar y San Pedrito mostraron la mejor aptitud recreativa de todas las playas evaluadas. Las playas ubicadas en la bahía de Manzanillo son más aptas para actividades recreativas en la parte emergida y las situadas en la bahía de Santiago mostraron mejor aptitud acuático-recreativa. Es importante resaltar que ninguna playa es apta para recolección de conchas ni para practicar deportes como el voli ni fut-bol de playa por la amplitud de estas y la pendiente de otras. La vocación o aptitud recreativa de las playas de Manzanillo, Colima, México se vio fuertemente impactada principalmente por: a) Condiciones hidrometeorológicas, como mareas de tormenta y marejadas por mar de fondo; b) características físico-geomorfológicas como: tamaño de sedimento, pendiente, amplitud de la zona de rompiente y erosión de la playa y c) actividades antropogénicas como disposición indebida de residuos sólidos y descargas de aguas residuales en las playas, falta de limpieza, recolección y transporte de basura costera e insuficientes sanitarios. Factores que deben considerarse en los planes y programas de ordenamiento y gestión de playas.

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# THE BENEFITS OF SIGN LANGUAGE FOR DEAF CHILDREN WITH AND WITHOUT COCHLEAR IMPLANT(S)

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## Abstract

Prelingual deaf children do not have sufficient access to sound to be able to acquire a spoken language via the acoustic channel. The same is true of many deaf children who received one or two cochlear implants: Only a small segment of these children profit from the implant(s) in such a way that they can acquire spoken language naturally. For most children the implants are improving the access to sound but not sufficiently to be able to reach a normal language competence. In order to give these children the possibility to develop a functioning communication system and to guarantee normal development they need a language which is totally accessible to them - a sign language.

The consequences of language deprivation for the development of a child are known from developmental psychology. To avoid this, sign language from the very beginning offers a deaf child the possibility to communicate at any stage in life and guarantees thus a normal development. Using a sign language does not mean the exclusion of a spoken language and vice versa; the use of a sign language and the development of spoken/written language should happen in parallel. What is crucial is that each child should have the possibility to communicate according to its needs and thus has the chance of a normal development.

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**Keywords:** Deaf, Sign Language, Bilingual Education, Cochlear Implant

## Introduction

Prelingual deaf children cannot hear spoken languages well enough to learn them via the acoustic channel. For these children acoustic information is not accessible and therefore all acoustic data has to be presented in a visual form. As a consequence they need a special form of bilingual education, where a sign language provides the linguistic and cognitive base and a national written/spoken language is 'anchored' to the first system as a second language.

Regarding children with a Cochlear Implant (CI) it is a fact that a CI does not automatically enable all implanted children to pass through a natural spoken language acquisition process – regardless of whether the child has a uni- or bilateral CI. Compared to hearing children, implanted children show a relatively large range of hearing, articulating and language abilities. For these children sign language can be a kind of “insurance policy” in case that the spoken language abilities do not develop sufficiently.

Many experts advise parents not to use sign language with their deaf child (with or without CI) and give various arguments against its use. In this article the most common arguments are evaluated for their relevance and it will be shown that they can be invalidated.

## Sign language

For many deaf, hearing-impaired as well as hearing people, sign language (SL) is their preferred language or mother tongue. Sign languages are languages with their own

structure, grammar and rules. Nowadays they are recognised as first language of the deaf in many countries (see Krausneker 2006). Consequently, it is a language which can be used by people to communicate with each other, in the same way like e.g. German. For children with a CI it is often strongly recommended to use spoken language only and not spoken and sign language simultaneously. Nobody would deny a child who grows up in a bilingual (spoken) environment like German and English to speak e.g. the German language. Quite the opposite is true: As is known from the research in bilingualism, bilingual children profit from their bilingual environment in every respect. This positive attitude towards bilingualism (sign and spoken/written language) is often non-existent with respect to deaf children - with or without a CI.

### **Cochlear Implants**

Until recently a unilateral CI was seen as standard treatment for infants and children who have a prelingual high-degree hearing impairment or who are almost deaf. The linguistic abilities of these children vary a lot and do not meet the expectations: only a small number achieve the articulating abilities and the language understanding of their hearing peers and are able to pass through normal language acquisition; compare Szagun 2001; 2010; Nussbaum et al 2003; Szagun et al. 2006; Moret et al. 2007;

Since the language competence expectations of unilateral implanted children were not met, it was assumed that two implants might guarantee better results. The basic idea of this assumption is that normal hearing is binaural and hence two CIs should ensure better results (Berke 2010). In fact, better results can be observed, but only in the areas of sound localization and speech recognition in noisy environments, although compared to hearing peers these results are still poor. Regarding language acquisition and competence no striking improvement - also compared to unilateral implanted children - can be observed (Krammer 2013). Both bilateral implanted children and unilateral implanted children show a far greater variability in their speech tests results than normal hearing children. The reasons are still unknown (Forli et al. 2011; Wilson & Dorman 2008). In the literature many hypotheses can be found about which factors might influence the language acquisition positively or negatively (compare Spencer 2004; Szagun 2001). However these often contradictory hypotheses show that there are still many unanswered questions in this field.

These studies and also practical experiences from schools (Nussbaum et al. 2003) make clear that there can be no “standard treatment“ of Cochlear implanted children. Different offers are needed which have to be adapted to the individual needs of these children.

### **Pros and cons concerning some central statements referring to bilingualism**

#### **“Sign languages are natural languages”**

As Dotter (1991) shows the most common arguments against this statement are the following: Sign languages are not languages from a linguistic perspective, i.e. they are denied the “character of a system with distinctive elements”. Sign languages, it is argued, are missing important features of a language (e.g. arbitrariness, morphology) and they are not as effective and versatile as spoken languages.

Linguistic research proves that sign languages have linguistic status (Boyes Braem 1990; Dotter 1991): Sign languages are natural languages with complex structures and an independent grammar (Stokoe 1960; Emmorey 2002; Skant et al. 2002), as well as a sub-lexically (“phonologically”) significant sequential structure (Liddell & Johnson 1989). This means that, like spoken languages, sign languages have sub-lexical elements (phonology), morphology, semantics, syntax and pragmatics, and the lexicon consists of iconic and

arbitrary signs. Moreover, sign languages may be used to convey complex and abstract contents - just as spoken languages.

On the basis of these scientific arguments there are no doubts whatsoever that sign languages are independent, visually perceivable languages which are as effective as spoken languages.

**“Sign variants are no problem for learning a sign language”**

Sign languages have national and regional variants: This is, the reasoning goes, why sign languages are not suitable for communication. The regional variants will lead to problems of understanding (Ribitsch 2002).

Looking at spoken languages, it becomes obvious that there is no difference to sign languages regarding variation: there are various national spoken languages (e.g. English, German) and all of them have several regional variants (e.g. Scottish, Irish). From this perspective, the argument against using a sign language is no longer valid.

The following variants in a sign language are examples from the Austrian Sign Language: There are standardized signs (ÖGS – which corresponds to a national spoken language) and regionally differing sign variants. As in spoken languages these can be distinct lexemes (example 1) or articulatory variants (example 2)

**Example 1:** Distinct lexemes of the sign BAUER (“peasant, farmer”)



ÖGS Sign



Sign used in Carinthia



Sign used in Vorarlberg

**Example 2:** Differing “articulation” of the sign ABEND (“evening”)



ÖGS sign



Sign used in Vienna



Sign used in Vorarlberg

**“Sign language allows a normal development”**

Another argument is that if a sign language is used with a child, there is the danger of a retarded or not normal development. Since sign languages are considered not fully effective languages (cf. 2.1.) they cannot fulfil the manifold functions of spoken languages. For a normal development, the spoken language<sup>199</sup> is a decisive factor; it is essential for the cognitive, social and emotional development of a child.

Sign languages are visual languages, which – in contrast to spoken languages – are fully accessible by a deaf child<sup>200</sup>. If communication is exclusively performed in spoken language, a major part of the acoustic information cannot be perceived by the deaf child and consequently cannot be cognitively processed. Information which does not reach the child is information missing in his/the development. The first two years are crucial for the general development of a child: during this time communication/language plays an important role in the learning process. If this time frame, when the child is especially receptive to learning in general and to learn a language system in particular, is not used, various cognitive as well as language limitations will be the consequence (Dotter 1995). Thus, what happens if only a spoken language is used is exactly what should be prevented: the general development of the child is at risk.

**“Sign language does not have a negative effect on the spoken language development”**

It is often recommended to parents of a deaf child to communicate with it from the beginning only in spoken language. This recommendation is also given to parents whose child is a potential candidate for an implantation<sup>201</sup>. The use of a sign language, it is argued, hinders or prevents the normal development of the spoken language (see Nussbaum et al. 2003).

Upon closer examination it can be seen that also in this case the use of a sign language has the opposite effect, i.e. it promotes the acquisition of the spoken/written language for both children with and without CI. Since there is a functioning communicative system, the child can be supported through the use of the sign language in learning the spoken/written language; the learning process is facilitated that way.

Problems with the acquisition of the spoken language by CI-implanted children may have different reasons:

- The CI does not work sufficiently well  
The hearing impairment after the implantation is still too severe so that spoken language cannot be acquired naturally. In order to disguise this fact, often other factors are blamed like e.g. missing support by the parents, missing positive social environment, missing “talent for languages”<sup>202</sup> (Lenhardt 1997; Bertram 1997) or the sign language.
- Grammatical markers that are difficult to hear and words with secondary accent  
Szagun (2001) noticed delays in the acquisition of article markers (case and gender) in CI-implanted children in Germany. These delays are due to the limited hearing ability of the children despite the CI: other than the stressed grammatical markers on verbs in the form of suffixes, the article markers are not stressed and are grammatical markers which are difficult to perceive. This is the reason why they are often missed or not acoustically perceived by the

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<sup>199</sup> Until recently, the specialised literature on the cognitive, psychological, social and emotional development of a child has almost exclusively dealt with spoken language; a hearing impairment still is not regarded as an independent factor for the cognitive-linguistic ontogenesis (Dotter 2009). The premise is usually “language = spoken language”.

<sup>200</sup> Exception: deaf children with a severe visual impairment; here the sign language has to be transferred to the tactile channel.

<sup>201</sup> Information given in personal communication with parents of deaf children (with and without CI) to the author.

<sup>202</sup> Lenhardt does not (1997) define “talent for languages”?

children. Therefore a delayed acquisition of article and similar markers can be observed in CI-implanted children.

- Acquisition of two languages

Research of spoken language bilingualism has shown that certain phenomena occur if two languages are acquired simultaneously (Bhatia & Ritchie 2007). With spoken language bilingualism, code switching, code mixing and borrowing of words<sup>203</sup> are normal “side effects” in the process of acquisition (Bhatia & Ritchie 2007; Werker & Beyers-Heinlein 2008). The same phenomena occur in the simultaneous acquisition of a sign and a spoken language (Emmorey et al 2008). But, although these are normal cognitive processes when acquiring two languages simultaneously and not the “negative” influence of the sign language, sign language opponents attribute these “mistakes” to the use of sign language and therefore recommend not to use it.

### “Children want to learn sign language”

“It is not necessary to offer the sign language. It is a fact that no single CI-implanted child wants to learn the sign language.” (Baumgartner 2007)

How can a deaf child (with or without CI) decide whether or not it wants to learn sign language, if it is not even given the choice? A child, hearing or deaf, will learn the language(s) which is (are) offered to it. Children are anxious and able to learn and – as is known from the research in bilingualism – learn two languages simultaneously without any problems as long as certain rules are observed. As is also known from the research in spoken language bilingualism, bilingual children profit from their bilingualism in several respects (Kern 2006): they have a higher awareness of language and a higher communicative sensitivity; they do better in tests on spatial perception, in verbal and non-verbal IQ tests and in tests of mathematics than their monolingual peers. Finally, these children are more flexible and open in socio-cultural and behavioural respects. Similar positive effects can be observed with bilingual children of a sign and spoken language (Krausneker 2004).

### “The acquisition of a sign language in a bilingual context is possible”

An argument often put forward against the use of the sign language is the time which is needed by the parents to learn the language. Everybody who has already learned a second language knows that it takes at least two years until one has built up a relatively high language competence. The same holds for a sign language. For children with CI one has to take into consideration, however, that the implantation/rehabilitation of a child is also a considerable additional expenditure of time for the parents<sup>204</sup>. If one compares the year-long intensive care and support of CI-implanted children by their parents before, during and after the operation with the expenditure of time needed to learn a sign language, the acquisition of a sign language in a bilingual context is not more time-consuming, but has many advantages for the development and the future of the child (cf. arguments above and Krausneker 2004).

### Sign language as “insurance”

Especially for CI-children, sign language can be seen as an “insurance”. Not all CI-implanted children (uni- or bilateral) are able to communicate exclusively in spoken language

<sup>203</sup> Code switching is a change between the two languages. The discourse, sentence, phrase and word level may be affected. The reason for code mixing (the use of single language elements in the context of the other language; is considered a sub-category of code switching) is not that they have not fully mastered the two languages, but is due to system factors (Werker & Byers-Heinlein 2008). The borrowing of words is to be attributed to the fact that the bilingual speaker does not have the adequate vocabulary in the target language and thus refers to the vocabulary of L1 or L2 (see e.g. Werker & Byers-Heinlein 2008).

<sup>204</sup> The rehabilitation phase may take up to five years and beyond that the child needs additional support (cf. <http://www.hoer-sprachfoerderung.de/cic/Rehazeitraum.php>)

after their implantation. Many of them do not achieve a satisfying language competence and comprehensible articulation (Kurschatke 2001, 2001a; Szagun et al 2006; Krammer 2008; 2013). As a result, they do not have an adequate linguistic system. For CI-implanted children who have communicated in sign language from their infancy the situation is different: These children are able to adapt the linguistic mode to the situation. If the spoken language capabilities of the child are developing ideally, its use of sign language may decrease with the rising competence in spoken language. If the child is not able to communicate sufficiently in spoken language, it may fall back on an already functioning system, the sign language. Another important reason for learning a sign language is that early-implanted children later in their lives often decide to live as if they were deaf (Dillier & Spillmann 1997).

### **“Sign language does not isolate”**

Another argument against using sign language is the low acceptance of the language or the isolation of people linked with it. A sign language is used and understood by rather few people, i.e. sign language users move in a small, closed communication environment<sup>205</sup> and due to the CI, this group is continuously becoming smaller (Kral 2009). Integration “with the outside” is difficult and the sign language community finally remains isolated.

It is true that sign languages still do not have the same status in politics and in public as spoken languages do. In Austria there has been a slow but continuous progress in sign language recognition in the last years. However, with the current (socio-politic) conditions, a full integration of the deaf and their language into the “culture of hearing people” is difficult. In general it has nothing to do with the sign language itself, but rather with the prejudices of many hearing people towards deaf people and sign language. It is also true that the deaf are a (stigmatised) minority within the hearing majority and like all minorities they are exposed to certain isolation.

In case of the deaf, however, there are differences with regard to the degree of their isolation:

If they have only the spoken language for communication, there is the danger of almost total social isolation. Knowledge of the spoken language is not sufficient to be able to fully participate in the social life of the hearing world. On the other hand they are not included in the deaf community either, because they cannot sign/communicate with other sign language users. These deaf people find themselves in a rather unpleasant situation: Due to their insufficient communication abilities in spoken as well as sign language they are (more or less) excluded from both the hearing and the deaf community. This way they drift more and more towards social isolation which – in the long run – has far-reaching consequences for their mental, psychological and physical health.

In contrast, deaf people who have grown up with a sign language as their preferred language or mother tongue are integrated in the deaf community, where they have intensive social contacts. Naturally, the social contacts with the hearing majority will always be more limited than those with people who use sign language. But through the early acquisition of written language, using their spoken language articulation abilities if needed, the services of a relay centre<sup>206</sup> and/or the use of an interpreter, deaf people are not excluded from their hearing environment. For people who have little or no knowledge about deafness, this group of people may seem isolated. However, if one compares sign language users to people who have to make do with their low (spoken) language abilities, the former are far less isolated

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<sup>205</sup> Users of sign language are not a small, isolated group: In the German speaking countries (Austria, Germany, Switzerland) there are approximately 250.000 people using sign language (native signers and second language users). As with the spoken languages in these countries, there are national/regional sign language variants; still – as with the national variants of the German languages – communication across borders is possible.

<sup>206</sup> A telephone exchange for deaf, hearing- and speaking-impaired people (Hilzensauer et al. 2005).

then the latter, who are almost completely excluded from either community. Seen from this perspective, the term “social isolation” has to be put into perspective.

Again, the opposite from what has been said about using a sign language is true: It does not lead to isolation but rather prevents isolation by improved integration into the respective communities.

### **The basis: linguistic input in the first 24 months of life**

It is obvious from the arguments stated so far that linguistic input is important for the development of the child during the first 24 months of life. There are important milestones in terms of language development during the first year, which are the basis for the following (linguistic) development. This is true for spoken languages (Clark 2004; Gervain & Mehler 2009; Kral 2009) as well as for sign languages. Whether the linguistic input is spoken, signed or bilingual does not have any relevance to language processing and cognitive development; it is independent from the language mode (Campbell et al 2007; Szagun et al. 2006). Dotter (2009: 37) defines two criteria for a natural language acquisition of deaf children:

*If one abandons the ideology that “the language” has to be a spoken one, general factors for a natural language acquisition may be analysed and respective compensation strategies for deaf children may be developed:*

- *A language which can be acquired by the child has to be perceptible for it and possible to be produced by it without any problem.*
- *The time of exposition to this language should possibly be the same as the normal time of exposition available by hearing children in the acquisition of a spoken language.*

Therefore, it does not make sense to communicate with a prelingually deaf child only in spoken language. It is useful to offer these children a language as first language which is sensorially accessible to them, in this case sign language. In this way an early linguistic input is ensured and delay in the linguistic and overall development is prevented. The use of sign language does not mean that the spoken language should be avoided. On the contrary: The acquisition of the spoken language should run in parallel and according to the child's possibilities. What is important is that a language competence is built up in the language which is physiologically/sensorially most accessible to the child in order to avoid language deprivation and the negative consequences this implies for the child.

### **Conclusion**

The arguments against the use of a sign language in the bilingual context with prelingually severely hearing-impaired and deaf children who are scheduled to get a CI or already have one are untenable. Since a pre-operative prognosis about the linguistic success with a CI is not possible, these children need optimal linguistic assistance and support already before the implantation. It is not a contest between different methodological approaches. The goal should be to combine these methods for the benefit of the children. The relevance of using sign language and bilingual education for the general development of children has been proved in cognitive and linguistic research as well as in developmental psychology studies.

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## FEMINIST CRITICISM AS A WAY OF LEARNING THE CATEGORIES OF “PRIVATE” AND “PUBLIC” IN KAZAKHSTAN GENDER LITERATURE

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### Abstract

The article considers the problems of conducting women nature research. The author offers to study women social behavior by reading fiction by Kazakh women writers. The author of the paper supposes that by analyzing Kazakh authors' literature it is possible to find out problems that Kazakh women faced in the families, society, business, etc.

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**Keywords:** Feminist literature, gender literature, feminist criticism, categories of “private” and “public”

### Introduction

There is not a human in the world more complicated than a woman. No philosophy, psychology or any other science can provide a clear system that will explain a woman's behavior, thoughts and deeds. As for a woman with eastern mentality it is aggravated by the fact that eastern woman is a thing in itself.

Family, household activities, career growth, relationship at work have unwritten steppe tradition, the essence of which is very simple: a woman should remember about her second position and not try to get ahead of the man, i.e. be cleverer and more presentable. In spite of the fact that in most families the woman is an economic pulling power, this traditional mentality can hardly be influenced from outside and prevents the possibility to scientifically measure and evaluate this process. It happens because it is not possible to attract women audience to sociological methods of gender issues study and make them speak about the problems of their private life. Fully formed during the centuries women ethics does not allow to tell some stranger all their “inside”.

### Main Text

If you compare modern woman life with that of her progenitor hundred years ago, you would admit an excess load and complicated women existence conditions. If in the end of the XIX century patriarchal structure required a woman to keep up family traditions (to be a faithful wife, a hospitable housekeeper, a wise adviser) then in the beginning of the third millennium a woman assumes a role of supporter and family defender (becomes a businesswoman, extends career growth in a business). To tell the truth a woman has taken the responsibilities for the family life with its routine and endless list of obligations (and only obligations) towards the husband and plenty of his and her relatives, and sole responsibility for her children's lives, health and development. Along with this, there is a job with dimensionless working-day, boss's indifference towards woman's moral and psychological condition, and chief's infringement on privacy of young and attractive women. As we could see, *under such conditions the frontiers of private and public, important and minor,*

*traditional and foreign, related and hostile things undergo changes (occasionally disastrous) in woman's life.*

*Being involved in this process I cannot help emphasizing that a woman began transforming from obliged and distressed creation into an aggressive one. «Unhappy Zhamal» (it was the name of a Kazakh writer's novel of the XX century by M. Dulatov [1]) turned into „Zhamal punishing“. It can be seen by everybody but nobody speaks aloud about this global problem. It is hardly normal. The problem will be solved if it is seen.*

While my colleagues think about the ways of receiving objective results on gender problem condition in the Republic of Kazakhstan I would like to offer not to ignore simple reading of gender prose of Kazakhstan.

Everything that literati contemporaries write about can be scanned analytically and get reliable information. The results will be the same as while conducting sociological interview or specific audience questionnaire. Work with fiction texts allows to see both author's and different characters' point of view.

There is one more point proving the significance of such interdisciplinary research: literature is more candid and popular than sciences about society. Fiction texts do not require from their readers special scientific instruments, they are clear, vivid and picturesque. Thus, texts comments, interpretation and publicity is a popular collective analysis of social problems.

Aigul Kemelbayeva, Umit Tazhiken, Liliya Kalas, Zira Nuryzbayeva, Raushan Baiguzhayeva, Feruza Kenzina, Dina Abilova, Sharbanu Beisreenova, Vera Savelyeva, Aigerim Tazhi were the first who started discussing gender issues in Kazakhstan literature. Each of the women has come to the literature in their own way, has her own literary style and penmanship, and broaches the questions familiar only to her. These authors write in different languages, are of different age, nationalities and confessions. The common things are their residence (Kazakhstan) and, thereafter, historical experience of social development. It is surprising that all of them consider gender situation only from the point of view of problems. We would like to present an outline of feminist prose of some of them.

Aigul Kemelbayeva is a Kazakh language writer. She has been being printed since 1980-s. The first work that brought her great success was a lyrics fantasy story “Konyrkaz” [2]. Here the problem of private and public was raised in Kazakh gender prose for the first time. The author declares absolute exposure of a Kazakh woman in her private life. The story is very sad, as the thought of a human's fatality with his inside life for understanding sounds like a verdict. It was a great everyday confrontation with the society for a Kazakh lady that had a baby without a husband and brought up an extraordinary child (a swan girl). The mother had to protect her baby from the society. The baby is a symbol of the realized, public made inside life of a woman. Hidden for the time being girl's wings (everybody thought them to be a hump) will be seen by everybody. The rebellion of a swan girl who realized her above human essence and had left with swans is nothing more than a romantic refusal from humiliated obedience to general rules. This is the dream of her mother. It is true that her mother injured by the feeling of survival guilt in front of the society for her sin was left to live at the same place and in future she accepts those general rules. But her further life is deprived of joy, though externally she lives no worse than others: she got married and had another baby.

Another concept of “private and public in a woman's life” is developed by A. Kemelbayeva in the late story “Yereimen men Akynai”. Post war life of one family is depicted here. Akynai is a typical steppe woman, wise and balanced was able not to permit the village inhabitants to private life of her family. When her husband had contusion onsets she collected all the family around him creating protecting circle of love. Family drama, involuntarily displayed in public (Yereimen had contusion onsets outside the house) also

displays preserved by the woman Kazakh family traditions. Akynai and Yereimen private life remains hidden from everybody as it was required by the law of the worship of the privacy of every human life. Because it is not possible to utter and denote everything that there is in the life of the man of the universe. It is not a tragedy but the entity that should be perceived philosophically.

U. Tazhiken in her books of poetic miniatures “Sacralization of memory” and “Ascension to the Absolute” [4] has told frankly and analyzed for the first time the way of a Kazakhstan woman in business. She has made a decision after 10 years to reflect aloud how she lived, what she had to go through being a business women, what she had lost and put up with during those difficult 1990-s. She has raised the problem of the household and its influence on the woman's world in a very interesting material which is worth sociological analysis.

The metaphor of those skewgee 1990-s is an accurate, realistic and at the same time awful image symbol – commercial tent, „komok“ in a substandard language. Not only selling took place in it, as the customers must have thought (me, for example): the whole families lived here, emigrants from the region tried to observe the norms of human life and even hospitality traditions! Household scenes of life in a tent horrify by its uncovered naturalism and disarming truth: people were getting used to such life...

The narration is done on behalf of a woman, forced to run a complicated business: first she was a tent owner and then ran a cafe in the mountains of Almaty for the sake of her family. She had to survive in this economic abyss. She had to raise and provide education for her sons. She had to preserve a decent level of family well being. And it is possible to survive in such world only by changing your gender status. It is not by chance that the main character (on purpose or not, but U. Tazhiken did not name her author - the narrator) does not recollect about her profession in the past and what she was. Now she has to protect herself in front of „skinhead“ guards, local authorities people, text department representatives and representatives of sanitary epidemiologic department and other authorities. She had to protect herself without expecting any support on the part of her either husband or brother or son. On the contrary she goes between her son and husband and protects her husband from her son's attacks (more likely to say, his ambitions) when she has to deal with night customers in her tent.

The author revealed her heroine's attitude towards a big family transformed into a productive one (she hired all destitute relatives). But imposing of official duties on kinship relationship not only complicated main heroine's life but debarred her private life.

At home surrounded by her sons and her husband's presence she feels everlasting grief. She understands that she stopped to associate the completeness and well-being of her inside life with family wealth and now she has nothing else as to hide from all her relatives and herself behind various masks and tears and cry because she has become lonely forever.

None of habitual positive philosophical notions – Home, Family, Family tree – does not act in stories by U. Tazhiken. As neither Home nor Family exists. As too much is lost and need to be prepared. And private life is absolutely lost.

Another modern Kazakhstan writer Liliya Kalas, an editor of Kazakhstan journal “Knigolub” wrote a story “The Dark Canvas” which is focused on feminist criticism. This fiction dialogues actively with Russian women prose traditions. There is a life plot of the women who live without men's help in the brief text. It is notable that from all the men characters only semi wacky Asya's brother is able to act. All the rest men's existence is too illusive: A husband of one heroine (Lida) and lover of another (Asya) are illusive and unable to act. They do not exist in women world. These men simply avoid their women in the most critical and turning-point moments when they need their support (i.e. Lida is in the family way and has to be in a hospital for maintaining pregnancy). For these men private and stable

life with a woman is the most horrible thing. And they go over and work, on business trips, to another less exacting girlfriend.

The only constant male character in the story is Almaty City. Only He allows being considered from different points of view and admits: "Yes, I am of such kind". Absurd, ugly and beautiful, kind and aggressive, violator and slave, it is the associate of their private and moreover public life, it helps the heroine in difficult situations and remains with them. And its women having convinced in its non-ideality and even handicapped:

*"... No, these are not nine-storied houses are creeping sadly behind the minibus windows, coursed with stream of right-handies but marble, hip-chopped colossus legs are walking not knowing about the rest body life. The legs are walking shedding the light, walking cheerfully, mechanically..."*

And also having trusted the city with their misfortunes in private life (they have more successful public life) the women made sure in their elective affinity:

*"... The landscape seemed to be native already as this flat smell, as unfamiliar circumstances, as new worries, as old summer corns".*

As we could see not new but frank idea is revealed in heroine's relationship with the Man-City, based on capability of trusting and esteeming not ideal but personal space of each other. But this space... And space emptied... Though the story is finished by the woman's up-to-the-minute delight and inspiration who cares for a newborn. However something else is necessary for a frank joy...

Vera Saveleva from Almaty is a specialist in literature study, a pedagogue and a poet. In fiction by V. Saveleva private and public life spheres are separated. Her poems ignore public life. A house (even "poor"), a flat (even "cramp"), limited and very private space is the place where a lyric heroine can see poetically all the world and herself in a different way. Sub astral man cannot exist here. All "male" images in V. Saveleva's poems correspond to nature images however they also bear the idea of violence and uncalled invasion:

...ветер, осенний, сильный,  
наделенный мужским терпением,  
хмурый, резкий и шелестящий...  
Склочник, ветреник и насильник... [6, с.7],

twilight:

кривоногий, патлатый, безумный...

он моргает слепыми глазами,  
шарит длинной и мягкой рукой [6, с.17],

A soul is a real substance in V. Savelyeva's literary world. It exists as another woman hypostasis: it is sometimes silent and obedient, but mostly it is capricious and incomprehensible. And the poet fixed this imbalance between fantastically rich inner women's world and poor world existence...

A sorrowful experience of gender issues turned to be stronger than a literary bestowal of a modern Kazakhstan-Russian poet Y. Zeifert and the result is that the fairy tale for children "The mirror wizardry" became not nearly childish. The women revenge overset moral buttresses.

All best qualities belong to tale heroines, and men have unfaithfulness, absence of logics and intuition, induration touching upon abusive treatment, pride and outrecuidance. Five wizards in their magic activity stately waited for the Supreme white Sorceress's support, her opinion is never disputed. Y. Zeifert even deprived Karl who was expectant for absolute positive hero of men pro-active approach and efficiency. His father-wizard asked princess's hand instead of Karl. The tale end fixed homely situation: two the most brutal men are thrown through the looking glass (the wizard caught away the king through the looking glass!). Out of sight, out of mind!

The fairy tale finished with the scene of violence (if not the killing) and is hidden with pseudo-sentimental phrase: “the ex-Queen was sure to be sick for her husband but she is said to be sometimes through the looking glass with the help of Supreme white Sorceress”.

This gender tale can be read as the tale about “private” and “public” categories sorrowful metamorphosis in every dweller’s life in this not half fabulous kingdom. There was courageous and heroic Karl who overcame obstacles for the sake of love (private feeling) and on his return was humiliated by the king’s and his daughter’s public contempt.

What can he do? Rubbing through aloof his humiliation and ... crying

There was a Mirror Master Shpigelmeister who avoided the court and held his beautiful wife down (hid her in the forest!) for fear of spoiling private family life in public. And the thing he was afraid of had happened.

The queen spending her life with the King and having born two lovely daughters, is happy while parting with the King.

It is obvious that woman conscious revenged for all women’s downtrodden private interests in the tale genre for children.

The tale by Y. Zeifert is like her coevals’ fiction had a very characteristic role: as if self-playing reed pipe Zeifert revealed unacific gender issues in “the state of Denmark”.

### **Conclusion**

As we could see one need not be a sociologist and in-depth analyst to reveal a problem in one’s own life on the level of primary perception. Otherwise, I know it exactly, the plot of any analyzed fiction is copied from my coevals’ private (hidden very deeply!) lives. If we are more attentive to our gender literature we will be able to see and discuss more existing problems. For the sake of what? For the sake of the balance recovery in ourselves and our relationships with amicable gender.

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# CHALLENGES OF REMOTE SENSING IMAGE FUSION TO OPTIMIZE EARTH OBSERVATION DATA EXPLOITATION

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## Abstract

Remote sensing delivers multi-modal and -temporal data. Image fusion is a valuable tool to optimize multisensor image exploitation. It has developed into a usable image processing technique to extract information of higher quality and reliability. Due to the availability of many different sensors and operational image fusion techniques researchers have conducted a vast amount of successful experiments. However, the definition of an appropriate workflow prior to processing the imagery requires knowledge in all related fields, i.e. remote sensing, image fusion and the desired image exploitation processing. From the results it is visible that the choice of the appropriate technique as well as the fine tuning of the individual parameters of this technique is crucial. There is still a lack of strategic guidelines due to its complexity and variability. This paper reports on the findings of an initiative to streamline data selection, application requirements and the choice of a suitable image fusion technique. All this forms the first step into the development a Fusion Approach Selection Tool (FAST). The project aims at collecting successful image fusion cases that are relevant to other users and other areas of interest. From there standards will be developed that apply to these cases that are valuable contributions to further applications and developments. The availability of these standards will help to further develop image fusion techniques, make best use of existing multimodal images and provide new insights on the processes of the Earth.

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**Keywords:** Remote sensing, image fusion, multisensor image exploitation

## Introduction

Image fusion has come a long way from experimental processing trials to an operational image exploitation technique. By definition image fusion combines different images from single or multiple sensors at pixel level to produce enhanced images for image visual and computer-based image interpretation (Pohl and Genderen 1998). Image fusion can produce information that is not available in the single data alone.

Remote sensing image fusion is a widely used methodology to make the most of multisensor remote sensing data. It is meant to combine different satellite images on a pixel by pixel basis to produce fused images of higher value. The value adding is meant in terms of information extraction capability, reliability and increased accuracy. Successful image fusion produces data that results in other, better or additional information that cannot be extracted from each single image alone. Starting off as experimental method image fusion has found its way into commercial software packages and many remote sensing applications (Beiranvand and Hashim 2013, Dahiya et al. 2013, Xin et al. 2013). Based on the fact that different applications require different information derived from remote sensing imagery the user is left with a large choice of processing possibilities. The selection of an appropriate image fusion technique has a great influence on the resulting fused product, which again limits its applicability. The outcome of this study contributes to the establishment of processing

strategies in image fusion to help other users and researchers to use image fusion appropriately and further develop this established research field.

With the continuous availability of multisensory images fusion has become commonly used image enhancement approach. In particular the combination of multispectral with panchromatic data, the so-called pansharpening is an accepted tool in the remote sensing community (Alparone et al. 2007, Choi et al. 2013, Ehlers et al. 2010). Even though it is widely used by image providers, software vendors and remote sensing data users there is little knowledge on which technique with which parameters delivers optimized results for a certain application. There is a lack of standardization and users have to develop their own processing strategy for each individual case again and again. Pansharpening forms only one example. Looking at the diverse nature of the different images available today (multispectral, panchromatic, hyperspectral, airborne, spaceborne, optical, microwave, etc.), the increase in spatial resolution (Witharana et al. 2013) and the possibility to access multipolarization SAR images, there are many more options to make use of multimodal imagery (Khaleghi et al. 2013, Zhang 2010). The final outcome of the project aims at providing results from existing, successful image fusion cases in a compilation of case studies that are valuable for future applications of image fusion. The compilation will help to standardize processing flows as well as provide a uniform terminology to the user community.

A major constraint of remote sensing for applications in tropical regions is the almost permanent cloud cover. It is very difficult to obtain up-to-date information from remote sensing satellites operating in the optical part of the electromagnetic spectrum. One option that is being studied since active microwave sensors have become operational is the use of synthetic aperture radar (SAR) images which are independent from daylight and weather conditions. However, the information content of these data is complementary rather than substituting the information from optical remote sensing (Su et al. 2013). Still, optical remote sensing plays an important role here.

The intention of the experiment presented in this paper is to exploit available, cloud-free images to a maximum to obtain the most accurate and reliable information. This paper illustrates with the help of this example the challenges that a remote sensing image fusion user faces and underlines the need of standardized processes in terms of image fusion and quality assessment. The remaining paper starts with a description of the data and study area, followed by a definition of image fusion and fusion techniques. Thereafter the results of the experiment are reported in detail, divided into fusion and classification results. The paper finishes with concluding remarks and an outlook for ongoing and future activities.

### **Materials and methods used**

In Malaysia an effort has been taken to launch a satellite with different orbit characteristics compared to the commonly used sun-synchronous polar orbits. The Malaysian RazakSAT is a Near-Equatorial Low Earth Orbit (NEqO) with a low inclination angle of 9°. This orbit allows 14 overpasses per day over the equatorial region which is one of the criteria to increase the possibility of obtaining images with low cloud coverage. The RazakSAT satellite that operated for about a year after its launch in 2009 contributed high resolution optical images acquired by a pushbroom camera with five linear detectors (one panchromatic, four multispectral) to the EO community (Hashim et al. 2013). RazakSAT was launched as a research and development project. In the meantime, the Malaysian space agency ANGKASA in collaboration with Astronautic Technology (M) Sdn Bhd (ATSB) is preparing the next mission, RazakSAT-2 planned for launch in 2015. In order to enhance the range and quality of applications for RazakSAT-2 the study exploited different image fusion techniques and processed the data further to extract thematic information using multispectral image

classification. The results form an excellent example to outline the challenges and benefits of image fusion to provide high quality thematic maps.

**Table 1. RazakSAT MAC details**

RazakSAT MAC	Band	Spectral Range [nm]	Spatial Resolution [m]
Panchromatic	PAN	510-730	2.5
Multispectral	blue	450-520	5
	green	520-600	5
	red	630-690	5
	NIR	760-890	5

For this paper an example of a multispectral and panchromatic image obtained from RazakSAT has been selected to demonstrate the potential as well as the problems that arise when working with remote sensing image fusion. The selected image covers an area on the west coast of Peninsular Malaysia, north of the heritage city Melaka. The medium-sized aperture camera (MAC) of RazakSAT contains four bands multispectral of 5 m spatial resolution and one band panchromatic of 2.5 m spatial resolution as described in table 1. The data is disseminated in 20 x 20 km scenes taken from the original 20 x 500 km swath.

**Figure 1. Multispectral and panchromatic image subset used in this study**

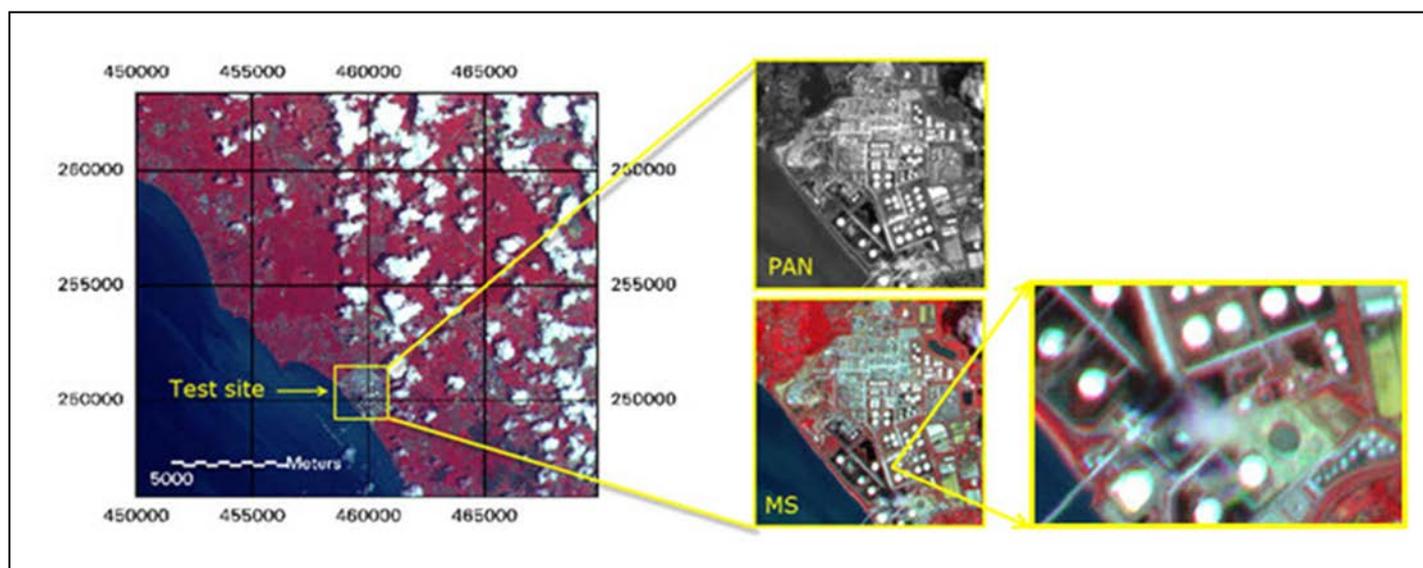


Figure 1 illustrates the location of the RazakSAT scene and the area of the subset taken to produce the fused images and finally the thematic maps. The selected test site for this experiment contains very complex structures of a petroleum storage facility. At the same time the site includes scrub, water bodies, the coastline and parts of the ocean. Due to the complexity of the site the results of these experiments are expected to show abilities and limitations of the various approaches. In addition it is very likely that the approach delivering the best results works for other less complex areas as well.

Prior to image fusion remote sensing images have to be pre-processed to eliminate sensor errors, atmospheric effects and geometric distortions. The image bands that finally enter the fusion process are radiometrically and geometrically corrected and geocoded, meaning that the image pixels in the different bands refer to the same location on the ground. The presented data does not introduce multisensor criteria or problems of multitemporal acquisitions where not only different sensor characteristics influence the images but also the different atmospheric conditions between the two acquisition dates. Regarding the changes on

the ground between different dates image fusion can be a useful tool to perform change detection analysis (Zeng et al. 2010).

The issues discussed in this paper exclude influencing factors from the use of multisensor and multitemporal data. Even in this simple single sensor and single date image fusion case the factors that influence the final result are manifold as will be shown from the results.

Image fusion is an established research field that has led to many successful implementations in remote sensing applications. It finds its place amongst the different levels at which fusion of data is possible. The terms commonly used in the remote sensing community vary. Two accepted terminologies are given in table 2. This paper tackles pixel or iconic level fusion issues.

**Table 2. Terms commonly used in remote sensing data fusion**

<b>Fusion</b>	<b>Pohl &amp; Genderen 1998</b>	<b>Ehlers et al. 2010</b>
Level	Pixel	Iconic
	Feature	Symbolic
	Decision	Knowledge

In the past 15 years many techniques have evolved to fuse remote sensing images on a pixel level. There is a trend to adaptations of established approaches to account for sensor particularities, local context and image characteristics that are relevant to the information that the user anticipates to extract. In addition the tremendous increase in available image bands and spatial resolution of the imagery demanded a progress in fusion techniques. From the traditional Intensity – Hue – Saturation (IHS) transform that was able to handle three bands, other techniques matured, such as the generalized IHS or Ehlers fusion, the latter using the Fast Fourier Transform (FFT) to extract and enhance the spatial content of the high resolution image to be inducted to the lower resolution image(s). Some of the developments have found their way into commercial software (e.g. Ehlers Fusion - EF, Gram-Schmidt method - GS, University of New Brunswick fusion – UNB); others are used by image vendors or form a product by themselves (e.g. Fuze Go<sup>TM</sup>, hereafter called Fuzego) (Alparone et al. 2007, Fuze Go 2013, Huang et al. 2013, Karathanassi et al. 2007, Zhang 2010).

The presented example uses optical remote sensing images in five bands (four multispectral and one panchromatic). Therefore the selection of fusion techniques that make sense reduce to pansharpening algorithms. This would be a first step in the definition of a processing flow and a standardization process. The performance evaluation is carried out using two different multispectral image classification algorithms, i.e. the Maximum Likelihood Classifier (MLC) and the Support Vector Machine (SVM). The reason for selecting these two classifiers lies in the fact that the MLC is a widely applied and known classifier, simple and with low computational effort. SVM in contrary is much more complex and computationally intensive. However, it achieves much better results even if only a few training samples are used. So this makes these two classifiers very suitable for this experiment.

For the production of thematic maps using multispectral classification the input images should contain the original spectral response of the land use / land cover. The performance of a spectral classifier improves with the separability of the different classes based on the different radiometric information contained in the different bands of the sensor acquisition. Therefore it is crucial to preserve the spectral information inherent in the image if the further information extraction relies on image classification. As a consequence the selection of suitable fusion techniques should give preference to methods that are proven

to maintain spectral integrity while at the same time improving spatial detail. Both aspects describe a high quality pansharpening approach.

Other researchers in this field have conducted a lot of case studies to evaluate the performance of different pansharpening algorithms. Table 3 compiles a list of techniques commonly used. From top to bottom the listed techniques evolve from traditional, generic techniques to more sophisticated hybrid, adaptive and context based methods that naturally lead to better results.

For this publication two fusion techniques for pansharpening have been selected to conduct the experiment. These two techniques, namely Ehlers fusion and FuzeGo, show promising results in the literature and from own experiments. They are both following the trend of adaptive and context based approaches that deliver higher quality fused images. Traditional methods had to be developed further with the upcoming new satellite generation providing data at much higher spatial and spectral resolutions, e.g. IKONOS, QuickBird, RapidEye, and others.

**Table 3. List of popular pansharpening algorithms** (adapted from Zhang 2008)

Pansharpening Algorithm	Abbreviation	Description
Intensity Hue Saturation	IHS	RGB to IHS, replacement of I by high res. image, reverse IHS
Principal Component Substitution	PCA	PCA, replacement of PC1 by high res. image, reverse PCA
Brovey Transform	BT	Multiplication of multispectral (MS) bands with high res. image, division by sum of MS bands
High Pass Filtering	HPF	HPF on high res. image, adding achieved spatial information to MS bands
Wavelet based methods	MRA	Wavelet transform to decompose high res. image into low res. image with high res. features, replacement of low res. image by bands of low res. MS bands, reverse wavelet transform
University of New Brunswick	UNB	Least square technique plus statistic approach to create relationship between high res. and low res. bands to fuse
Ehlers	Ehlers	IHS fusion, spatial information extracted in feature space using Fast Fourier Transform
Fuze Go <sup>TM</sup>	Fuze Go <sup>TM</sup>	Commercial UNB algorithm

Ehlers fusion is based on a very common image fusion method called Intensity – Hue – Saturation (IHS) transform. Traditionally this method converted three input bands from the Red – Green – Blue (RGB) color space to IHS. In IHS space the Intensity (I) is replaced by the high resolution panchromatic channel. The reverse IHS transform produces the fused image. Ehlers discovered that the traditional use of IHS is not suitable for many applications, in particular if spectral content preservation is required. His research team advanced this method by transferring the panchromatic image (P) and the intensity component of the multispectral input data into the frequency domain using a Fast Fourier Transform (FFT). From the power spectrum of both images an appropriate low pass filter for I and a high pass filter for the high resolution P are designed (Ehlers 2004). The filtering takes place in the frequency domain to extract the spatial detail that is then to be introduced into the low resolution data by replacing I through the sum of the low pass filtered  $I_{LP}$  and the high pass filtered  $P_{HP}$ . A reverse IHS produces the fused image in RGB space. Within the processing flow bands that are being replaced are adjusted in terms of histogram matching to optimize the result.

FuzeGo is a commercialized pansharpening approach that has evolved from an algorithm developed by the University of New Brunswick called UNB (FuzeGo<sup>TM</sup> 2013). The research group of Zhang realized that new sensors appeared to require new adaptations

of existing methods due to the fact that the wavelength of the panchromatic channels extended from the visible to the near infrared range (Zhang 2004). Therefore they developed a new approach that uses statistics to avoid color distortion and the operator and data set dependency, the latter being one of the major issues of the research project of which this experiment forms one example. Fuzego uses the least square technique to find the best fit between the bands being fused and to adjust the weighting of each individual band contribution. It applies a statistic approach to create a grey value relationship of all input bands to avoid redundancy and automate the fusion process.

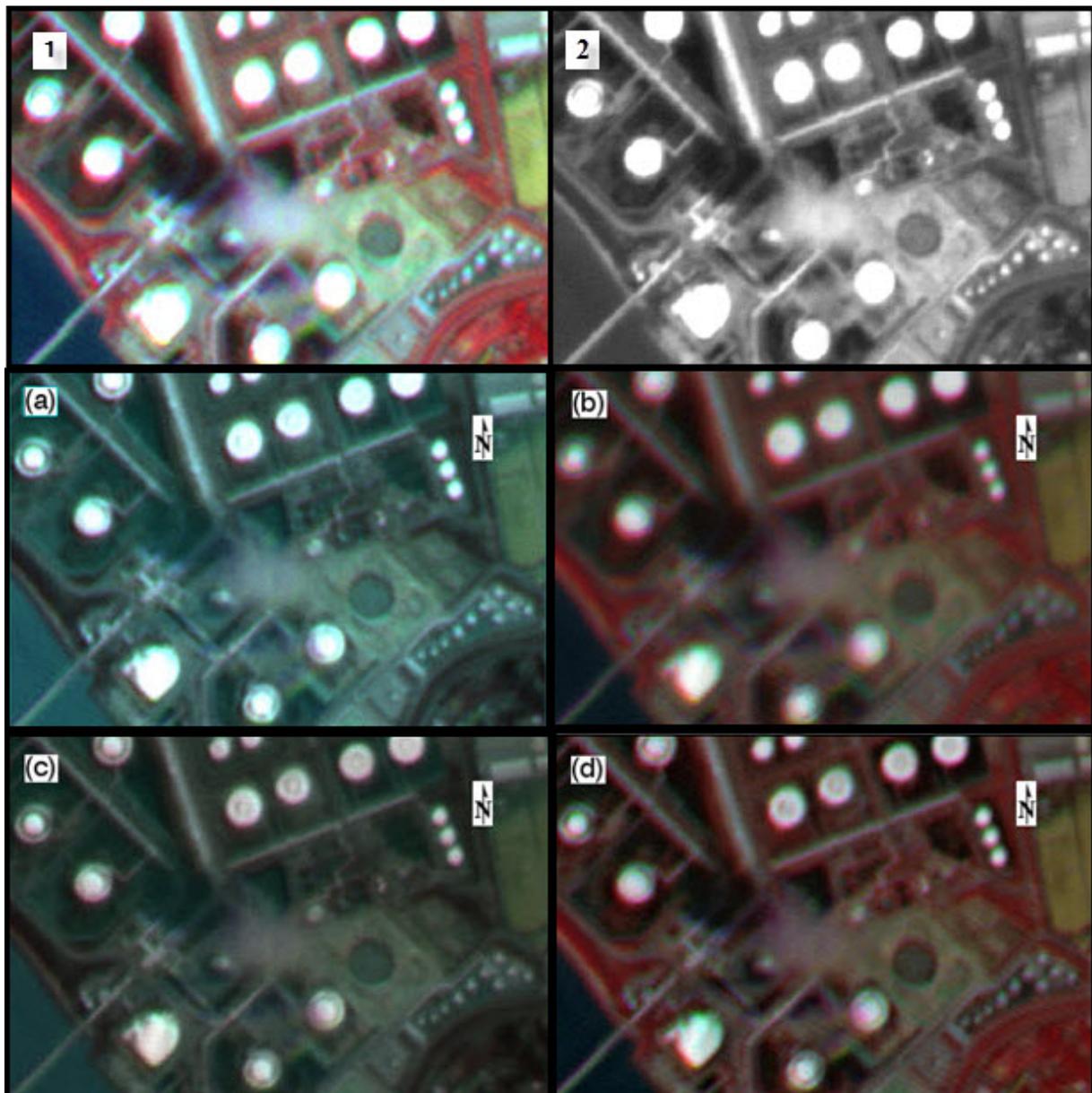
Obviously there would be many other suitable candidate techniques. However, for the purpose of this study the use of two advanced and up-to-date techniques is sufficient. It should be mentioned that each fusion technique inherits the possibility of fine-tuning its parameters which again multiplies the number of options to produce fused images.

### **Achievements and discussion of results**

The first outcome of the experiments conducted using the above described image fusion techniques is a series of fused images. They contain contributions of the lower spatial resolution multispectral data and the high spatial resolution panchromatic channel. This can be observed in a comparison of the original data with the fused images (see figure 2).

The visual inspection suggests that the Fuzego algorithm disturbs the color content while achieving a very high spatial detail. The Ehlers method on the other hand stays closer to the original spectral information with a little less spatial crispness than the Fuzego method.

Results can only be discussed if the processing allows an objective and comprehensible evaluation. In this respect a visual inspection of the images obtained (be it the fused data or the classified map) can show a potential. The verification of the results requires quality parameters. In the literature many different so-called quality indices for imagery can be found. Also, in the frame of pansharpening many solutions have been suggested. A discussion of the usefulness of the different indices is not subject of this paper. A few researchers have followed the path of investigating the usefulness of a result to a certain application which should be considered a priority in remote sensing image processing. Therefore, it was decided to take the fused images and continue the processing flow using the two different classification algorithms based on the same training samples and control points. The 200 control points to produce an accuracy measure were randomly selected over the entire thematic map.



**Figure 2. Comparison of original images - (1) multispectral and (2) panchromatic bands with fusion results: (a) Fuzegeo without emphasis on spatial content (b) Ehlers fusion focusing on spectral content preservation (c) Fuzegeo with spatial enhancement (d)**

### **Ehlers fusion with emphasis on spatial content**

The second stage of results contains the classification results of the different fused images and the results of classifying the original data. Since two different classifiers (MLC and SVM) have been tested the same data set becomes available for both of the classifiers. From the classification process itself, considering the separability of classes in this data set, eight elements were identified: Reservoir, petroleum storage/pipeline, building, pavement, bare soil, water, scrub and road.

The results of the two different classifiers applied to the Fuzegeo fused images are depicted in figure 3. The statistical evaluation of the classification performance is summarized in table 4.

Obviously, inherent cloud cover in the processed subset of the test site image causes artifacts (lower part of the classification results). The clouds lead to artifacts that influence the different classifiers with a different. An example is the clear picture of the petroleum

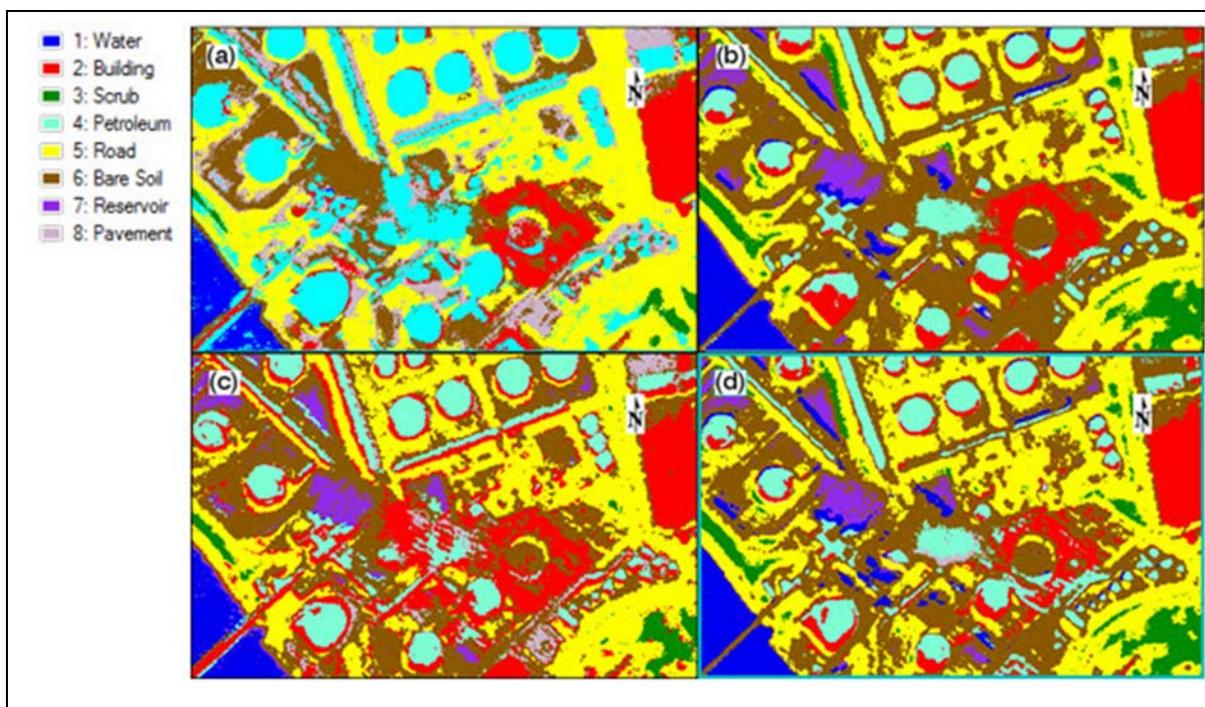
storage infrastructure (tanks and pipelines) in the MLC image while the SVM classifier provides much too much detail with wrongly classified pixels (petroleum partly classified as building). This is also partly related to the image quality of this particular RazakSAT data set. The original data shows striping effects that are enhanced using image fusion and sophisticated classifier algorithms. The pier leading into the ocean was identified best by the SVM classifier in the spatially enhanced Fuzego image. Logically, different data and applications require different algorithms.

**Table 3. Comparison of MLC and SVM classification results of fused images**

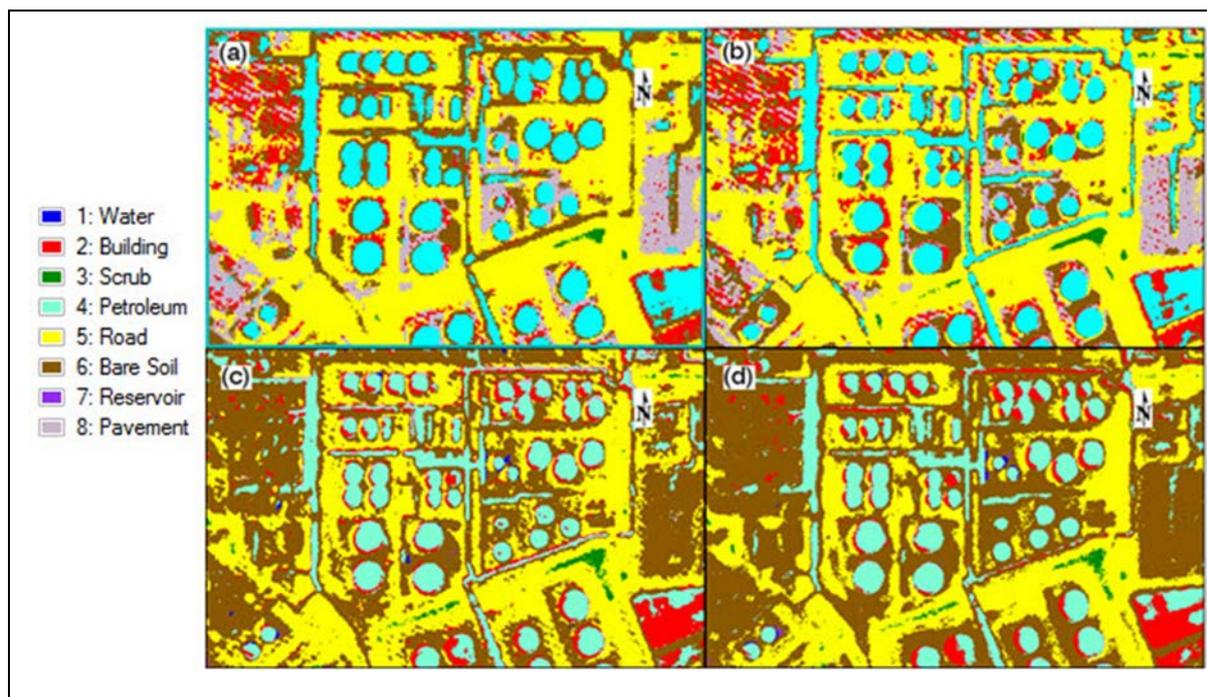
Image classified	Overall accuracy MLC [%]	Overall accuracy SVM [%]
Original	84.51	89.37
Fuzego spectral	<b>92.59</b>	94.57
Fuzego spatial	38.98	<b>94.58</b>
Ehlers spectral	56.12	86.70
Ehlers spatial	65.14	89.70

The statistical evaluation summarized in table 4 provides more insight in the classification results. Apparently Fuzego beats the Ehlers method in terms of overall classification accuracy, i.e. MLC 92.59% vs. 65.14% and SVM 94.58% vs. 89.70%, respectively for the best results achieved by each fusion technique.

If another area of the image is chosen and the focus of the application is oriented towards petroleum storage facility mapping the images show different results (see figure 4). There is no 'negative' influence of clouds and as for the petroleum storage facilities the classification algorithms perform well. The best "visual performance" is the use of Ehlers fusion, tuning its parameters to extra spatial enhancement rather than preserving spectral qualities.



**Figure 3. Fuzego classified fused images using MLC and SVM classifiers: (a) Fuzego spectral MLC, (b) Fuzego spatial MLC, (c) Fuzego spectral SVM and (d) Fuzego spatial SVM**



**Figure 4. Comparison of Fuzego and Ehlers fusion for Petroleum facility mapping using the SVM classifier: (a) Ehlers spectral, (b) Ehlers spatial, (c) Fuzego spectral and (d) Fuzego spatial**

This contradicts the result of the overall accuracy statement discussed previously. This implies that an image fusion technique per se is not generally good or bad. A precise application framework has to be known prior to performing any processing on the images. An awareness of key parameters for the application is essential.

## Conclusion

The results of the experiment show that RazakSAT imagery has the potential for map updating applications. Using appropriate image fusion techniques and adequate fine tuning of the individual techniques an enhancement of features can improve the results obtained from the imagery. The cloud cover problem in tropical areas will not be solved but available imagery with little cloud cover can be used to an optimum following this approach.

The lessons learned from this experiment prove that there are many quality influencing parameters that the user of remote sensing image fusion has to be aware of. A professional application of these technologies requires expertise in the sensor characteristics and performance, appropriate pre-processing, image fusion and proper knowledge of the application, in particular with respect to using remote sensing. Only then the resulting data makes sense and can be used by others, i.e. introduced in a geographical information system (GIS) to model the Earth surface. In conclusion there is no such thing as an absolute statement for the performance of a certain fusion technique.

Remote sensing provides a vast amount of Earth observation images that needs to be processed and value-added in order to be useful for the end user (government, industry, university, citizen, etc.). Remote sensing image processing software has integrated in the past decade new tools for multisensor image fusion. In the meantime the user has access to more than 20 commercialized image fusion techniques plus the option to tune the parameters of each individual technique to match the anticipated application. This leaves the operator with an uncountable number of options to combine the remote sensing images, not talking about the selection of the appropriate images, resolution and bands. Image processing and in particular multisensor image fusion is a machine and time consuming endeavor.

Future activities will add further selection criteria to provide an image fusion framework to be discussed internationally. There are two steps for the implementation: 1. Compilation of image fusion atlas to provide guidelines for useful image fusion applications and approaches and 2. Development of a Fusion Approach Selection Tool (FAST) containing a decision feature plus the option to preview fusion results based on different applications. It will be designed to provide the user with a FAST overview of processing flows to choose from to reach the target. The concept of FAST uses the available images, asks for application parameters and desired information and processes this input in order to come out with workflow to quickly obtain the best results. It will optimize data and image fusion techniques and provide an overview on the possible results from which the user can choose the best one by visual inspection. FAST will enable even inexperienced users to use advanced processing methods to obtain better results. The development of FAST is an ongoing research project.

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# **EXPLORING THE POTENTIAL OF ONLINE GROUP COUNSELING : A CASE-STUDY FOR MAURITIAN STUDENTS PRESENTING THE INTERNET ADDICTION DISORDER SYNDROME**

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## **Abstract**

Investigating the prevalence of Internet addiction disorder among Mauritian students at tertiary level seems to be appropriate, especially at a time when Internet access cost is becoming cheaper and number of user is, consequently, growing. This research, structured with an initial preliminary investigation about online behaviors of tertiary students and the psychological features associated with Internet addiction, explores the design and implementation of online counseling. A random sample of more than eighty participants completed a web-based questionnaire, which was used to assess the usage, influence and depth of penetration of Internet in students' life at the University of Mauritius. Backup with a critical literature review, this research study used a methodological framework to setup online counseling session for treating Internet Addiction disorder (IAD). The design and implementation process was developed and analyzed after a group of nine counselees completed online group counseling sessions for IAD, by extensive use of discussion forum for communication purpose. The three months long program ended with a feedback questionnaire, where participants responded to a series of open and closed-ended type questions pertaining to whether they found the counseling sessions to be helpful, useful and meaningful. Moreover, the best features of the online platform and areas which needs improvement were also queried. From a compilation of advantages of using a virtual environment, benefits of online counseling were deduced and the whole implementation process was presented as a model which can be used to screen counselee for online counseling program to handle IAD and provide remedial solutions via a computer-mediated platform, if needed.

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**Keywords:** Internet Addiction Disorder (IAD), online counseling, computer-mediated communication, University students.

## **Introduction**

Mauritius, despite being a developing country and island, is not spared from the invasion of Internet. In most, if not all, tertiary institution of the island, on-campus computer with internet connection is provided to students. Students go online for various reasons, not only for academic purposes. Apart from on-campus computers, students also access the internet from other public places and for many at home, as well.

Nowadays, news headlines are updated by the minute, not just daily. A user can easily connect with literally hundreds of people on social networking sites like Facebook, or Twitter. Email, online chat and message boards allow for both public and anonymous

communication about almost any topic imaginable, down to the smallest detail. Most of us enjoy the benefits of the Internet, some find it is an indispensable tool for work as well.

The growth of the Internet has been accompanied by a growing concern that excessive use is related to the development of a disorder which is commonly known as "Internet addiction," and more scientifically as "pathological Internet use" or "Internet Addiction Disorder, (IAD)". In South-East Asia in particular it has become a serious concern. In a March 5, 2010 article entitled "Girl Starved to Death While Parents Raised Virtual Child in Online Game," The Guardian reported that a Korean couple left their baby to starve while immersed in an online role-playing game for up to 12 hours at a time. With the soaring number of Internet users world-wide, and by extension in the local context, the problem of Internet addiction should attract the attention of policy makers, educators, administrators, psychiatrists/counselors and the public in general. The Internet has helped us communicate, learn, work and even entertain ourselves in way never thought a few decades ago. We can use this medium, which is become more popular, to help those who find help in finding a balance in life. Technically speaking, online counseling refers to the *provision of professional mental health counseling services* concerns via the Internet (Wikipedia). Till date (as at August, 2012), there is absolutely no record of study, done in Mauritius and on people living in the country, about online behavior relative to the phenomenon of Internet Addiction Disorder. This investigation can help to give an insight of online activities of the students at post-secondary level, Univeristy of Mauritius' students and consequently deduce whether there is a tendency or prevalence to IAD. This research investigated into the design issues and consequently proposed an internet-based framework for implementing online counseling. The literature review will help in setting the theoretical foundation, and prior research findings, used to treat Internet addiction and understand how online counseling work. Finally, the evidence-based recommendation will expose key issues for a successful implementation of a computer-mediated platform for online counseling.

### **The Internet Addiction Disorder Syndrome**

To be able to diagnose a person for Internet Addiction Disorder, certain criteria, as prescribed by the American Psychiatric Association ([www.apa.org](http://www.apa.org)), should be met. And also three or more of these criteria must be present at any time during a twelve month period. Young (1996) developed a brief eight-item questionnaire which modified criteria for pathological gambling to provide a screening instrument for addictive Internet use.

Internet Addiction is a broad term covering a wide-variety of online behaviors. In a survey based on 13 Qualitative results, Young et al. (2000) suggest that five specific sub-types of Internet addiction could be categorized:

- Cybersexual Addiction - compulsive use of adult web sites for cybersex and cyberporn.
- Cyber-relationship Addiction – over-involvement in online relationships.
- Net Compulsions - obsessive online gambling, shopping, or online trading.
- Information Overload - compulsive web surfing or database searches.
- Computer Addiction - obsessive computer game playing (e.g., Doom, Myst, or Solitaire).

In the same Qualitative analysis, Young et al. (2000) indicated that a leading factor underlying pathological or compulsive use of the Internet was the anonymity of electronic transactions. Specifically, anonymity was associated with four general areas of dysfunction:

1. Encouraged deviant, deceptive, and even criminal acts such as viewing and downloading obscene images (e.g., pedophilia, urination, or bondage fantasies) or illegal images (e.g., child pornography) widely available on adult web sites. It should be noted that the evidence indicates that clients who entertained deviant sexual fantasies involving children

and adolescents did not attempt to contact children or adolescents beyond the Internet. Observations noted suggested that the existence of deviant behaviours and fantasies did not necessarily equate to sexual molestation of children or vulnerable ones. Generally, the behavior began out of curiosity and developed to an obsession.

2. Shielding shy or self-conscious individuals, with a virtual context, to allow interaction in a socially safe and secure environment, over-dependence upon on-line relationships resulted. Accompanied with significant problems with real life interpersonal and occupational functioning, in such cases, CBT and interpersonal psychotherapy techniques were applied in to reduce avoidant behavior and to enhance social skills.

3. Moreover, Interactive components of online communication facilitated cyber-affairs/Extramarital relationships to develop on-line, impacting negatively on marital or family stability, primarily leading to separation and divorce. Individual, marital therapy and family therapy was used when couples' worked towards reconciliation after the online infidelity.

4. With ease to develop alternative online personas, dependent upon a user's mood or desires, Young et al. (2000), suggests that the virtual environment can provide a subjective escape from emotional difficulties (e.g., stress, depression, anxiety) or problematic situations or personal hardships (e.g., job burnout, academic troubles, sudden unemployment, marital discord). This immediate psychological escape found within the on-line environment served as a primary reinforcement for the compulsive behavior and development of a fantasy virtual world. Underlying mood disorders and psychosocial issues can be treated with psychotherapy and pharmacological interventions as appropriate.

Egger (1996) posted a questionnaire to the Web designed to determine Internet behavior and addiction. Most of the replies came from Switzerland, 450 valid responses were received, and a throughout statistical analysis of this data was available for review. Egger did not advertise for Internet Addicts to take his survey, but instead asked all respondents to self-identify as addicted or dependent. There were 10.6% of the respondents who endorsed this item as being addicted/dependent. Thompson (1996) posted a survey called the "McSurvey", composed of questions designed to determine the kinds of disruptions experienced by people that self-identified as Internet Addicts. From the respondents, of those, 72% reported an addiction or dependency to the Internet, and 33% stated their Internet use had negative effect on their lives. In testing to see if a perceived deficit in real life personal relations was correlated to the reporting of Internet Addiction, Thompson reports mixed results.

A review of the Internet addiction research published in 2009 (Byun et al., 2009) demonstrated significant, multiple flaws in most studies in this area. Young (1996) points out that one area that clearly has not been addressed at the level it deserves is the use of, and addiction to, on-line pornography and interpersonal cybersex. Anything that can safely, quickly, and completely satisfy such a basic human desire is bound to be addictive to some. King (1996) stipulates that technological advancements in communication tools have opened a new domain in social interactivity. King (1996) states that IAD "*is not like other forms of behavioral addiction because it involves interaction with others in the context of this new, scarcely researched medium*". This is a categorically different form of human interaction, one that is too recent and still changing too fast, for its implications to be fully cognizant to even the oldest members of online virtual communities.

### **Online Counseling**

Online therapy is nothing new in the field of experimental research. Eliza was launched in 1966 and developed by Weizenbaum to study 'natural language 'communication between a computer and a human, based on Rogerian therapy (<http://en.wikipedia.org/wiki/ELIZA>).

Eliza was not developed to be utilized in the role of a counselor. However she was readily available to anyone who wanted to have dialogue with her. Eliza convinced clients to voice out, believing that a person, and not software, was responding to them. Dr Eliza is still available online at <http://www.pandi.20m.com/games/elizav2.html>.

"Fee-based mental health services offered to the public began to appear on the Internet in mid-1995" Martha (1995). Most were of the "mental health advice" type, offering to answer one question for a small fee. The earliest was Leonard Holmes, who offered "Shareware Psychological Consultation" (<http://www.leonardholmes.com>) answering questions on a "pay if it helps" basis. Holmes reports that as soon as he set up a website advertising his practice, he began to receive e-mail from people asking for help; it was apparent that people were ready to reach out to psychotherapists via the Internet. "Help Net" and "Shrink Link" were two other fee-based mental health advice websites available in the fall of 1995 (neither is still online).

According to Martha (1995), David Sommers can be considered the primary pioneer of "e-therapy." He was the first to establish a fee-based Internet service in which, more than answering a single question, he sought to establish longer-term, ongoing helping relationships, communicating only via the Internet. From 1995 through 1998, Sommers worked with over 300 persons in his online practice, spanning the globe from the Arctic Circle to Kuwait. Sommers employed several consumer-level Internet technologies for e-therapy, primarily e-mail with encryption but also real-time chat and videoconferencing.

Ed Needham, established his "Cyberpsych" IRC chat service ([www.win.net/cyberpsych](http://www.win.net/cyberpsych)) in August 1995, and was the first to focus exclusively on e-therapy interaction via real-time chat. The development of hospital- and clinic-based telemedicine-the use of sophisticated videoconferencing hookups to allow physicians to work with patients in remote locations-has been well-documented elsewhere. In the fall of 1995, Martha (1995) found twelve e-therapists practicing on the Internet. His database has now grown to include over 300 private-practice Web sites where e-therapists offer services and "e-clinics" which represent, collectively, more than 500 more e-therapists. The formation of the International Society for Mental Health Online (or ISMHO, <http://www.ismho.org>) was a milestone in the development of e-therapy. ISMHO is a nonprofit society formed in 1997 to promote the understanding, use and development of online communication, information and technology for the international mental health community.

## Methodology

This study was carried out to investigate mainly into the student's internet usage, with focus on psychological characteristics that can identify existence of Internet Addiction Disorder (IAD). A look at the characteristics of student preferred activities, proportions of time spend by student on online activities and its relationship, if any, with Internet addiction disorder, were among questions set, in a web-based survey.

The main research questions were:

1. What is the online activities of student and nature of browsing?
2. Do students have IAD, based on Young (1996) screening's criteria?
3. What are the perceptions of students towards the influence of Internet?
4. Does Internet Addiction Disorder (IAD) affect tertiary students in Mauritius?

The main research objective is to understand the online behavior of students and to find the psychological features of Internet Addict among a student population, at University level.

A web-based survey questionnaire, administered to a tertiary student's population was used as a tool to collect data, of a qualitative nature, particularly helping to collect data which was used in analyzing the need of connecting to Internet, describing the means and ways

available to students to construct their online presence, establishing an online presence and relationship with social realities. Also it was investigated about the experience with the development of a strong craving (addiction) for an online presence, denoted by a need to connect even when they are on campus.

Moreover, the quantitative aspect will be complementary in knowing the proportion of regular internet user, frequency and duration of online presence. The quantitative aspect will find give insights in extent to which students are affected, whether adversely or positive. The relative significant of these various factors will also be analyzed to find how they are correlated.

This quantitative research method is designed to ensure objectivity and reliability. Participants (students) will be selected randomly from the study population in an unbiased manner. Anyone who enters the computer laboratory during the period of data collection will have access to the standardized web-based questionnaire. The statistical methods used to test predetermined hypotheses regarding the relationships between specific variables, covers ways in which quantitative research take place and the results are expected to be replicable no matter who conducts the research.

An online platform was identified to provide group counseling. Open-source software hosted on a web-based server, at Virtual Centre for Innovative Learning Technologies (VCILT), a department of University of Mauritius, provided the necessary space for creating an online group counseling therapy.

The main hypothesis that was being tested was to see whether students' online presence and behavior can be controlled to a socially acceptable level by the use of online group counseling. Preliminary data was collected at the computer laboratories of University of Mauritius (UOM), more specifically at Centre for Information Technology and Systems (CITS). The participants consisted mainly of full-time undergraduate students having access to CITS computer laboratories. The sample size will be about 100 students from a student population of about 1000 students from the Faculty of Engineering, Computer science and a total on-campus student population of about 9000 (as at January, 2010). The survey, at the computer laboratories of the University of Mauritius yielded in the participation of 107 students during an 8 days period (October 2009- November 2009). 83 valid responses collected were taken into consideration. The rest were partially incomplete attempt in replying to the questionnaire. The valid feedbacks were processed. Reports and graphs generated helped during the data analysis stage.

Further to the preliminary study, a batch of 10 full-time students was retained for the experiment on online counseling. They were chosen from the student population of about 1000 students who were enrolled on at least one online module. The subjects were volunteers who felt they were addicted to the Internet, responding to printed poster advertisement, stuck on various faculties' notice board. The final selections of the participants for the study were based on a further screening done by the researcher using the instrument developed by Young (1996).

A weekly counseling plan was devised. The counseling Intervention was divided into 10 sessions lasting about 12 weeks. On average, one session last for one week, however there can be two weeks log session also. A description of weekly counseling intervention which was used is provided below:

Table 1: Planning of counseling session

Session	Objective	Procedure
1	Introduce online tools, group members, group rules and set goal	<ul style="list-style-type: none"> <li>❖ Ice-breaking: Help members to introduce themselves and one reason they are in the group.</li> <li>❖ Discuss purpose of the group.</li> <li>❖ Complete the Internet Addiction Screening.</li> </ul>
2	Getting to know about IAD	<ul style="list-style-type: none"> <li>❖ Briefly restate the purpose and rules of the group.</li> <li>❖ Explore the factors of the Internet addiction.</li> </ul>
3	Understanding Choice theory	<ul style="list-style-type: none"> <li>❖ Help to explore choice theory as a guided principle to overcome IAD.</li> <li>❖ Homework assignment: Summary of Choice theory and discussion.</li> <li>❖ Follow up on the homework assignment.</li> </ul>
4	Develop principles to guide treatment process	<ul style="list-style-type: none"> <li>❖ Encourage to develop own principles using choice theory as guided principle to overcome IAD</li> <li>❖ Homework assignment: Summary of Choice theory and discussion</li> <li>❖ Follow up on the homework assignment</li> </ul>
5	Personalizing theory into practical guiding principles	<ul style="list-style-type: none"> <li>❖ Build up principles to be more personal to overcome IAD using previously develop principles.</li> <li>❖ Homework assignment: Personalized Choice theory and discussion.</li> <li>❖ Follow up on the homework assignment.</li> </ul>
	Applying personalized principles	<ul style="list-style-type: none"> <li>❖ Request members to use the personalized principles in everyday life.</li> <li>❖ Homework assignment: Forum discussion on how the applied principles work.</li> <li>❖ Follow up on the homework assignment.</li> </ul>
6	Reflection about own IAD and triggers	<ul style="list-style-type: none"> <li>❖ Ponder feelings of members when heading for the computer and share Internet addiction triggers.</li> <li>❖ Identify usage pattern with some question: What days of the week do you typically log online? What time of day do you usually begin? How long do you stay on during a typical session? Where do you usually use the computer?</li> <li>❖ Forum discussion and review posting.</li> </ul>
7	Make own contract	<ul style="list-style-type: none"> <li>❖ Make a self-contract.</li> <li>❖ Encourage the group to commit to plans.</li> <li>❖ Homework assignment and remind the group of only two more session.</li> </ul>
8	Use positive reminder card	<ul style="list-style-type: none"> <li>❖ Develop the concept of positive reminder cards and encourage the group to use in their real life.</li> <li>❖ Homework assignment: Apply positive reminder</li> <li>❖ Forum Discussion: Internet excessive use and major benefit of reducing online time.</li> <li>❖ Remind the group that the next session will be the last session.</li> </ul>
9	Significant accomplishment	<ul style="list-style-type: none"> <li>❖ Follow up on the homework assignment.</li> <li>❖ Review significant accomplishments of the group members.</li> </ul>
10	Thank you	<ul style="list-style-type: none"> <li>❖ Thank the group for the effort they invested and participation.</li> <li>❖ Complete a group evaluation sheet.</li> </ul>

### Strengths and Limitations of the methodology

The need to determine whether there is a form of Internet addiction, among students, prior to starting online group counseling is necessary for two reasons. First and foremost, Internet addiction is in itself “a relatively new phenomenon” (Young, 1996) and Internet addiction is not yet a DSM IV diagnosis, but its definition has been derived from DSM IV

criteria for addiction and obsession. However, the draft of the new edition (DSM V), which represents a decade of work by the APA in reviewing and revising the DSM (www.dsm5.org) will be further refined before the APA conducts 3 phases of field trials to test some of the proposed diagnostic criteria in real-world settings before the final version is published in May 2013. The work group is recommending Internet addiction be placed in the DSM-V appendix to stimulate future research. The preliminary investigation used in this study can give some light on online behaviors of tertiary students.

Secondly, it will be a difficult, and unethical, to help a counselee into recovering from a deviant behavior unless there is some understanding on what the deviant behavior is, its persistence and how it influences the individual. This understanding is essential for the counselor to guide the counselee in achieving the aim of striking a balance and control Internet addiction. Qualifying the presence and associated aspects of online behavior, consequently Internet addiction disorder if ever present is most likely determined by the preliminary investigation done.

Moreover, this research, in the preliminary investigation, does indeed demonstrate that an Internet addiction exists and some students do not always perceive that they can control their Internet usage. This shows that Internet addiction counseling might be needed for curative purposes and preventive mechanisms for those who are susceptible to this condition. Further research into structuring treatment options can be based on the online group counseling model which is set-up in this work.

The reliability of the study depends heavily upon the use of valid fact and appropriate methods of data capture. The selection of reliable information and theoretical foundation is achieved through selectively screening the information available on Internet addiction. Examples of screening are in dismissing first- person accounts of personal experiences with Internet addiction and advertisement for treatment where data might be commercial biased. The methodology used, within the perspective taken towards counseling for Internet addiction, is based on providing an online platform for counseling. This approach seems to fit this study because of four main reasons:

1. The behavior of Internet addict predisposes the counselee to have Internet access and is available to communicate online.
2. The platform caters for group activities like debate and both synchronous and asynchronous communication, which can be an advantage as compared to traditional group counseling with only synchronous live meeting.
3. The counselor can personalize and make visible or invisible features on the platform depending on need of the group. Moreover, the setup is reusable with an unlimited number of groups.
4. Asynchronous debate in discussion forum has the potential of making the frequency and availability of treatment much more readily available to counselee.

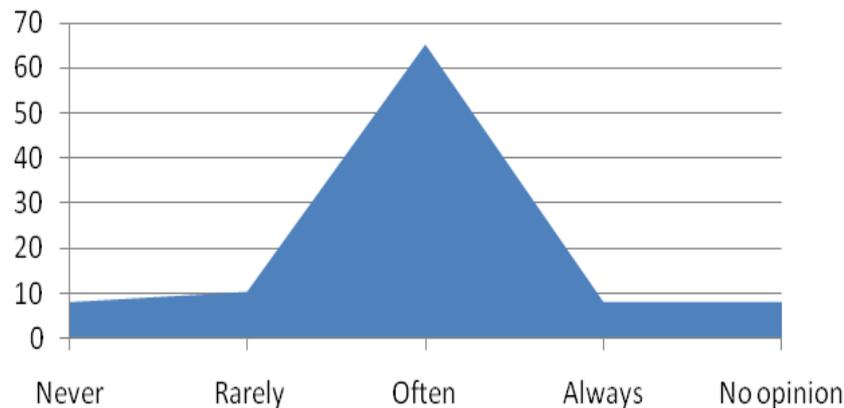
This study also presents a few limitations. A review of the Internet addiction research Byun et al., 2009 demonstrated significant, multiple flaws in most studies in this area. "The analysis showed that previous studies have utilized inconsistent criteria to define Internet addicts, applied recruiting methods that may cause serious sampling bias, and examined data using primarily exploratory rather than confirmatory data analysis techniques to investigate the degree of association rather than causal relationships among variables." This suggests that much of the prior research done on this issue had technical limitations to a significant extent. The following limitation has to be signaled with respect to the current study. This is the fact that it is a single research work with a relatively small group, about ten counsees, is not sufficient to produce a significant generalization of the issues which will be faced with large number of participants in online group counseling.

## Findings

### 1. Preliminary Study

#### *Thinking about Internet*

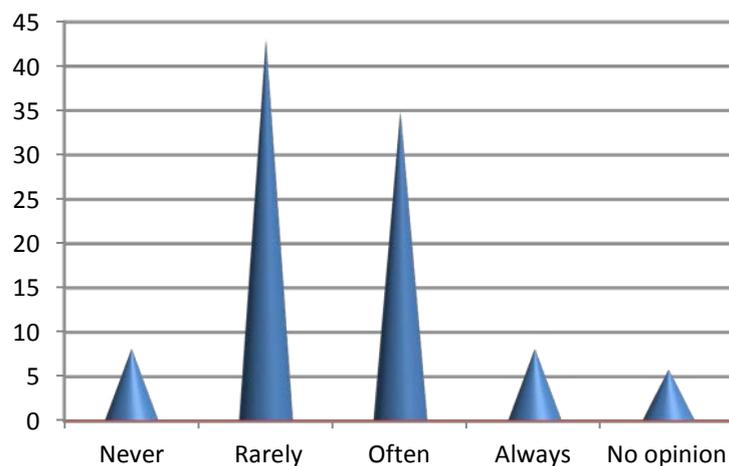
While 65% of the student's population often thinks about what's happening on the internet, there is 8 % who are always thinking about it and an equal proportion never thinking about it. This issue about feeling preoccupied with the Internet (think about previous on-line activity or anticipate next on-line session) is listed as criterial in the eight-item questionnaire of Young (1996), in the diagnosis of Internet addiction disorder. Based on this criterion, there is about 73 %, those who either "often" or "always" thinks about happening on Internet, satisfying one of Young (1996) criteria for screening Internet addiction disorder.



**Figure 1 Thinking about happening on Internet**

#### *Internet usage control*

About 86 % of the student population made unsuccessful efforts to control Internet use, meeting criteria 3 of Young (1996). Out of which, some 35% often try to control their use of Internet, while 8 % are always trying to control their internet use and a significant 43% of the students rarely do it.



**Figure 2 Controlling excessive uses of Internet**

Coupled with the above figures, around 43% of the student population admit that often lose tract of amount of time spend online (Figure 3) and stay on-line longer than originally intended, meeting criteria 5 of Young (1996) for screening IAD.

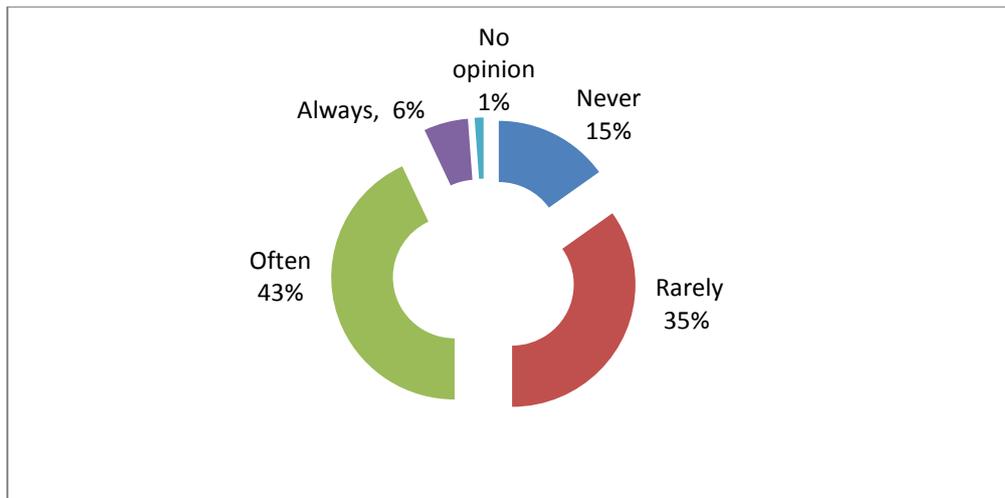


Figure 3 Losing track of internet usage

*Duration of online activity per day*

Distribution of time that student spends online follows a normal curve, with a mode of between 1 hour and 2 hours. Around 42% of the students' population stays online on average between one and two hours.

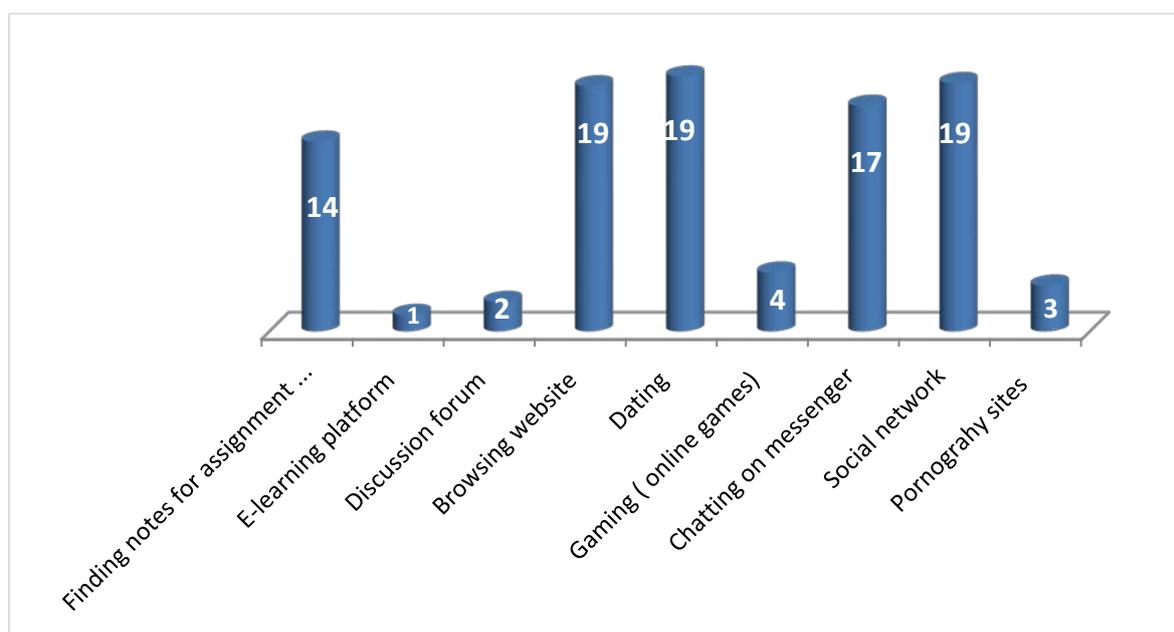
**Table 2: Average time student spend online per day**

Time spend online per day	< 30 mins	30 min -1hr	1 - 2 hrs	2 - 3 hrs	3- 4 hrs	> 5 hrs
Proportion(%)	8	17	42	9	8	15

At least 15 % of students, that is 13 out of 86 students, admit that they spend more than 5 hours per day on the Internet. Taking into account that students are normally on campus averaging 6 hrs per day, excluding travelling time to-and-fro their residence, 5 hours per day on Internet, for purposes other than academic, might be detrimental for the student growth. A simple mathematical calculation, taking into account sleeping time of about a minimum of 6 a day, plus the number of hours a student is not at home, either on campus or travelling, and of about 5 hours online, the student has about 3 hours left for other activities.

**Online activities**

The student's population, under study, seems to spend most of their online time in activities such as browsing website (19%), online dating (19%), social networking (19%), chatting on messenger (17%) and finding notes (14%). The proportion of time spend online in other online activities, such as E-learning, Discussion Forum, Online Gaming and pornography sites, are relatively insignificant.



**Figure 4: Panoply of online activities**

Students' use of the computer lab, on the University campus, can be broadly be categorized as:

- (1) Information search (33%) - Browsing website (19%) & Finding notes (14%)
- (2) Online communication (55%) - Online Dating (19%), social networking (19%) and chatting on messenger (17%)

A relatively high proportion, approximately 55% of time spend online, are mainly for online communication, with a major portion devoted to an online presence for dating, networking or chatting.

## 2. Counseling Sessions

### *Lifespan of participant*

The poster advertisement on various faculties' notice board at the University of Mauritius attracted 11 participants who showed interest about online group counseling for IAD. Five of them emailed their interest while others send text message via their mobile phone.

During the screening process, ten participants responded to the invitation for a screening test. The screening tool was developed using all elements from Young (1996) eight item criteria to determine prevalence of IAD. The results qualified all of them for the online group counseling session. This qualification is in concordance with prescription by the APA (American Psychiatric Association) who identifies the eight criteria of Young (1996) as valid screening's instrument for addictive Internet use.

However, there is one respondent who did not give any reply despite being accepted and offered a seat in the online group. Nine participants showed online presence in the various discussion forums and consequently completed the program. During the various counseling sessions, lasting about 3 months, the participants posted their views/opinions/feedback in respective discussion forum and also submit homework assignment on the online platform

At the last counseling session, a feedback questionnaire, with both closed & open-ended type of questions, was sent to all participants. Within one week, all the participants submitted the feedback questionnaire via email. This demonstrates that the participants were active till the end.

### Feedback from participants

An online questionnaire, was developed to gather feedback from participant and also used as a tool for assessing the online group counseling session, infrastructure and tools used. The questionnaire was divided into two segments with first part being closed-ended type questions, testing mostly about the experience of the participant's, with a focus on satisfaction of goal being met and the counseling process carried out to their expectation. Open-ended question, forming the second segment, provide more room for participant to express their views about best features and what need to be changed about the program, and how counselor can improve. Last question was of an open-ended type, providing space to participants for any further comment, with an invitation to use additional pages.

For Question one to nine, most of them either "strongly agree" or simply "agree", while the rest (a minority ranging from 11% to 22%, depending on question set) being on neither side of the likert scale. The psychometric scale used was a typical five-level Likert item ranging from "strongly agree" to "strongly disagree". Questions 10 to 14 was answered with a "yes" or "no", instead of the five-category response set. This simplified understanding whether the counseling sessions were helpful, useful, meaningful, and whether the counselee would like to keep in touch with the counselor for IAD & other issues. All the participants were unanimous that the sessions were helpful, useful and meaningful. However, only 5 out of 9 would like an additional counseling session. This is a sign that at least 4 were fully satisfied and most probably the rest felt that the program should have lasted longer. The last question of the closed-ended type showed that nearly 80 % of the participant would not like the counselor to call them back. This might arise from a privacy issue where participants would not like their dears to know that they attended counseling session.

Being open-ended type questions, forming segment 2, questions 15 to 18 encouraged the participants to explain their answers and reactions to the question with a sentence, a paragraph, or even a page or more. A persistent observation was that many of the participants commented lengthier on the best features and what need to be changed rather on how the counselor can improve. Counseling being relative a new concept that participant preferred not to comment on it and technicalities of the counselor skills/know-how might be unknown to many. Some of the participants commented on that fact that they were proud to have been able to communicate exclusively online and were eager to have more online communication.

Complaints about what could be changed were addressed to layout and design of the platform which had the feeling an environment related to e-learning rather than a counseling services to deal with an issue that is not academic. Some considered forums should have been much more animated. Many complained about too much assignment and lengthy notes with theory. Accessibility problem to the platform was also evoked. "When we connect to the platform, it is slow and sometime not reachable" was among replies of what should be changed. On a more positive note, forum participation was also considered very useful and enjoyable to interact. However, there is a concern about online chat which was missing. There was a felt need for synchronous interaction, with a general request for video chat.

### Discussion

Reports and graphs generated during the data analysis stage of the preliminary investigation, conducted with about a hundred students, focusing mainly on online behavior showed clearly that 65% of the student's population often thinks about what's happening on the internet. Only about two out of ten student declared that they have never lied about their involvement with the Internet. While about 86 % of the student population made unsuccessful efforts to control Internet, around 43% of the student population admits that they often lose tract of amount of time spend online and stay on-line longer than originally intended. Students' use of the computer lab, on the University campus, was broadly categorized into (i)

Information search (33%) –Browsing website & Finding notes (ii) Online communication (55%) - Online Dating, social networking and chatting on messenger. At least five out of ten students have a firm belief that the internet is “always” beneficial to their studies. In the same line of thought, more than six out of ten students, have a flat refusal that the Internet has “never” influence their life in a negative way. This shows clearly the high esteem that the student population, at tertiary level, has in favor of the Internet. This preliminary study was used as the basis in the formulation of online activities for, online group counseling, promoting counselee ability to understand IAD, grasps theoretical understanding to empower themselves in achieving their goal and maintaining healthy online behaviors.

By combining critical literature review, the preliminary investigation and a methodological framework, online group counseling was offered for about three months to a batch of nine participants. A feedback questionnaire provided insights into issues that were a success and areas of the counseling program that need to be addressed. On the overall, participants were unanimous that the sessions were helpful, useful and meaningful. However eight out of ten participants showed a preference that the counseling sessions remain anonymous.

As the counseling sessions progressed, views and comments about participants own feeling about Internet usage and IAD were discussed in various discussion forum. There have been diverse subsets of dependency identified including Information search, technically known as information overload, and online communications, using messenger, form of Internet addiction. In these respective sub- sections, the following aspects of addiction have been identified: Time spent engaging in the activity, unnecessary pursuit of contact with the activity, disruption of social sphere directly because of the activity, disturbance of academic spheres directly because of the activity. Additional criteria consistent with addiction have also been identified to a lesser extent in respect to Internet addiction in either the gaming or viewing obscene sites, including a feeling of loss of control over their online environment. It is clear that participants struggling with Internet addiction has a compelling need to devote significant amount of time to checking e-mail, participating in online chat rooms or surfing the Web, even though these activities cause them to neglect family, work or school obligations. These problems reflect a user's loss of control over time in Internet use, increasing involvement with the Internet and an inability to stop this involvement in spite of adverse consequences associated with such use.

However, little information was obtained on how the counselor could improve the program, despite that many participants lengthily commented on the best features of the online platform, in response to the feedback questionnaire. The most prominent complaints were about the layout and design of the online platform which was describe as cold and not setting the mood for counseling. Some counselee wished forums should have been much more animated. And participants expected much more input from the counselor rather than assignments and lengthy notes with theoretical foundations.

## **Conclusion**

Computer technology *is* increasingly extending into work, home, family, and community life accompanied by significant benefits and challenges. At the same time, the counseling professions have ventured into the computer-mediated world of online counseling. Counselors who are new to online counseling should not only know the differences faced while working via an online environment but also acquire know-how to work in this new setting. If educators, researchers, and technologists (software developers) are going to implement and make online counseling become more popular, they definitely need more information on patterns of participation, and correlations between various features in the online environment and its effectiveness. To understand the appeal of online counseling, it is

essential that counselors understand client characteristics of those who are most likely to use online counseling services; have a solid understanding of the appealing qualities of computer mediated counseling; and be able to identify the core issues, be it of technology as well as typical nature of online counseling that must be carefully evaluated by counselors contemplating providing counseling delivered/supported by technology. The basic model for setting up an online counseling program is already set in various models, in purely research context and also in a much larger scale, in e-clinics by professional online counselors.

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Appendix 1: Participant Feedback Questionnaire

**For 1-9, please use the rating number along the scale that best represents your counselling experience:**

	Not Applicable NA	Strongly Agree 5	Agree 4	Neither Agree or Disagree 3	Disagree 2	Strongly Disagree 1
1.						_____
2.						_____
3.						_____
4.						_____
5.						_____
6.						_____
7.						_____
8.						_____
9.						_____
	I am satisfied with my overall group counseling experience. (If disagree, please explain) _____					
	_____					
10.	Was the counseling session of help to you? Yes <input type="radio"/> No <input type="radio"/>					
11.	Was the advice you received of use to you? Yes <input type="radio"/> No <input type="radio"/>					
12.	Did the session address the areas of your concern? Yes <input type="radio"/> No <input type="radio"/>					
13.	Are you planning or would you like an additional counseling session? Yes <input type="radio"/> No <input type="radio"/>					
14.	Would you like a counselor to call you to see if you have additional areas of concern? Yes <input type="radio"/> NO <input type="radio"/>					
15.	What were the best features of this online group counselling? _____					
	_____					
16.	What didn't you like or how might the group be changed? _____					
	_____					
17.	How could the group counsellor improve? _____					
	_____					
18.	Further comments on (use additional page if you need more space to write):					

## «LE POETIQUE HABITE DANS L'HOME» – COMMENTAIRES SUR HEIDEGGER

*Gorun Manolescu*

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### Abstract

According to Heidegger there are some dangers threatening a rational thinking. But it seems to be others ways of knowledge and action beyond a rational thinking. Those are mystic and poetic modes.

Heidegger said "poetically man dwells on the earth". Paraphrasing Heidegger – and in fact following him – I state: "poetry lives in man". The two formulae express both an existential disappointment and a deep epistemological need. As we know, for the ordinary people poetry was and is a preceding form of knowledge and expression of sensitivity: precursory to the philosophical and scientific formalisation of knowledge. But for Heidegger: "The good and thus wholesome danger is the nighness of the singing poet./ The evil and thus keenest danger is thinking itself. It must think against itself, which it can only seldom do. ". Therefore Poetry is maybe better another way of access to the truth of being. Thus, it seems that the most important reason of poetry is its possibility to be an antidote of the danger represented by the philosophical thought itself.

Is there an identity between poetry and mysticism? My text tries to offer an answer using a work of Derrida where Heidegger is opposed to Kant.

Finally, I remark Heidegger's philosophical-poetical discourse by which nothing is stated in an apodictic manner, but all is metaphorically suggested. It seems to be a third way of thinking that Heidegger not highlights but practice it.

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**Keywords:** Rational thinking, mystic, poetic, being, "Dasein"

### Introduction

" *Le «poétique» habite dans l'homme*". Ceci est une paraphrase d'une citation qui découle de Heidegger.

Voici le texte original (Hölderlin cités par Heidegger) : "Plein de mérites, mais l'homme habite poétiquement sur cette terre"<sup>207</sup>.

Pourquoi me suis-je permis cette paraphrase ? Puisqu'elle me semble être la plus appropriée pour exprimer les idées que je voudrais transmettre. Et parce que la poésie représente, pour Heidegger, "l'autre grande voie d'accès à la vérité de l'Etre. Le poète est un médiateur et un messager [...] il devient *l'agent d'une expression orale essentielle (Sagen)*"<sup>208</sup>.

### "Trois dangers menacent la pensée:

[a]Le bon et salutaire danger est le voisinage du poète qui chante.

[b]Le danger qui a le plus de malignité et de mordant est la pensée elle-même. Il faut qu'elle

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<sup>207</sup> Laurent Giroux, "Éléments d'un art poétique national : Heidegger", *Laval théologique et philosophique*, 52, n° 1 (1996), 125.

<sup>208</sup> Gabriel Liiceanu, "Note" asupra: Martin Heidegger, *Originea operei de artă*, trad. din germană, T. Kleininger și G. Liiceanu (București: Univers, 1982), 208.

pense contre elle-même, ce qu'elle peut que rarement.

[c] Le mauvais danger, le danger confus, est la production philosophique"<sup>209</sup>.

A tous ceux-là, j'en rajouterais encore un :

[d] Le technique – le plus dangereux et le plus nocif – qui même s'il n'est pas mentionné expressément par Heidegger, trouve une place particulière dans son ouvrage *l'Origine de l'oeuvre d'art*. Car, il habite dans l'homme mais en même temps il cherche à le remplacer, en l'intégrant. Ce dernier aspect ne fera pas l'objet du présent commentaire, il sera débattu ultérieurement.

Je vais commencer par "le danger qui a le plus de malignité et de mordant..." et nous allons voir par la suite comment il rencontre les autres deux.

### **"Le danger qui a le plus de malignité et de mordant est la pensée-même. Elle doit penser contre elle-même..."**

Certains commentateurs parlent d'un échec de la pensée philosophique (européenne), généralement, et de celle heideggerienne, en particulier, lorsqu'ils cherchent d'une manière *philosophique rationnelle* à "attraper" l'être-étant. Et ce parce que : "Chasser le non-être a fait naître, en réalité, une utopie de la Raison dans la pensée européenne, une inégalable force de durer au-delà des siècles et des millénaires. Utopie de la raison? Peut-être devrais-je parler tout simplement de l'Utopie, dans sa forme la plus pure, la plus métaphysique et la plus abstraite. Extraire l'être de son étreinte avec le non être, exclure par la suite avec détermination la deuxième comme si c'était quelque chose d'impur et de néfaste, en laissant à la place que l'être unique, immobile et parfait ; invoquer comme si c'était *quelqu'un d'illuminé*, la déesse de la Raison afin de garantir la réussite de l'opération - ne s'agirait-il pas justement de la description générale de l'Utopie ? Ou, ce serait, peut-être, la quintessence de cette curieuse préoccupation quasi-utopique que, depuis deux mille cinq cents ans, nous persistons de cultiver plus ou moins bien, en l'appelant «philosophie»..."<sup>210</sup>.

Serait-ce la dernière tentative d'Heidegger de sauver, par la *philosophie*, une telle utopie?

Parménide, celui qui est à son origine dit:

"Eh bien ! Je dis ceci : toi, prends en ta garde la parole que tu entends (sur ceci) :

Quelles voies sont à envisager comme les seules pour un questionner.

L'une : comment c'est (ce que cela, l'être, est) et comment ainsi (est) impossible le non-être ainsi

Cela c'est le chemin de la confiance fondée, il suit en effet la non- latence.

Et l'autre : comment cela n'est pas, et aussi comment est nécessaire le non- être.

Celui-ci donc, je le déclare, est un sentier qu'on ne peut pas du tout conseiller ;

en effet, ni tu ne saurais lier connaissance avec le non-être, car il ne peut être présenté,

ni tu ne pourrais l'indiquer avec des mots..."<sup>211</sup>.

Dans son ouvrage *Être et temps*, paru en 1927, Heidegger fait une première tentative échouée lorsqu'il souhaite, avec désespoir, trouver directement – et bien sûr comment autrement que par la philosophie? – l'essence de "l'étant", c'est-à-dire "l'Être" de celle-ci, juste au moment, en effet, ce *être* "sort de sa cache". Et en tire conclusion que ceci arrive seulement lorsque le sujet, "en se comprenant soi-même et son propre monde d'une façon

<sup>209</sup> Martin Heidegger, "L'expérience de la pensée, 1947",

[http://www.skafka.net/archives/alice69/doc/exp\\_pens%E9e.htm](http://www.skafka.net/archives/alice69/doc/exp_pens%E9e.htm), accesat 25.09.2012.

<sup>210</sup> Andrei Cornea, *O istorie a neînțelegerii în filozofia greacă* (București: Humanitas, 2010), 46.

<sup>211</sup> cités par Martin Heidegger, *Introducere în metafizică*, traducere Gabriel Liiceanu & Thomas Kleininger (București: Humanitas, 1999), 151.

extatique [...] Le Dasein factique apparaît dans ces horizons vers l'étant..."<sup>212</sup>.

Alors que par ceci, en fait, on quitte le domaine d'une philosophie « rationnelle » de la Raison absolue, abstraite (arrivée à l'apogée chez Kant et Hegel). Alors que Heidegger rencontre un tel type d'*extatique*, en arrivant à la limite à laquelle nous conduit « le danger qui a le plus de malignité et de mordant, [qui] est la pensée [rationnelle] même. Elle, [il faut] qu'elle pense contre elle-même...". A un *extatique* qui paraît être de nature *mystique*.

### Arrivé à ce point de l'exposé,

je ferai appel à un ouvrage étrange, beaucoup plus différent des autres appartenant à Jacques Derrida. Il s'agit de *Foi et Savoir. Le Siècle et le Pardon* qui oppose Heidegger à Kant.

Dans cet ouvrage il parle de trois lieux : *L'île*, la *Terre Promise* et le *Désert*.

En fait les trois semblent être subordonnés à un *Désert intérieur* qui : il existe des fois un lieu "sans issue ou chemin assuré, sans route ni arrivée, sans dehors dont la carte soit prévisible, et le programme – calculable [...] une certaine *epokhè* qui consiste – à tort ou à raison, car l'enjeu est très grave – à penser [*i.e.*, *le mystique*] ou de [le] faire apparaître 'dans les limites de la simple raison' [...] Question connexe: Quoi de ce geste kantien aujourd'hui? A quoi ressemblerait aujourd'hui un livre intitulé comme celui de Kant, la Religion dans les limites de la simple raison?"<sup>213</sup>. Dans lequel Kant s'efforcerait de comprendre l'origine rationnelle d'un mal qui reste inconcevable pour la raison, en affirmant en même temps que l'interprétation de l'Écriture (Le Nouveau Testament) excède les compétences de la raison et que, de toutes «les religions publiques » qui n'aient jamais existé, il n'y a que la religion chrétienne qui aura été une religion morale.

Il n'est pas question ici d'une quelconque contradiction. Mais d'une immense confusion entre la religion (si chrétienne soit-elle) et *la mystique*. Puisque, tel que Jacques Derrida le dit, Heidegger – en saisissant ce fait du point de vue d'un protestant, arrive à la conclusion que le sentiment mystique (l'être chez Heidegger) précède toute *Révélation* (du sentiment en question) dans toute religion dogmatisée ou, encore pire, institutionnalisée. C'est-à-dire, le sentiment mystique apparaît et accompagne l'homme et ce depuis qu'il est devenu *Homo sapiens* par une mutation brusque de l'Homme de Néanderthal.

Que tout soit résumé à cet élément mystique ; serait-ce l'unique modalité pour entrer dans l'*extatique* et ce qui nous bloque? Non, car si celui qui est arrivé jusque-là réussit à trouver une issue cachée vers l'extérieur (une sorte de centre dans l'intérieur d'une labyrinthe, centre qui constitue l'unique issue possible puisque l'entrée a été bloquée au moment où l'on pénètre dans ce labyrinthe) et par celle-ci on pourrait être menés « au bon et salutaire danger [voire le voisinage du poète qui chante] ». La différence entre eux tient de la nuance de la communication : chez le poète : les choses sont comment elles *pourraient être*, alors que chez le mystique les choses sont *telles qu'elles sont*. Mais dans les deux cas, la métaphore est présente par le terme manquant de la comparaison qui se trouve carrément derrière les mots.

Par *Introduction à la métaphysique* (avec des versions successives à partir de 1931, ainsi que *l'Origine de l'oeuvre d'art*), Heidegger change sa stratégie, parlant d'abord de *l'étant* (le devenir), voire ce qui nous montre dans notre monde tous les jours (la «facticité» comme il l'appelle), pour qu'il essaye ensuite de redevenir *rationnel philosophiquement* à « l'Être de l'étant » d'un immuable absolu.

Ainsi dans, *Introduction...* il commence par la "Question fondamentale de la

<sup>212</sup> Martin Heidegger, *Ființă și timp*, traducere Gabriel Liiceanu & Cătălin Cioabă (București: Humanitas, 2003), 485.

<sup>213</sup> Jacques Derrida, *Foi et Savoir. Le Siècle et le Pardon*, (Paris: Seuil, 2000), 13 – 5

métaphysique” plus précisément : ”Pourquoi s’agit-il de l’étant plutôt que de rien?”<sup>214</sup>. Et avec l’espoir d’obtenir une réponse et pour délimiter (implicitement) le domaine de la métaphysique circonscris strictement à *étant = devenir*, et de ressayer d’arriver à son *Etre* même si l’on dépasse la métaphysique.

Et l’on finit par arriver aux dissociations suivantes :

” [1] ] L’être, dans sa corrélation au devenir, est la permanence.

[2] L’être, dans sa corrélation à l’apparence, est le modèle permanent, le toujours-identique.

[3] L’être, dans sa corrélation au penser, est le sous-jacent, le subsistant.

[4] L’être, dans sa corrélation au devoir, est le toujours pro-jacent, le dû non encore ou déjà réalisé.”<sup>215</sup>.

La, par des négations successives, rappelant la *théologie apophatique*<sup>216</sup>, il cherche «conceptuellement» à délimiter *l’Etre*, en arrivant ainsi de nouveau à une limite de la Raison (abstraite) qu’il ne peut pas dépasser «raisonnablement». Car: ”Où la philosophie peut-elle intervenir [dans ce cas]?...Nous ne devons pas discourir ici sur une intervention, mais accomplir celle-ci *pour notre compte*...”<sup>217</sup>.

Voir (c'est-à-dire) pénétrer nous-mêmes (en faisant l’expérience) dans le domaine de l’Etre qui se trouve à l’ombre de notre étant de tous les jours. Mais alors toute possibilité de communication, d’une manière « conceptuelle », disparaît. Et si, comme nous venons déjà de le dire, nous ne sommes pas mystiques, mais «le poétique nous habite» nous avons, de surcroît, la possibilité de le relever, nous pourrions seulement le « suggérer » et non pas le statuer (apodictiquement) parce que nous ne saurions pas comment. D’ailleurs, Heidegger le fait lui-même à la fin des commentaires dans *Introduction à la métaphysique*: ”Ainsi un questionner originaire et poussé jusqu’au bout à travers les quatre dissociations conduit ceci: l’être qu’elles encerclent doit lui-même être transformé en un cercle entourant tout l’étant et le fondant”<sup>218</sup>.

C’est-à-dire on nous propose un métaphore dans le genre *halo/aura* qui entoure tout être vivant (y compris une plante) tant que cet être est vivant, mais dont seulement l’homme peut devenir en certaines circonstances, conscient ( ”doit lui-même être transformé en un cercle entourant tout l’étant et le fondant”). Mais, attention : une telle *aura* (qui pourrait être confondue avec l’étant) est juste un *signe/symbole*, un terme moyen de cette métaphore particulière - voir «métaphore vive» chez Ricoeur<sup>219</sup> - ainsi qu’un type à part de symboles associé à de telles métaphores, l’exemple typique étant les notes musicales derrière lesquelles se trouve le poli sémantisme de la mélodie et du rythme. Et nous ne devons pas y restés fixés car ce serait comme si notre attention restait fixée sur «le doigt» qui montre, au lieu de regarder ce que *montre* ce doigt. Et ce, puisque lui, le signe, pourrait être facilement confondu, comme je l’ai déjà dit, à *l’étant/le devenir*- et non pas pris comme une indication que dans nous-mêmes habite *Le Poétique - L’Etre*. Alors que cette chose est mise en évidence par une métaphore plus complexe proposée par Heidegger dans *De l’origine de l’œuvre d’art* : „Au sein de l’étant se trouve un lieu ouvert comme un ensemble. Lieu d’ouverture [...]. Conçu de la perspective de l’étant, il a le caractère de l’être [...]. Ce centre ouvert n’est pas donc fermé autour par l’étant, mais c’est le centre-même qui éclaire et entoure – tel le néant

<sup>214</sup> Martin Heidegger, *Introduction à la méta physique*, trad. G. Kahn, (Paris: Presse Universitaires de France, 1958), 9.

<sup>215</sup> Heidegger, *Op. cit.*, 205

<sup>216</sup> Dumitru Stăniloae, *La théologie dogmatique orthodoxe [en roumain : Teologia Dogmatică Ortodoxă]*, vol. I., (Bucarest: l’Institut Biblique et de Mission de l’Eglise Orthodoxe Roumaine, 1996).

<sup>217</sup> Heidegger, *Op. cit.*, 207

<sup>218</sup> *Ibid.*, 207.

<sup>219</sup> Paul Ricoeur, *La métaphore vive*, (Paris: Seuil, 1975).

que nous connaissons à peine – l'étant."<sup>220</sup>

Je vous laisse goûter seul le charme de cette nouvelle métaphore dans le paradoxe où elle disparaît. Sans «dialectique» aucune (hégélienne : thèse antithèse synthèse) mais il s'agit tout simplement de la suggestion métaphorique. Mais si vous souhaitez tout de même tenter un décryptage (lui aussi crypté), en utilisant une «vue intérieure», alors peut-être pourrions-nous «voir» comment au centre de l'étant dans notre monde de tous les jours s'ouvre l'Être qui, à son tour, enveloppe d'un autre *topos* différent de celui du «monde», l'étant/ le devenir.

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<sup>220</sup> Martin Heidegger, *Der Ursprung des Knustwerkes (1935/36) (De l'origine de l'œuvre d'art)*, (Frankfurt/Main: Kolestermann, 1977), 42.

## THE STATE OF SCIENCE IN 2013

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### Abstract

The state of science in 2013 is presented. This in comparison to science in earlier times. “Where did we come from, where are we, and where are we going?”

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**Keywords:** Scientific method, politics, technology

### Introduction

We all love science. Science is considered by society as a noble goal. Something to be proud of. Something that will forward our society, to take us out of the Dark Ages. Heroically we remember people that were fighting against contemporary opinions and thought-patterns in society. We read historical novels how individuals were fighting religious indoctrination and thus breaking the hegemony of institutes. All because of science. As long as we stick to science, so we think, everything will be OK.

Yet, in 2013, science is dead.

This is quite a strong statement to make. How can something be dead that we all venerate so much? And, if so, how could that have happened? What went wrong, and why? Are there examples to substantiate this pessimistic claim?

### Main Text

We first have to introduce to the reader what *is* science. And what it is not. It is amazing to see that nowadays PhDs are given to people graduating from technical high schools. That is, students of a faculty teaching a technology approach get a *philosophical* degree. The reasoning behind it is that technical high schools are of a level as good, if not better, than many universities. It is not fair to call one school a university and the other just a technical high school, implicitly assuming that something that is called a school is of lower value compared to a university. The result is that all high schools have been re-baptized 'university' in many countries. And all students from a university, after doing research (be it science or not) get a PhD. Yet again, the reasoning is that “If it was as difficult to do as science, it deserves a diploma equal to one given in science”. As an example, students from our engineering department, where they formerly would get an Engineering degree, now get a PhD.

This goes even further. Most students getting this philosophical degree never had a single lecture of philosophy in their lives. Most people probably think that philosophy is just thinking intelligent and complicated. “Since my research was difficult, hard working, intelligent and intellectual, I deserve a PhD”. This makes as much sense as calling a shoemaker a farmer, “because it is just as difficult”.

A PhD should be given to a scientist, and an engineering degree to an engineer. They are different things, and thus deserve their own diploma. A scientist knows something about philosophy, an engineer knows something about solving problems. In a simple way, one can say that a scientist tries to understand the world, and an engineer tries to use this acquired

knowledge to address problems in the world, to make it a better place. Note that no science is addressed at making this world a better place. "Anyone who thinks science is trying to make human life easier or more pleasant is utterly mistaken", as Albert Einstein said. This is already directly busting one myth in society: Science is not 'useful', or something like that. Science is closer to Art than to Technology. Science can be beautiful, but not intended to be useful.

A better definition is that a scientist is someone who uses the 'scientific method'. So, now the question is deferred to: What is this so-called scientific method? Chalmers wrote a very nice summary on this subject in his book "What is this thing called science?"[1]. One basic ingredient is 'falsification', a scientific approach is making a model that can *possibly* be rejected by facts somehow. And, science is then addressed to falsifying the theories. Here's then a second myth being busted: Science is not calculating yourself into a stupor until you get what you wanted when you started. No, quite the opposite, science is wrecking your brain until you cannot find anything anymore why your ideas would be wrong. Then – and only then – communicate them to the rest of the world, and let the others have a go at wrecking your ideas. We recognize in this the profile of a Skeptic, which tries to see where the ideas of others in society might be wrong. A scientist is an auto-skeptic. Skepticism is a basic ingredient of science.

We have summed up the scientific method in the following points[2], which were presented by Feynman in his book *The Character of Physical Law*[3]. While the details can be discussed, basically, the scientific method is consisting of the following four elements

1. Once developed a 'hypothesis', an idea or model of how nature works, effort should be spent on finding out where and how the model fails, i.e., 'falsification'. Moreover, Feynman added: It has to be mentioned by the developer, not only where the model is correct, but also where it is on thin ice. "In other words, we are trying to prove ourselves wrong as quickly as possible, because only that way we can find progress"[3].

2. The creators of the model should convince the readers that it is the *only* model that can explain reality (the data).

3. The model should include a verifiable prediction of an event happening in the future, for instance an experiment that can be done and the outcome of it. "Science is only useful if it tells you about some experiment that has not been done; it is no good if it only tells you what just went on"[3].

4. Other scientists can repeat the work presented.

Some comments are in order.

A vague model cannot be proven wrong. While science goes about disproving things (and not proving things, something what science can never do), models that do not have any clearly testable item are not scientific.

Bayesian science is not science. It consists of adjusting the models after new data come in. It is named after Bayes, the founder of empirical forecasting, where past data are used to predict the future and every time new data arrive, the parameters of the distribution of probabilities are adjusted. This directly contrasts the second item of the list above, namely, the new model that explains new as well as the old data makes the old model scientific (and making us doubt the new one, from the hand of the same authors, as well). Apparently, the old model was not the only model to explain the old data – the new model can do that just as well. A lot of research in literature is not meeting this scientific criterion.

Related to this, if there are two models that can explain a phenomenon, the simplest one is correct. This according to William of Ockham, a XIV century monk who presented this idea in what is called Ockham's Razor; shave away everything that is not needed. If a temperature series is both consistent with constant temperature and a linear rise – that is, if both cannot be excluded – the constant-temperature model is correct (until proven wrong),

because it has one parameter whereas the linear model has two. Then, linearity has priority over parabolic, and so forth.

If a group of scientists present a paper, "Here is the result of our simulation", without saying how and on basis of what, that is not science, according to the fourth criterion of the scientific method. Colleague scientists should be able to understand and possibly repeat the research. It should not be about 'believing' or 'trusting' the scientists. It is all about convincing and that includes reproducibility by others.

Apparently, most of the scientific papers presented in even the most prestigious scientific journal, *Science*, are not scientific[4]. Most are not aimed at testing a model, but are of the tallying type. That is, either just simply presenting some numbers on the subject (for example, the statistics on species X in biotope Y), or accompanied by a retroactive (Bayesian) type of prediction, also known as 'retrodiction' (for example, species X declined because of phenomenon Y). Science is dead.

How did it get this far? We think it is due to the society that has changed and has demanded that science is somehow useful for the society. Our entire funding scheme is nowadays based on this paradigm of usefulness. People who write project proposals know that these normally contain 'milestones' and 'deliverables', or in other words, things that should be solved in society. But, that is technology. In technology you can make a future estimation of what will be the result of the work. "We are going to reduce the channel length of transistors from 50 nm to 30 nm". However, we would like to see Einstein in 2013 writing a proposal titled "Invention and development of Relativity Theory", or something like that.

Too ridiculous for words? Let's analyze the internet pages describing science of one of the most famous and prestigious universities in the world, the University of California at Berkeley. It writes there, in *How Science Works*, that science has three aspects[5] (in brackets our interpretation):

- "Exploration and discovery" (research)
- "Benefits and outcomes" (relevance to society)
- "Community analysis and feedback" (peer reviewing)

Some observations can be made here. First of all, science is not equivalent to research. Research – collecting data, reading literature, modeling, discussion with colleagues, etc. – is an important tool in science, but the two are not the same.

Second, science, as discussed above, has no relevance to society. Of course, there can be beneficial side effects, but science itself is not aimed at attaining these. When Galileo developed the telescope, he did so to study the stars, to understand nature better, not to develop the art of lens-making so that problems of people with lack of vision were solved. In 2013, this has all changed. Science is aimed to have benefits and outcomes. The problem with this is that things will tend to be proven correct, as long as they make enough money (relevance to society is like anything else, in 2013 expressed in monetary terms). The truth loses significance. People are confusing science with technology. Technology has benefits, science not (necessarily).

A side effect of this, by being embedded in society, is that things in 2013 have to be 'politically correct'. The pages of UCB specifically state this. As an example, in its *Misconceptions* tab, it is now said that science (philosophy) does not say anything about religion or the existence of a deity ("Misconception: science contradicts the existence of God"), where it moreover denies that science and beliefs are at war. The argument is that this subject is not in the realm of science, science "pronounces things on the natural world and not the supernatural". In this way, the scientific community is avoiding difficult discussions with people that believe things (and pay their salary). Believing is a human right, so now it has been made a rule that science cannot make statements about anything a person might believe. It has been declared that science cannot make statements

about beliefs or make generally statements that can offend people. Everything has to be politically correct. To make the extra effort to not offend or insult anybody.

This is not correct. While science cannot prove *anything* to be correct, including the existence or not of a deity, it can only prove things to be *incorrect* (by falsification), it can indeed make statements on any subject, including this one. (And if they offend people or not, is irrelevant). There can be theories, including about deities, and actually, one of the major discussion points of philosophy is the subject of religion. Science also contributes. The scientific reasoning goes like this:

- 1) There is no need to include a deity to explain the existence of the universe and therefore – scientific observation – no deity exists. (see Ockham's Razor above). The universe might always have existed.
- 2) If a deity is needed to to explain the existence (creation) of system as complex as the universe, then
- 3) This deity is as least as complex as the universe and therefore also needs an explanation. “Who created the creator?”.

This is an age-old discussion, but the current state of science is that no universe-creating entity exists or existed. This, of course, is not the end of the discussion. Like with any other subject, including the ones we see as absolutely fully established truths, science cannot prove things to be 100% certified correct. That is science. Do not confuse “not being able to establish undeniable truths” with “not being able to make a statement”. Compare this to a discussion people might have had some centuries ago. “I believe the back of the moon is green. Since you cannot check it, you cannot make a statement, therefore I am right”. This is false logic, Ockham's Razor tells us that the simpler model is that the back of the moon is the same color as the front. Science makes a statement that the back of the moon is *not* green.

To give you a nice counterargument. The ontological argument for of the existence of a god:

1. God might exist or not
2. God is by definition perfect, without any imperfections
3. Non-existence of something is an imperfection of that thing, because a non-existing thing could be more perfect by adding the aspect of existence

Therefore, God exists. As you can see, there can be philosophical statements about the existence of God. The scientific statement is that no god exists, basically because of Ockham's Razor. Nothing wrong with this statement. Yet, it is not politically correct, and that is why UCB makes it clear that they will not say anything against the beliefs of the people that pay for the research. Don't bite the hand that feeds you. We now have a scientific community that goes out of its way to not annoy anybody and delivers any 'truth' the society wishes to hear.

130 years have passed since Engels wrote his disdainful comments on spiritualism in his book *The Dialectics of Nature*. In 2013, no comments on spiritualism are allowed, apart from respectful ones. If people believe certain things, then science will let these people in peace and the area unattended.

This way, we have created a consensus in many subjects. We just basically vote for what is the truth, exactly because of the link with a society that pays and that can demand usefulness of science. 'Useful' is by definition 'what the people want'. Therefore, if a consensus in society exists about a certain belief, science is called in to prove it.

But, the concept of consensus is diametrically opposing science. Science is trying to extend the boundary of knowledge, there where a consensus is trying to fence it in. Advances in science are always done by individuals and thus against the consensus. To give you an example, Einstein was against the contemporary consensus. Einstein, in a modern approach of science and research funding, would be completely marginalized. “Mr. Einstein, stop being

annoying. Gravity has been completely settled! We have reached a consensus on the theory of gravity of Newton". If not for individuals trying to overcome the boundaries of consensus, science would never advance. A more dramatic example is the aforementioned Galileo. He was forced to renounce his theory that the Earth was revolving around the Sun because of the subject was at that time dominated by the church and they dictated the consensus which placed the Earth at the center at the universe; a moving Earth was against the consensus. On his death bed Galileo uttered the famous words "Eppur si muove" (and still, it moves), which we now teach in the history of science as a heroic act of scientific rebellion. If we look back at it, the scientific path in history is littered with such individuals fighting the consensus. In 2013, however, a consensus is called heroic. For present time, the majority is considered heroic, while for past time the minority is heroic. This is quite a schizophrenic approach our society has adopted.

Consensus is more so anti scientific, because of the definition of science. By being essentially 'falsification', a million pieces of evidence cannot prove a theory correct, while a single piece of evidence can prove a theory wrong. Thus, a consensus is not a proof of a theory. Never is and never will. Closing the debate on a subject, with as argument a consensus, is effectively killing science and making it a political subject.

Still, it is interesting to analyze how a consensus is achieved in scientific literature? What is the mechanism? How is rebellion eliminated from the scientific community?

It has all got to do with the funding structure of science and the peer-reviewing system used in literature. It results in a positive-feedback behavior that, as we know from control-engineering lectures, results in saturation. In this case, it results in 100% consensus on any subject. It works as follows: 1) For a manuscript in peer reviewing, referees are selected on basis of their publication record. More publications, more chance of being chosen for reviewing. 2) By 'cognitive bias', referees are more inclined to accept papers that confirm their belief than papers that go against it. This effect is amplified by the feeling of consensus, especially when consensus has gotten a heroic connotation (the author will feel contributing to society by rejecting a difficult, controversial paper). 3) Authors without (enough) publications lose their job, because they cannot show they are relevant for society. Authors with controversial ideas, see their publication rate peter out, eventually losing their job and no longer publishing, even no longer writing papers altogether. After a while, a controversial idea cannot be published, nor studied. The only people that break the cycle are scientific philanthropist, people that do not do science for a living, but for their passion of finding the truth. Such people are rare indeed in 2013. Either this, or studying irrelevant subjects, which also naturally peter out because of the need to show relevance to society. A perfect example of a scientific philanthropist is Nassim Nicholas Taleb. He made a fortune in the stock market and can now lean back and philosophize about (financial) forecasting and all its pitfalls. In fact, his book *The Black Swan*[6] can be considered one of the most relevant works of philosophy of the last 50 years.

What remains for the researchers to do is technology, developing new products to be sold to a gadget-hungry society. For this purpose, all technical high schools are relabeled universities and all universities are effectively converted into technical high schools, where research is aimed at developing useful things to society. Even fundamental research is addressing society-relevant issues, like studying the physical processes in photo-voltaic materials, to be used in solar cells and light-emitting devices, etc.

This reduction in intellectual diversity is further exacerbated by standardization of university courses around the world. An example is the Bologna Treaty that standardizes all the courses in the European Union. We have now wound up in a situation similar to the state of things in the beginning of the 20<sup>th</sup> century, namely the idea that everything is known. At that time people thought that knowledge reached its limit and what remained was just

'working out the details'. In many subjects in the 21<sup>st</sup> century the idea is the same. "Subject X is settled. No need for further thinking". How naive we were then; some decades later physics was completely revolutionized by the advent of Quantum Mechanics and Relativity Theory. How equally naive we probably are now.

The amount of science in the world is quite small. Examples we can find is the Higgs Boson and String Theory. We would like to express our concern for the lack of pioneering ideas. Where these two examples are even from the previous century, we actually cannot come up with a single example of an original idea in science in the 21<sup>st</sup> century.

### **Conclusion**

We summarized here the appalling state of science in the 21<sup>st</sup> century. A state that reminds us of previous states in which scientists thought that everything was known and we only had to work out the details and make use of the knowledge in technological applications. Science is taught in a dogmatic way in schools and universities. "This is the knowledge you have to put in your heads. This is how the universe works". It is all quite disillusioning.

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## **LAS COMPETENCIAS: UNA PROPUESTA CONCEPTUAL HACIA LA UNIFICACIÓN MULTIDIMENSIONAL EN EL CONTEXTO DE LOS RECURSOS HUMANOS**

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### **Abstract**

The meaning of the term competition has given rise to multiple interpretations, nuances, or even to misunderstandings, since the concept has more than one meaning, and discernment settling context of the audience at any given time. In a general way it is usually understood that competition comprises the attitudes, knowledge and skills that enable to successfully develop an integrated set of functions and tasks in accordance with the performance criteria considered suitable especially in the workplace. Therefore, this paper aims to show different meanings of the term Competition, in which product content analysis methodology provides a global type definition covers the essential components, in order to have a more accurate understanding; although different scenarios is at stake, given the connotations that make it a term with many meanings, and therefore difficult to conceptualize. To carry out this investigation, we applied the content analysis methodology that is affected by means of encoding, namely, a process in which the relevant characteristics of the contents are transformed into units allowing precise description and analysis. The sample consisted of 59 definitions authors analyzed fifteen categories corresponding to the three concepts that currently manifest in the organizational environment.

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**Keywords:** Competency, Meany meanings, Human Resources

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### **Resumen**

La acepción del término *Competencia* a dado lugar a múltiples interpretaciones, matices, o inclusive a malos entendidos, dado que el concepto es polisémico, acomodándose al contexto y discernimiento de la audiencia en un momento dado. De un modo genérico se suele entender que la competencia comprende las actitudes, los conocimientos y las destrezas que permiten desarrollar exitosamente un conjunto integrado de funciones y tareas de acuerdo a criterios de desempeño considerados idóneos especialmente en el medio laboral. Por todo ello, éste trabajo tiene por objetivo mostrar diversas acepciones del término *Competencia*, en el que producto de la metodología de análisis de contenido se presenta una definición de tipo global que abarca los componentes esenciales, con la finalidad de tener una comprensión más acertada; aunque los distintos escenarios en los se pone en juego, le da las connotaciones que la convierten en un término multiconceptual, y por ende, difícil de conceptualizar. Para la realización de esta investigación, se aplicó la metodología de análisis de contenidos la cual se efectúa por medio de la codificación, es decir, mediante un proceso en el que las características relevantes del contenido se transforman a unidades que permitan su descripción y análisis precisos. La muestra correspondió a las definiciones de 59 autores, analizados entre

quince categorías correspondientes a las tres concepciones que actualmente se manifiestan en el entorno organizacional.

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**Palabras clave:** Competencias, Multiconceptual, Recursos Humanos

### **Introduction**

En la actualidad, la acepción del término *Competencia* a dado lugar a múltiples interpretaciones, matices, o inclusive a malos entendidos como lo afirmara Prieto (1997:8-9), dado que el concepto es polisémico, acomodándose al contexto y discernimiento de la audiencia en un momento dado. Por todo ello, este trabajo tiene por objetivo mostrar diversas acepciones del término *Competencia*, en el que producto de la metodología de análisis de contenido se presenta una definición de tipo global que contribuye a disminuir las complicaciones de los marcos de competencia en el contexto de los Recursos Humanos. Por ser un término harto y complejo, el cual no puede ser encapsulado exclusivamente a un conjunto de conocimientos y habilidades del individuo o como un término que exclusivamente pertenece al ámbito laboral, es imperioso considerar otras variables que tienen relación con el contexto organizativo, como: la misión, la estrategia, la cultura de las organizaciones, entre otras.

La estructura del presente trabajo se presenta como sigue: En primer lugar un análisis de la revisión de la literatura que nos presenta el contexto general del estado de la ciencia y la problemática. En segundo lugar, definimos la metodología que se encuentra fundamentada en el estudio de contenidos a través de la codificación, es decir, mediante un proceso en el que las características relevantes del contenido se transforman en unidades que permitan su descripción y análisis. En tercer lugar se presentan los resultados obtenidos, luego de aplicar a la muestra de tipo no probabilístico correspondiente a 59 autores que representan la conceptualización de las tres corrientes de competencias, que de acuerdo con Guerrero & Alcaraz (2009) y Horton (2000) se encuentran conformadas por una visión americana, francófona y británica. En cuarto lugar se presenta la propuesta conceptual sobre *Competencia*, sustentada en un análisis profundo de las variables que la conforman. Finalmente se emiten las respectivas conclusiones.

### **Revisión de la literatura**

La competencia se define como un conjunto de elementos heterogéneos combinados en interacción dinámica. Entre los ingredientes podemos distinguir los saberes, el saber hacer, las facultades mentales o cognitivas; podemos admitir las cualidades personales o el talento. Según la aproximación que se adopte, la selección deberá efectuarse con el fin de determinar la unidad de referencia (Marbach, 1999:15-16). De acuerdo con Le Boterf (2001:41), “La gestión de competencias está a la orden del día en las grandes empresas y organizaciones. Pero a unas órdenes del día ambiciosas -gestión anticipada de competencias, inversión en el capital de competencias, mutación de los sistemas de clasificación, (...)”. Es decir, el vocablo “competencia” funciona más como un discurso prescriptivo, plagado de buenas intenciones respecto a lo que los directivos desean en cuanto al desempeño de sus empleados, de lo que en realidad es a la hora de implantarlo en la vida organizacional. Uno de los motivos de esta situación corresponde a la utilización de una definición débil de la competencia. (Le Boterf, 2001:42). McLagan (1997) precisa que tanto las organizaciones y los individuos relacionados con este tema, deben de ser conscientes sobre las diferencias que comprende su significado, además de discernir sobre las ventajas e inconvenientes en cada aproximación conceptual. McLagan (1997) expone diferentes elementos, que desde su perspectiva son los que determinan sus distintos significados: i) Las competencias como tareas, ii) Las competencias como resultados, iii) Las competencias como “outputs”., iv) Las competencias como:

habilidades, conocimientos y actitudes, v) Las competencias como desempeño superior y diferenciado.

Bajo esta perspectiva parece que su interpretación depende del alcance (individual y organizacional) que a este término se le quiere dar, cuyo objetivo es pues mejorar la actuación profesional de los empleados a través de un nuevo rango en los procesos de recursos humanos, tales como: selección, compensación, evaluación del desempeño y el desarrollo de carrera profesional (Hondegheem & Vandermeulen, 2000). Por lo que, "...es urgente dotarse de definiciones más rigurosas de la competencia si se quiere evitar que los proyectos de gestión de desarrollo de competencias no se vayan abandonando progresivamente, cuando su necesidad no es discutible" (Le Boterf, 2001:42).

De acuerdo con el objetivo que propone este trabajo, relacionamos algunas definiciones que ponen en evidencia los diversos aspectos y enfoques, según el contexto en que son utilizadas. Así, se considera como competencias: a las características subyacentes que están casualmente relacionadas con la actuación efectiva o superior en un puesto de trabajo (Boyatzis, 1982:21, Spencer & Spencer, 1993:9; Shoroder, 1989:22; Guion, 1991; Cit. por Spencer y Spencer, 1993:9).

Una competencia es un conjunto específico de formas de conducta observables y evaluables que pueda ser clasificado de una forma lógica. (Aledo, 1995:52). Así como los comportamientos, habilidades, conocimientos y actitudes que favorecen el correcto desempeño del trabajo y que la organización pretende desarrollar y/o reconocer en nuestros empleados de cara a la consecución de los objetivos. (Alamillo & Villamor, 2002:5; NCVQ, 1997 Cit. por Horton, 2000:312; Hager et al;1994; Cit. por Hoffmann, 1999:279; Nordhaug & Gronhaug, 1994:91; Parry, 1996:50).

Las "competencias individuales" son los conjuntos de características personales y conocimientos que confieren a las personas la capacidad para desempeñar las funciones correspondientes a su ocupación, de manera satisfactoria. (Llopert, 1997:137). Son repertorios de comportamientos que algunas personas dominan mejor que otras, lo que las hace eficaces en una situación determinada. Las competencias representan, pues, un trazo de unión entre las características individuales y las cualidades requeridas para llevar a cabo misiones profesionales precisas (Levy-Leboyer, 1997:54; Bergenhenegouwen, Horn & Mooijman, 1997:36).

Se entiende como "competencia profesional" quien dispone de los conocimientos, destrezas y aptitudes necesarias para ejercer una profesión, puede resolver los problemas profesionales de forma autónoma, flexible y está capacitado para colaborar en su entorno profesional. (Bunk, 1994:9; CEDEFOP, 1996:3). En este mismo sentido, Guerrero, (1999:346) define como a la capacidad de aplicar en condiciones operativas y conforme al nivel requerido, las destrezas, conocimientos y actitudes adquiridas por la formación y la experiencia, incluidas las posibles nuevas situaciones que puedan surgir.

En cambio, "competencia laboral" ha sido definida como la habilidad para desempeñarse conforme a los estándares requeridos en el empleo, a través de un rango amplio de circunstancias y para responder a las demandas cambiantes (IHCD, 1998, Cit. por Irigoín & Vargas, 2003:45). También comprende las actitudes, los conocimientos y las destrezas que permiten desarrollar exitosamente un conjunto integrado de funciones y tareas de acuerdo a criterios de desempeño considerados idóneos en el medio laboral. (Miranda, 2003). No es una probabilidad de éxito en la ejecución de un trabajo; es una capacidad real y demostrada (CONALEP, 2011).

La "competencia ocupacional" es la posesión y desarrollo de habilidades y conocimientos suficientes, actitudes y experiencia para lograr éxito en los roles ocupacionales (Sims, 1991:142), es la habilidad para realizar las actividades dentro de una ocupación o

función para el nivel de actuación esperada en el empleo (Management Charter Initiative, 1990; Cit. por Horton, 2000:311).

Contraria a las definiciones anteriores, Le Boterf (1998:144) considera que las competencias no son seres o hechos que se pueden observar directamente, tampoco son entidades que existirían independientemente de las prácticas de evaluación que las intentan delimitar: Lo que existen son personas, equipos o redes que proceden con más o menos competencia. La competencia a decir de Dranke & Germe, (1994:3), es una capacidad multidimensional para realizar actividades de manera satisfactoria (...). Incluye conocimiento específico y habilidades técnicas para una actuación exitosa en el trabajo (...). Más allá de la adquisición de habilidades o de conocimientos, la competencia incluye la capacidad para hacer frente a lo incierto y a lo irregular en la situación de trabajo.

En general el término “competencia” a evolucionado a lo largo del tiempo y ha dependido de ciertos criterios de evaluación (Le Boterf, 1998:149), esta situación a sido considerada para que en la actualidad se haya emitido definiciones como: Un conjunto de comportamientos sociales, efectivos y habilidades cognitivas, psicológicas, sensoriales y motoras que permiten llevar a cabo adecuadamente un papel, un desempeño, una actividad o una tarea (Argudín, 2009:15). Conjunto de conocimientos, habilidades y destrezas, tanto específicas como transversales que debe reunir un titulado para satisfacer plenamente las exigencias sociales (ANUIES, 2011). Conjunto de capacidades que incluyen conocimientos, actitudes y destrezas que una persona logra mediante procesos de aprendizaje y que se manifiestan en su desempeño en situaciones y contextos diversos (SEP, 2011). Capacidad productiva de un individuo que se define y mide en términos de desempeño en un determinado contexto laboral, y refleja los conocimientos, habilidades, destrezas y actitudes necesarias para la realización de un trabajo efectivo y de calidad (CONOCER, 2011).

## Metodología

Para el cumplimiento de nuestro objetivo; esto es mostrar diversas acepciones del término *Competencia*, con la finalidad de presentar una definición de tipo global que contribuya a disminuir las complicaciones de los marcos de competencia en el contexto de los Recursos Humanos. En primer lugar, se utilizó la metodología de análisis de contenidos la cual se efectúa por medio de la codificación, es decir, mediante un proceso en el que las características relevantes del contenido se transforman a unidades que permiten su descripción y análisis. En forma seguida, se aplicó una muestra no probabilística correspondiente a las definiciones de 59 autores. Posteriormente se establecieron 15 categorías, integradas de la siguiente forma: a) Características Subyacentes, b) Conocimientos, c) Comportamientos, d) Capacidad, e) Comprensión, f) Estándares, g) Generalizable, h) Atributos, i) Creencias y Valores, j) Movilizable, k) Potencial, Experiencia, l) Aptitud, m) Habilidades y n) Actitud. Variables que de acuerdo con Guerrero & Alcaraz (2009) y Horton (2000) representan en esencia la conceptualización de las tres corrientes de competencias en el mundo conformada por una visión americana, francófona y británica. Posteriormente, de acuerdo al análisis terminológico se establecieron tres enfoques: i) Definiciones enfocadas al individuo: Relacionado a los procesos subyacentes en las que se ignora el contexto en el que se ponen en juego o se aplican las competencias, ii) Definiciones enfocadas al trabajo: Es decir, la competencia es parte de la conducta asociada a la conclusión de tareas atomizadas, iii) Definiciones Multidimensionales: También conocido como “Relacional”, este enfoque toma en cuenta el contexto para hacer combinaciones complejas de las habilidades, actitudes, valores, destrezas y conocimientos para desplegarlos en la búsqueda de soluciones complejas. Finalmente se procedió a cruzar la información a través de una “Tabla de frecuencias”, la misma que exponemos a continuación:

## Resultados

Como podemos observar infra en la Tabla 1, las definiciones sobre competencias de los autores seleccionados se sintetizan en los siguientes resultados: Las competencias toman en primer lugar una acepción de *Conocimientos*, correspondientes al análisis de las definiciones de 32 autores, que representan el 53 % del total. En segundo lugar, se puede apreciar que las competencias son un sinónimo de *Habilidad*, ya que el porcentaje indicado para esta acepción fue del 47%. De hecho, este término regularmente es una variable que los autores combinan con otras acepciones. El tercer lugar lo ocupa el significado de *Capacidad*, tal y como lo definen el 39 % de los autores analizados. En el cuarto sitio, con el 27%, también relevante aparece el término *Comportamiento*. En quinto lugar lo ocupa la denominación de *Actitud* con un 20%. Seguida a esta acepción encontramos con un 19% una preferencia por conceptualizar a las competencias como *Estándares*. Con un 17% del total encontramos a las definiciones inclinadas con las *Características Subyacentes*. Por debajo de esta acepción y no menos importante, encontramos con un 15% las definiciones que se inclinan a considerar las competencia como *Aptitud*. Del mismo modo con un 12% lo tiene la *Experiencia*. Con un menor número, encontramos a los autores que consideran a las competencias como *Atributos* y *Movilizable* con tan solo el 8%. Esto significa, que además de tratar de definir el término, los autores tratan de expresar una acepción de combinación de recursos que el individuo pone en juego. Finalmente, un número mucho menor de autores consideran a las competencias como *Creencias* y *valores* con un 7%, como la *Comprensión* y el *Potencial* con el 5% y con un 2% incluyeron el término *Generalizable*.

**Tabla 1. Análisis terminológico de competencias.**

	ENFOQUE	Unidades de análisis:	Característica subyacente	Conocimiento	Comportamiento	Capacidad	Comprensión	Estándares	Generalizable	Atributos	Creencias Valores	Movilizable	Potencial	Experiencia	Aptitud	Habilidades	Actitudes
		Definiciones															
1	I	Boyatzis	X														
2	I	Spencer y Spencer	X														
3	I	Shoroder			X												
4	I	Aledo			X												
5	I	Alamillo y Villamor		X	X											X	X
6	I	LLopart	X	X		X											
7	T	MCI						X								X	
8	M	NCVQ		X			X	X							X	X	
9	T	Hager		X				X								X	
10	T	Strebler			X			X									
11	T	Nordhaug y Gronhaug		X		X										X	
12	T	Parry		X				X								X	X
13	T	Woodruffe			X												
14	I	Guion	X		X				X								
15	I	Ansorena			X					X						X	
16	I	Pereda y Berrocal			X												
17	M	Mirabile		X		X					X					X	X
18	I	Rodríguez		X	X											X	
19	M	Mandon		X						X		X					
20	M	Ellström				X				X			X				
21	M	Le Boterf		X	X	X						X		X	X		
22	M	Levy-Leboyer			X							X					
23	I	CEDEFOP		X		X								X		X	
24	T	Sims		X										X		X	X
25	T	Bunk		X											X	X	
26	M	Dranke y Germe		X		X						X				X	
27	T	Hooghiemstra	X	X		X					X						X

28	T	Esque y Gilbert			X			X									
29	M	Zarifian					X										
30	I	Bergenhengouwen,	X														
31	T	Colardyn			X	X											
32	I	Dalton	X		X	X									X		
33	I	Hutmacher		X		X				X			X				
34	I	Du Crest		X													
35	T	Guerrero		X		X							X		X	X	
36	M	Marbach	X	X											X		
37	M	Woodall y Winstanley		X			X			X	X				X		
38	I	IHCD y Mirabet		X		X								X	X		
39	T	Argudín			X										X		
40	T	ANUIES		X				X						X	X		
41	M	SEP		X		X		X							X	X	
42	T	OCDE		X				X			X			X	X		
43	T	CONOCER		X		X		X						X	X	X	
44	T	CONALEP				X											
45	M	IHCD						X							X		
46	T	Tamayo		X		X								X	X	X	
47	T	Ducci											X				
48	M	OIT				X											
49	T	Moore				X						X					
50	M	Rojas															
51	T	Agudelo				X											
52	M	Mertens		X		X									X		
53	T	Miranda		X												X	
54	T	Muñoz de Priego	X	X							X	X					
55	T	Kochansky	X	X										X	X		
56	T	Bisquerra		X		X									X	X	
57	T	Tejada y Navío		X												X	
58	T	Diccionari de comp.				X											
59	T	González				X				X							
		<b>f</b>	<b>10</b>	<b>32</b>	<b>16</b>	<b>23</b>	<b>3</b>	<b>11</b>	<b>1</b>	<b>5</b>	<b>4</b>	<b>5</b>	<b>3</b>	<b>7</b>	<b>9</b>	<b>28</b>	<b>12</b>
		<b>%</b>	<b>17</b>	<b>53</b>	<b>27</b>	<b>39</b>	<b>5</b>	<b>19</b>	<b>2</b>	<b>8</b>	<b>7</b>	<b>8</b>	<b>5</b>	<b>12</b>	<b>15</b>	<b>47</b>	<b>20</b>

Fuente: Elaboración propia.

**I**=Definiciones enfocadas al individuo,  
**T**=definiciones enfocadas al trabajo,  
**M**=Definiciones Multidimensionales.

Las definiciones sobre competencias de acuerdo a los tres enfoques propuestos, nos indican que las competencias multidimensionales integran los atributos personales y las actividades profesionales en la consecución de los objetivos organizacionales, cultura y misión estableciendo una relación con el desarrollo de las competencias de forma compleja. Que, a diferencia de un enfoque establecido en el “Trabajo” o el “Individuo”, éste logra combinar dichas relaciones para entender la influencia de estas variables en el diseño de puestos de trabajo en competencias, así como el desempeño de los individuos. En este sentido, esta clasificación expresa mejor el significado de las competencias ya que no se limita al ámbito laboral exclusivamente o a las características del individuo.

Una conceptualización de competencias en opinión de Gallego (2000) y Ruiz (2010) debe de ser estudiada desde la teoría de la complejidad, debido a que las competencias poseen múltiples componentes que interactúan desde variables de contexto, capacidades, etc; que se entretrejen en interacción, y por tanto, sólo pueden comprenderse desde una visión compleja. Más aún, Gallego (2000:56) sostiene que “las competencias son construcciones y reconstrucciones de cada individuo en comunidad, o mejor, son las interacciones con un

colectivo dado, de donde deviene la necesidad de hacerse competente en una clase de saber que ese colectivo domina”.

### Propuesta

Tratar de construir una definición que abarque los componentes esenciales en aras de tener una comprensión más acertada del término competencia; aunque como ya se ha dicho, los distintos escenarios en los que se pone en juego, le da las connotaciones que la convierten en un término multidimensional, y por ende, difícil de conceptualizar. Por ello, a continuación se propone una acepción que intenta ser una aproximación en este mar de definiciones partiendo precisamente de una visión de complejidad por las distintas variables expresadas en el contexto organizativo. En este contexto se consideran como *Competencias*: “*Al conjunto de las habilidades, conocimientos, valores y características subyacentes, como recursos que se ponen en juego en un puesto de trabajo o una situación específica, que pueden ser desarrollados por la experiencia y la formación profesional, posicionando en un estado de mejora continua al individuo u organización que las posee, en el cumplimiento satisfactorio de las tareas y objetivos relacionados con su estrategia, vinculados a una misión organizativa, en el marco de su cultura*”. Esta aproximación conceptual se la puede justificar de la forma siguiente:

“*Conjunto de las habilidades, conocimientos, valores...* está relacionada con la productividad y con la demostración de actuaciones satisfactorias y efectivas. Los resultados (outputs) de las organizaciones y los hechos concretos de los individuos, evidencian la existencia de las competencias. Sí por el contrario, las habilidades, conocimientos y atributos de la persona permanecen de manera soterrada o sin manifestarse, las organizaciones no podrán desarrollarlas y ponerlas en práctica dentro de la organización. Significa también, que las competencias son perceptibles en la vida cotidiana, esto es, cuando alguien nos impacta por su ser, por el conocer y el hacer. Ahora bien, los valores forman parte integral de las competencias debido a que los juicios evaluativos generan actitudes en los individuos. No olvidemos que las actitudes darán como resultado un determinado comportamiento que afectará a la organización.

...*Características subyacentes...*La forma de conducirse o reaccionar de un modo determinado está ligado a una dimensión fundamentalmente emocional. Concretamente podríamos mencionar aquellas características que ayudan a las personas a ser conscientes de sí mismos, lo cual les proporciona *adaptabilidad y autocontrol*; lo que significa una buena relación con los demás. En este sentido, coincidimos también con Boyatzis (1982) ya que para este autor no sólo se trata de observar comportamientos, sino de distinguir ciertas características en los seres humanos para que sus acciones reflejen diferentes significados dependiendo de cada contexto en que tenga lugar, a través de un raciocinio originado por el aspecto cognitivo del individuo.

...*Como recursos que se ponen en juego en un puesto de trabajo o una situación específica...*Las competencias se valoran por la relación de causa y efecto en el puesto de trabajo- productividad- y su desempeño. Se menciona que están vinculadas a una situación específica, porque su aplicación puede dirigirse a otras actividades de interés para las organizaciones, (Horton, 2000; Raven, 1984; Spencer & Spencer 1993; etc.). Debemos destacar, que no compartimos la acepción de *Competencia Laboral*, porque consideramos que sólo se trata de puestos de trabajo o de trabajadores que pertenecen a una organización pública o privada. En este sentido es reduccionista, exclusivamente para el mundo laboral. Creemos que el concepto de *Competencia* es suficiente, debido a que es amplio y abarca cualquier ámbito en el que exista una actividad a realizar por el ser humano. Finalmente, los recursos que se ponen en juego es lo que para Le Boterf (2001) significa combinar y movilizar un equipamiento doble de recursos.

**...Pueden ser desarrollados por la experiencia...** Compartimos la opinión de Levy Leboyer (1997), cuando se refiere a que las competencias pueden ser desarrolladas por la experiencia. El individuo desarrolla habilidades en el transcurso del tiempo, automatizando sus tareas por la acumulación de conocimientos y destrezas que obtiene de sus vivencias. Experiencias directas.

**...Posicionando en un estado de mejora continua, al individuo u organización que las posee...** Es evidente que el individuo u organización competente, tiene ventajas con respecto a la de sus competidores. Aquí el nivel de competencia en el individuo y la organización se matiza y se gradúa de manera que las competencias se desarrollan permanentemente, adaptándose a las innovaciones y exigencias de su entorno. Moreno (1997:257), reconoce que: "(...) en la generación y gestión de competencias hay que contemplar, efectivamente, todas las dimensiones de la acción social: la realidad objetiva, que requiere competencias técnico-científicas; la social, que requiere comprensión de los procesos organizativos como espacios generadores de normas que determinan los comportamientos, y la subjetiva, que se configura como personalidad y que determina la percepción de la realidad y que es el soporte de las facultades y capacidades necesarias para que las tres dimensiones se integren racionalmente, es decir, objetiva y comprensivamente".

**...En el cumplimiento satisfactorio de las tareas y objetivos relacionados con su estrategia...** El cumplimiento satisfactorio se puede entender como un concepto más adaptado a la realidad y más estándar en la actuación profesional de los individuos en comparación con una definición de éxito utilizada por autores como Boyatzis (1982). Se intenta que la interpretación del término sea menos subjetiva. En otras palabras, el éxito en la empresa "A" no es valorado en la misma forma que en la empresa "B".

Con lo que respecta a las tareas, estas son realizadas por la organización para alcanzar sus objetivos, y como consecuencia de ello tienen su origen en la estrategia de la misma. De esta manera, los perfiles de competencias estarán relacionados con la estrategia organizacional en funciones específicas como: el reclutamiento, selección, formación y planes de carrera de los recursos humanos etc.

**...Vinculados a una misión organizativa y en el marco de su cultura.** Se puede visualizar la misión de la organización en conjunto, en donde los individuos que la integran persiguen un fin común. En lo que se refiere a la cultura, se puede entender que es el producto de la mentalidad y convivencia de los seres humanos, en el que se crean las costumbres, creencias- paradigmas- en un lugar y tiempo determinado. En este caso será la propia empresa la que se encargue de diseminar esta ideología. García & Dolan (1997:33) opinan que: "El nivel de lo que se piensa en la empresa, el cual es implícito y está constituido por las creencias o supuestos básicos y -sobre todo- los valores esenciales. Los valores esenciales, nucleares o compartidos son valores primarios de la cultura predominante. Estos significados compartidos facilitan el dar sentido y cohesión a los esfuerzos cotidianos, y son fundamentales para la generación de compromiso, más allá del interés individual inmediato".

Finalmente, nuestra propuesta conceptual forma parte de las acepciones que hemos denominado *Multidimensionales* por las razones ya expuestas. Sin embargo, debemos destacar los elementos que enriquecen el concepto de *Competencias* por la relación de variables que interactúan en el ejercicio que realizan las organizaciones a la hora de gestionar sus recursos humanos. En realidad estamos convencidos de las competencias que forman parte de los diccionarios de las empresas análogamente representan los colores que utilizará un pintor para realizar su obra o el músico que ensaya sus notas y la armonía para crear su música. Pues sí, la utilidad de las competencias en los distintos procesos de recursos humanos no puede tener una acepción que limite su verdadero alcance y contenido; por el contrario debe aproximarse el contexto que le da origen y razón de ser.

## Conclusion

Con la finalidad de aportar nuevos conceptos sobre este tópico, ha sido necesario comprender que existen diversos enfoques sobre lo que se debe entender por “competencias”; en las que puede verse reflejado distintas interpretaciones, inherentes al ámbito empresarial de los investigadores y expertos en recursos humanos que han participado activamente en la construcción teórica de la gestión por competencias, lo cual ha sido una fuente primordial para proponer nuestro punto de vista acerca de lo que significan las competencias, intentando con ello, tener una aproximación conceptual de equilibrio.

Por otro lado, de las distintas definiciones analizadas pudo comprobarse que las variables *Conocimientos* y *Habilidades*, se presentan con mayor frecuencia como los principales componentes de las competencias. Es decir, indicadores cognitivos y destrezas observables.

Finalmente, debemos aceptar por más esfuerzos que se intenten para que la comunidad internacional ponga en práctica una acepción unívoca de “competencia”, antes, se debe dotar nuevamente de un contenido científico y contexto social a este término, y despojarlo, por decirlo de algún modo, de esa forma mercantilista, que indudablemente nos lleva a una interpretación reducida sólo a funciones y tareas que únicamente sirven para elaborar listados estandarizados o universales de competencias. Es decir, hay que redefinir este término para que sea de mayor alcance y no se encapsule en un contexto laboral exclusivamente atiendo a la complejidad según los contextos que expresa.

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# THE DESTROYED MINARET OF THE Umayyad Mosque OF ALEPPO, THE SURVEY OF THE ORIGINAL STATE

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## Abstract

This paper discusses the spherical photogrammetry as a metric documentation technique applied in the field of architectural and archeological heritage. the mentioned technique can obtain dimensions and shapes of the architectural geometry which could be used to create 3D models, suitable for reconstruction and restoration. The applications shown in this paper is the survey of the Minaret of the Umayyad Mosque of Aleppo in the UNESCO heritage site of ancient city of Aleppo. The Minaret was destroyed during the current civil war, but fortunately a metric photographic documentation was effected three years before for many important monuments inside World heritage sites in Syria, and this minaret is one of them. This metric documentation could be a very useful reference for a future reconstruction or restoration of those structures.

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**Keywords:** Photogrammetry, Survey, 3D modeling, spherical photogrammetry, panorama image-based modeling

## Introduction

Syria has a huge historical and archaeological heritage thus the capital, Damascus, considered to be one of the oldest cities in the world. Six Syrian sites are part of the World Heritage Site (Ancient city of Damascus, ancient city of Aleppo, Ancient city of Basra, Ancient Villages of Northern Syria, Crac des Chevaliers and the site of Palmira). Many monuments on those sites were severely damaged since 2011 due to the civil war in Syria.

The Great Mosque of Aleppo "Umayyad Mosque", which is one of Syrian's most famous mosques, was declared by UNESCO Director-General Irina Bokova in 24th of April 2013 for the destruction of its minaret during the clashes in the northern part of Aleppo city. This year, 2013, all of the Syrian sites are listed as World Heritage in Danger. Many panoramic photographs were captured during the visit of G. Fangi to Syria in 2010. Those photographs are used by us now to get a metric documentation using the spherical photogrammetry to produce 3D models refers to their situation before the civil war.

## Main Text

The Photogrammetry is the science, and art, of determining the size and shape of objects as a consequence of analyzing images recorded on film or electronic media<sup>221</sup>. The close range form of the photogrammetry is very useful for fast, economic and accurate documentation for the heritage. The advantage of using the photogrammetry for the survey is that the data acquisition is fast and simple, and the extraction of the metric information or the restitution can be done in any time after that. Many photogrammetric techniques are in use

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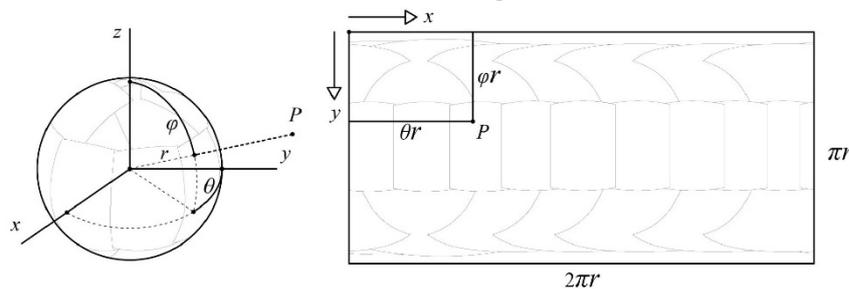
221 J.G.Fryer, 1996

today but they are different from many point of view. The spherical photogrammetry is one of those techniques and one of the fastest documentation techniques applied for huge monuments and sites it is developed by G. Fangi.



1/ Panorama of the Roman theater in the Ancient city of Basra

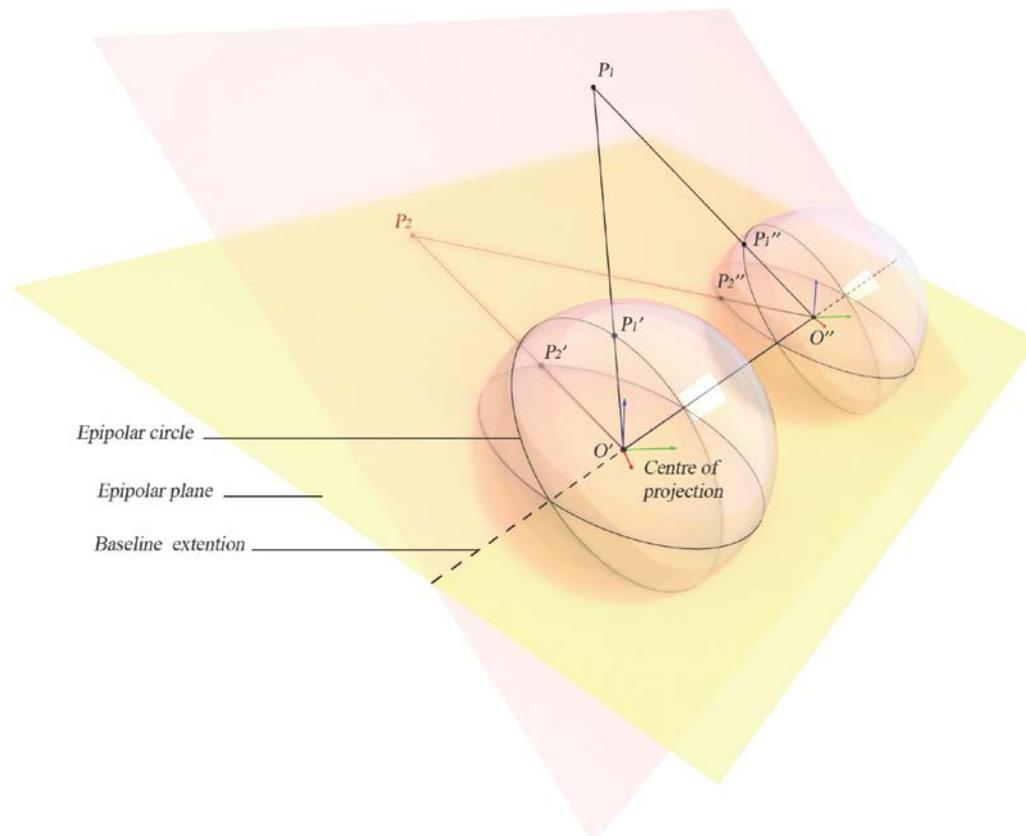
The multi-image panoramic photo is series of digital images are taken from the same point of view to cover up to  $360^\circ$ . The images are stuck using commercial software and projected on a sphere. The sphere is then mapped in a plane, with the so-called longitude-latitude projection or equirectangular projection. It has a great metric value for many reasons: 1. it is easy to transform between spherical coordinates system and Cartesian coordinates system; 2. it is unlimited as resolution and depends only on the used lens; 3. it has up to  $360^\circ$  as field of view which can cover the entire surrounding environment.



2/ Multi-image panoramic photo and equirectangular projection, transformation between spherical and planar (equirectangular) coordinates.

When we have more than one panoramic image it is possible to obtain 3D data. The first step in photogrammetry is the orientation of the panoramic photos. The orientation is an important phase of the process to define the position and rotation of all panoramas; they have to be oriented with a block bundle adjustment<sup>222</sup> and one measurement at least is needed to give the survey model the right scale.

<sup>222</sup> Gabriele Fangi, Carla Nardinocchi. Photogrammetric processing of spherical Panoramas - The Photogrammetric Record 28(143): 293–311 (September 2013) DOI: 10.1111/phor.12031 pg. 293- 311 © 2013 The Remote Sensing and Photogrammetry Society and John Wiley & Sons Ltd



3/ The epipolar Geometry of two panoramic photos

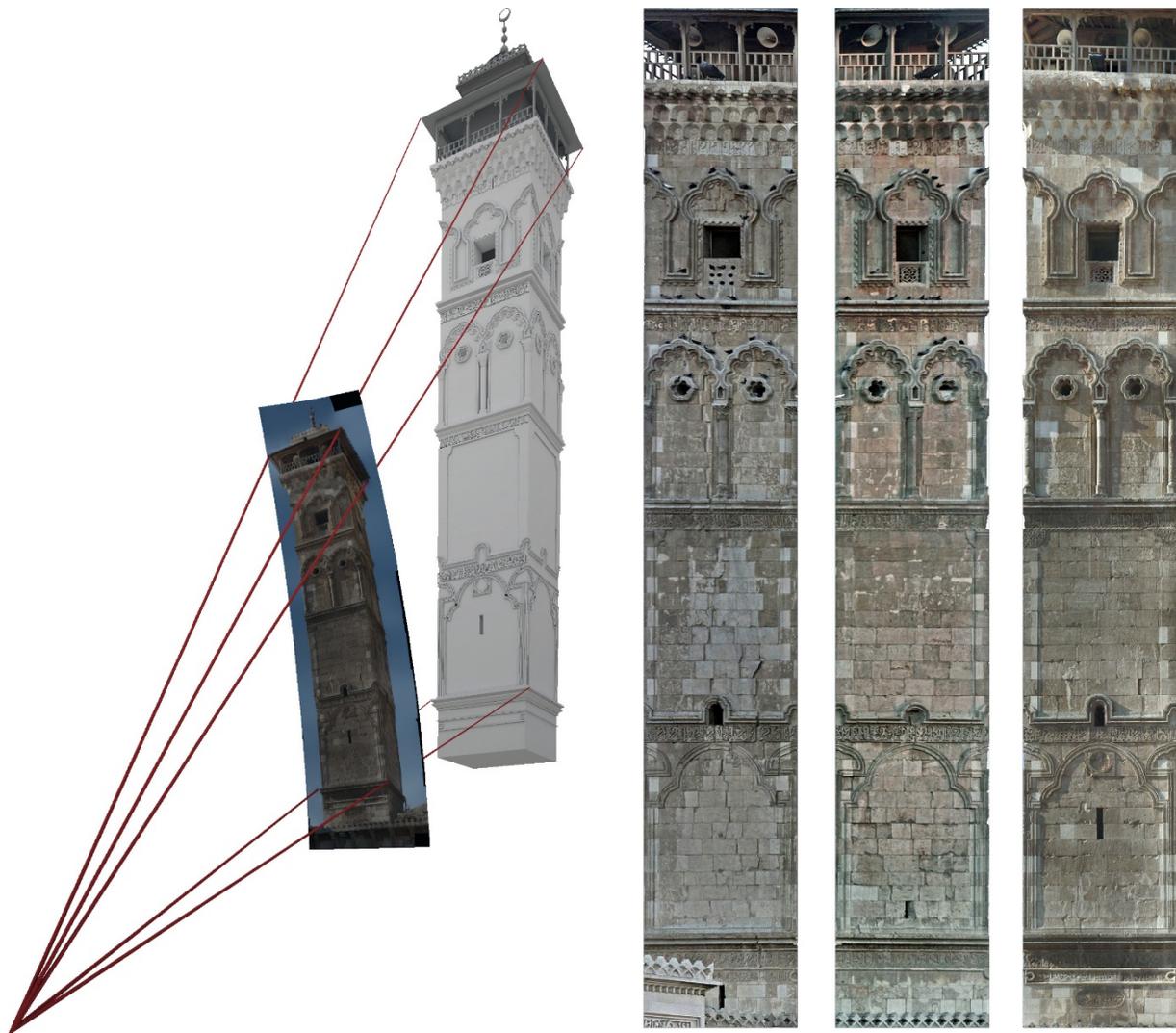
We applied this technique for the orientation of the Great Mosque of Aleppo's panoramas which was created by the Umayyad Caliphs. It is one of the world heritage sites since 1986. Its minaret, dating back to 1090, was created during the Seljuk period. It was an icon of Aleppo City for nearly thousand years, and after the reports of the complete destruction of the minaret of the Umayyad mosque of Aleppo we started to survey the minaret by means of spherical photogrammetry crating the 3D model using the high resolution panoramic photos.



4/ The situation of the Umayyad mosque of Aleppo before and during the war

About 550 photos were used to create 25 panoramas with different focal length (50 mm-200 mm). The best panoramas were chosen for the orientation, then using the orientation parameters which are six for every image, (three coordinates of the centre and three rotation angles), it was possible to create the main volume of the minaret. The depth was obtained by intersection in space using more than one panorama for every point. Therefore, the next step

was projecting the photos using spherical texture mapping in the virtual space. The obtained textured model was a rectification of the elevations of minaret in 3D space which could be itself an important metric result.



*5/ Image Rectification using the 3D model and spherical mapping of panoramic photos*

The details were modeled on the main minaret body in correspondence with the image projections using the so called Interactive Panoramic Image-Based Modeling method to use the 3d modeler as survey instrument. It exploits the geometrical constraints to simplify and speed the modeling. It is based on the recognition of the geometrical elements of the surveyed architecture. It is ideal technique for the architectural representation, because it produce a low-poly model rich of high resolution maps texture. Therefore, the result model make this architecture easy to read for the architect, restorer.



6/ The wireframe, shaded and textured model

The high resolution images were useful to create many details of the minaret as the relief writings which were very high. The high resolution of the panoramas is due to the focal length of the used lens which was 200 mm, but the use of such high focal length lenses involves many photos to create a single panorama.



7/ A detail of the facade of the minaret from the textured 3D model (orthographic rendering)

### **Conclusion**

Close range photogrammetry techniques in general are very useful in emergency cases, they are fast in data acquiring, economic and produce a high accuracy textured 3d Model. Spherical photogrammetry in particular has many more advantages as the use of very high resolution image to create detailed model and the 360° FOV. The interactive Image-based modeling can be combined with the spherical photogrammetry result to a fast restitution method which can produce a high resolution textured 3D model.

Now we are working on the documentation of many other Syrian heritage sites to create metric references to a possible future restoration of those monuments. We have a partial metric photographic documentation of Basra, Palmira, Crac des Chevaliers, Umayyad Mosque of Damascus and Aleppo citadel.

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## THE CASTLE, THE TOWN OF RASHAN (TREPÇA)

*Pajazit Hajzeri, PhD*

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### Abstract

During the long history of the Albanian people, an almost forgotten part, and without being sufficiently studied, is the cultural heritage with special emphasis on fortified buildings as is the town (alb. "Gjyteti") of Rashan (Trepça).

The paper about Trepça castle is the first paper that addresses the current condition of the castle and brings historical data, oral legends that are still part of the memory of population, toponyms, microtoponyms, and also assumptions regarding the history of this castle with extraordinary historic values about the past of the Albanian people in this area.

The uniqueness of this castle is its role in protecting the mining and mineral wealth of Bajgora region, and the main roads that gravitated to this part of Kosova.

Another novelty is the drawing of the castle's layout which is presented for the first time, and a number of photographs that reflect the current condition of the castle.

This paper will serve as a guide for knowing this castle, and also for eventual intervention to conserve and restore the castle in order to return its treasured historic values as a symbol of the past.

It is interesting the case of some holes found west to the castle's surrounding wall, 0.9 cm deep, and with a diameter of 0.6 cm, that looked like they were there to drain the water, but their construction, I think, was an architectonic work that reinforced the wall in case of a tectonic quake (earthquake).

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**Keywords:** History, Heritage, Monument, Culture, Art

### The castle, the town of Rashan (Trepça)

The joining of Mazgiq River and Rashan river expose the hill of Rashan (Trepça). The castle of this small town (alb. "Gjytet") is located somewhere 5 km flight distance from Mitrovica. It is a castle built by Illyrians, respectively Dardans in the IVth-Vth centuries AD during the late Antiquity, with a very favorable geografic position with an height above-sea level at 851 m. The castle of Trepça was a vanguard of the Trepça mining source and it controlled the main road that went from Municipium DD, Zveçan, Trepça, and Llap, and also controlled the road Trepça, Vicianum, Novobërda (Artana).

The ruins of this "Gjytet" castle are found on a steep hill, from where the view around was comprehensive.<sup>223</sup> Without any hindrance, almost all the plain of Kosovo is seen from the castle, whereas the castle of Vushtrri communicated directly with the castle of Trepça. From north it defended the mining galleries, especially the Trepça mining and the town outside the castle. From the west it communicated with the hill of Cërrnusha and that of Kutllovc, which Castle Rashan probably should have had towers too. There was a communication from these hills with the castle of Zveçan, the hill of Sokolica and Mejdan, Vidishiq edifice (alb. "Gradina") and with Kreshbardha (Ostrokoplen). On the hill of Kutllovc, the Yugoslav army had built a military base, while the hill of Cërrnusha was used for military shooting exercises. Thus, both these hills had a very favorable strategic position

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<sup>223</sup> Abdullah Mulaku, Disa të dhëna lidhur me lashtësinë e Vushtrris me rrethinë, Mitrovica, 2004, p. 14.

even for the Yugoslav army to control all the plain of Kosovo including that of the most Northern point to the most Southern, Western, and Eastern point. It was possible to communicate from the castle with Qyqavica Mountains, the central mountains of Kosovo that divide the plain of Kosovo from the plain of Dukagjin.



From the north side the castle of Rashan is surrounded by the hill called “*Bhiri i dhisë*” (the Goat Horn) whereas from the west it is surrounded by the hill of Moistir. The hill of Moistir is named by the monastery situated in the furthest part of this mountain. I claim this based on the ruins and the piles of stones found in that site and also based on the legend of the local people. From the hill of Moistir in the north-west side there are two tunnels that are known by the people as “*birat e kishës*” (The Church Holes).

Bajgora region is a region very rich in different kinds of ore but during the Middle Ages it was mostly known for gold and silver. In the nineteenth century Arthur Evans mentions the Municipium DD as well as a fortress called Monte del argenta – Montania argenta, whereas in the maps of Poitengen the city of Argjentania is presented near the above mentioned fortress, but there is a possibility that it is the Fortress of Trepça town the one that was mentioned because it was known as a very rich town. Local people say that the town possessed even golden tufting machines that prove the region’s mineral wealth where this fortress lies.<sup>224</sup>



Based on the construction material, the castle belongs to the late Antiquity, it is multi-layered, and it is surrounded by three pairs of walls. The first wall surrounds the city center about 300 m, the second wall surrounds it about 200-250 m, and the third (inner) wall is

<sup>224</sup> Jahja Draqolli, Pajazit Hajzeri, Emisioni shkencor "Etnik" në televisionin publik të Kosovës, RTK më 06.11.2007, me temë “Gjyteti i Rashanit (Kështjella e Trepçës)”.

somewhat closer to the center. The walls are built with well-carved stones. The front wall is also associated with binding material. The inside of the wall possess also binding material but the stones are not carved well. The wall thickness is about 2 m while the height of the preserved walls is 2-3 m.

The castle is located on top of a cliff with an 80 – 100 m height from the ground (base). It is in the shape of the number eight 170-200 m long (north-south) and 30-45 m (east-west). The north side and the east side have natural protection whereas the west side and the south side are protected by walls. The entrance road begins from the north then goes round towards the west and enters in the castle from the south. The castle was protected by the watchtowers that included: a north tower, two west towers, and a south-east tower.

The Smrekovnica River that supplied the castle with drinking water is located west of the castle. South of the castle are the ruins of the city whereas the castle had a fortified position and construction in order to protect the city. Inside the castle fence, there are also a number of objects such as the watchtowers, Donjon (the main tower) which was located in the center of the castle, the water reservoir, as well as two other objects in the shape of rectangle where one of them is thought to have been a small chapel

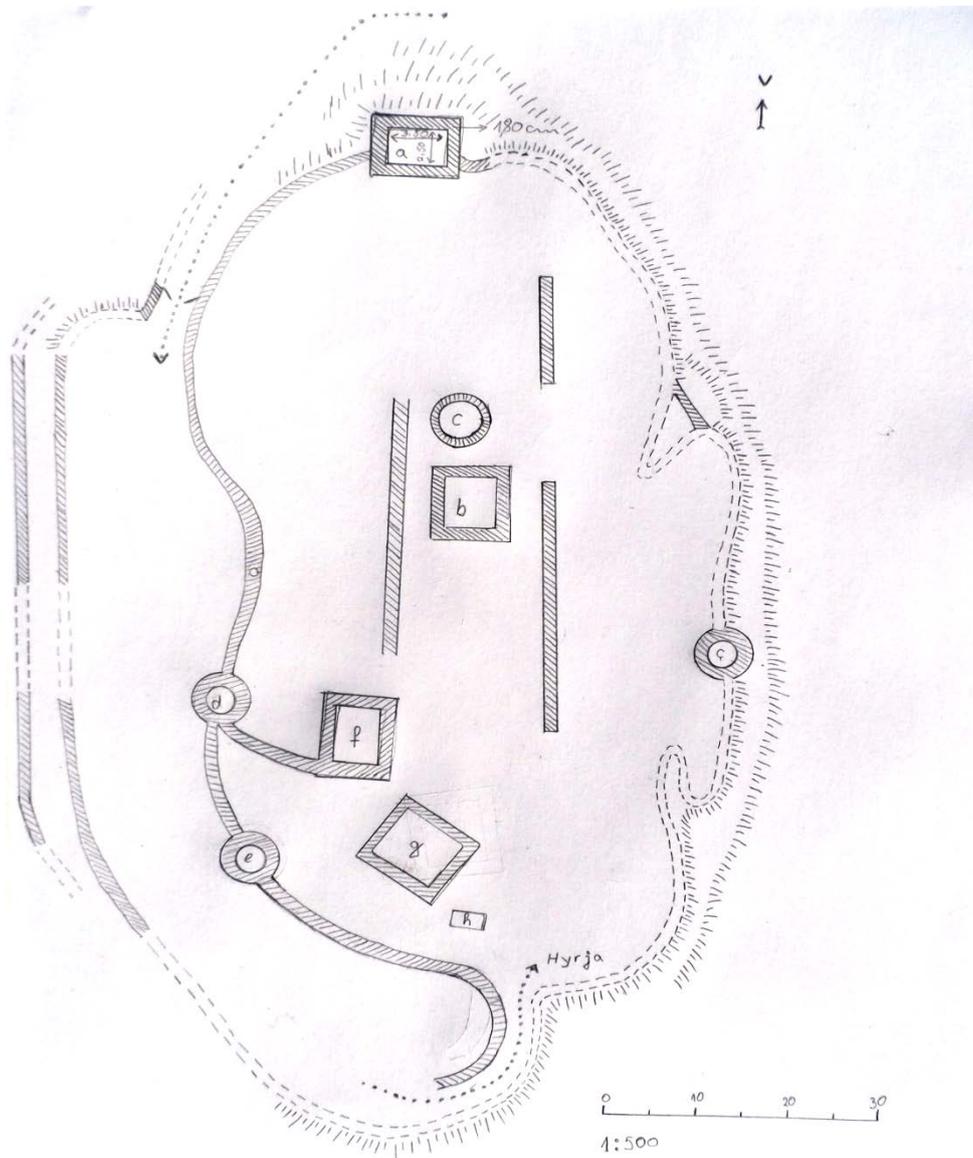
The archives of Ragusa (Dubrovnik) and Venice give us a lot of information about this city because in the fifteenth century we encounter in Trepça many Ragusans, Venetians, Montenegrins, Saxons, etc. and together with Novobërda (Artana) they are considered as the largest cities in Kosova.<sup>225</sup>

According to people's oral data, under the castle, south of the castle, there is a tunnel that is already closed. Its inner part was walled and served as a warehouse for cereals. Cereals such as millet, barley, etc., are found in that tunnel.

The presented layout of Trepça castle from the north side consists of the north tower marked with the letter a, the width of this defensive tower is 2.50 x 3.80 m, and the wall thickness is 1.8 m. The material used is stone together with the binding material. In the inner part of the tower, popularly known as "*dhoma e mbretit*" (the King's Room), in the south The King's Room side about a meter high, is derived a stair in the form of a guardrail to put things on it. From the north tower was controlled the road coming from Trepça and the road coming exactly from Rashan north-east of the castle. Those roads joined at the castle entrance. The two other west towers marked with d and e communicated with Cernusha and Koder villages located in front of the castle and at the same time they protected the road that led to the inner part of the fortress. The East of the castle had only one watchtower marked with ç which communicated with the Moistir hill while the entire east side starting from the most northern point to the most southern was protected by the nature itself. The object marked with the letter c is the water well whereas the object marked with b is thought to be "*donjon*" or the main tower. The objects f and g are associated facilities within the castle. Regarding the f object, it was protected by a wall from the watchtower side d to an object that I think was a cult object. The site marked with h from the clandestine excavations has turned out to be a grave that according to the location, I think it has been the grave of a cleric or superior killed and buried during a conflict (war).

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<sup>225</sup> J. Drançolli, P. Hajzeri, op cit.



The castle was also surrounded by two walls on the west side where the castle was less protected from nature, whereas even if the part where the wall is marked by broken lines today does not exist, we can see the edge of the cliff that should have been surrounded with a wall for the inhabitants' own safety so that they would not fall into the 100-meters deep chasm.

The very favorable geographic position of this castle gives the impression, and I suppose that it has been a branch of a Dardan royal dynasty. I state this based on some toponyms and microtoponyms found around this castle

We know very well that the goat's horns were a royal symbol from the Illyrian period to the late Middle Ages. Pyrrhus kept the goat's horns on his helmet. Scanderbeg kept the goat's horns on his helmet too.

The northern tower of the castle is known as the king's room. From that room it is observed the nearest mountain called "*Briri i dhisë*" (The Goat's Horn). North-east, not far from this castle, it is situated Gumnishta village, where the mountain called "*Mali Kurora*" (The Crown Mountain) is located. Also in this village there is another microtoponym called "*Prroi i hyjneshës*" (The Goddess Creek). There is also found an altar corresponding to the Antiquity which has a much damaged inscription that has not been deciphered yet. This altar is called "*altari i hyjneshës*" (The Goddess Altar).

We also have the two church holes mentioned earlier which are located on the right side of the "Reka e keqe" in front of the Trepça castle. Local people say that the Dardan king has attended religious ceremonies and different kind of games<sup>226</sup> that took place during the holidays outside the castle walls.

Given these toponyms, and microtoponyms, and the legends and knowing the values of this region's ore, I assume that this castle has been a royal Dardan residence.

## Conclusion

The great values of this castle are vital for an intervention as soon as possible for its conservation and restoration. As an emergency action for the castle, is considered getting rid of the vegetation, which gradually is destroying this ancient wealth with extraordinary values, also starting the archaeological excavations in the castle to point out the monuments located there and to study the aging layers of this cultural monument.

We propose the international mechanisms of UNESCO to interfere as soon as possible in order to avoid the castle destruction and the disappearance of a very rich culture with incalculable values.

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<sup>226</sup> Abdullah Mulaku, Disa të dhëna lidhur me lashtësinë e Vushtrrisë me rrethinë, Mitrovicë, 2004, p. 24

## TOPIC: ALBANIAN – GREEK DICTIONARIES, COMPILED IN THE 90'S

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### Abstract

The compiling of Greek - Albanian and Albanian - Greek dictionaries after the 90's has been a necessity due to the contacts which were established between the Greek and Albanian people after the fall of Communism in Albania and after the Albanian people came out of the half-century isolation.

The efforts for compiling bilingual dictionaries during this period have been very important although there didn't exist models which could be used to compile such dictionaries.

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**Keywords:** Dictionary, author, bilingual dictionary, Greek – Albanian, Albanian – Greek, lemma, phraseological dictionary

### Introduction

Through this article, we will present the three Albanian – Greek dictionaries which were compiled during the 1990's and here they are:

“*The Albanian – Greek Dictionary*” of Konstandin Papafili, which was published in Athens in 1997.

“*The Albanian – Greek Dictionary*” of Niko Gjini which, was published in Ioannina in 1998.

“*The Phraseological Dictionary of the Balkans*” compiled by Jani Thomai, Xhevat Lloshi, Rusana Hristova, Kosta Qirioazati and Ana Melonashi, published in 1999.

### Main Text

In 1997 Konstandin Papafili publishes the Albanian – Greek Dictionary, [K. Παπαφίλη, *Λεξικό Αλβανο - Ελληνικό*, Αθήνα, 1997]<sup>227</sup>, which contained 30.000 words in Albanian and their Greek equivalents. The dictionary is of the same quality as the Greek-Albanian Dictionary that this author published at the same time. This dictionary also has a pronounced pragmatic character, aiming to lead the reader easily from the Albanian word into its corresponding Greek.

The dictionary has the undisputed merit of displaying in a small and very useful volume a relatively great number of words. It is the Bilingual Albanian – Greek Dictionary which up till now has the greatest Albanian lexicon with the greatest number of *lexemes*.

The dictionary is equipped with a short Preface, with Bibliography and with the Abbreviations used in both languages, with the Lexicon, the Geographical Names, and also with Grammatical charts, so technically, it meets all the necessary parameters of a contemporary dictionary.

The dictionary was published at a time when the Albanian lexicography, monolingual and bilingual, had made many great achievements. That's why the work of compiling a quality book might have been eased on many levels.

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<sup>227</sup> K. Παπαφίλη, *Λεξικό Αλβανο - Ελληνικό (Albanian-Greek Dictionary)*, Αθήνα, 1997.

But we can't say that the quality is the best one:

1. The Albanian lexicon, apart from the expertly selected words, often leaves much to be desired: words which are not found at all in Albanian might be found in it, either in the standard or in the dialects or social parlance, like *keverim*, -i, -e, -et [o]. *η διακυβέρνηση, η διοίκηση*. In the dictionaries of Today's Albanian, we don't find even the word *qeverim* which could lead the author to an acceptable mistake. A few lines below in the dictionary we have also the word *qeverisje* of Standard Albanian which the author gives with the same meaning, but not as a synonym: *qeverisj/e, -a [η]. η διακυβέρνηση, η διοίκηση*.
2. The author doesn't respect the orthographical and orthoepic norm in selecting many words, by giving often phonetic variants. We believe that he hasn't made use at all of the explanatory dictionaries of Standard Albanian, although in the Bibliography, he has actually made reference to the Dictionary of Modern Albanian Language (1980), the Dictionary of Today's Albanian (1984)<sup>228</sup>. Perhaps he might have been influenced by the Albanian- Greek Dictionary of N. Gjini (1971) or by the Dictionary of Albanian Language (1954). For example, we have tens of words like: *çpartallim, çpartalloj, (i, e) çpartalluar, çpëlahem, çpëlahaj, (i, e) çpëlarë, çpërdor, çpërdorim, çpërdoraj, çpërndahem, çpërndaj, çpërndarje, çpërngul, çpërngulem, çpërngulje, çpraps, vendos, vendoset, vendosje, çvoshket, çvoshk, çkëlqen, çkarkim, çkarkohem, çkarkoj, çkrep, mvar, mvarësi, mvartës, mvartësi* etc.
3. He gives a lot of derivational paradigmatic families, but quite often they are truncated: *çpërbëhem, çpërbërje (shpërbëj and (i, e) shpërbërë are missing) ; çpërblehem, (i, e) çpërblyer (shpërblim and shpërblej are missing, words which are often commonly used);* whereas for some other words like *çvaros* and *çpraps*, not only do we see a normative incorrectness in their display, but not a single word derived from them is given in the dictionary, etc.
4. In the dictionary we find also dialectical and obsolete variants like *çapuar (i, e). [ε] τροπημένος* (which stands for *i shpuar*), *druar* (which stands for *druvar*), *dukuni* (which stands for *dukuri*) etc.
5. We also see barbarisms which Albanian might have once used but hasn't really made them its own in the monolingual or bilingual dictionaries, like *mylfiz, -i [o], χρεωκοπημένος; emboli* etc.
6. There are borrowed words in Albanian which in the dictionary are given with distorted pronunciation, which lead to double mistakes, like *byrokratizoj (burokratizoj), byrokrat (burokrat), byrokraci (burokraci), byrokratik (burokratik), byrum (bujrum, urdhëroni)* etc.

Many mistakes which are seen in the dictionary might be explainable, because the author of the Dictionary (of 2 dictionaries) is not a lexicographer, but a writer. In the preface it is said that "The writer worked a lot to make the dictionaries as correct and as complete as possible".<sup>229</sup>

\* \* \*

1. In the year 1986, Niko Gjini, now retired from 1971, and with a life dedicated to Greek and Albanian, after he had finished compiling (but without giving the final touch) the biggest Greek – Albanian dictionary, gets back to work and revises, completes and updates *the Albanian – Greek Dictionary* published in 1971.

So after an extraordinary work, spurred by the great changes in both countries, in Albania as in Greece, historical and economic changes, but also linguistic ones (Albanian was standardized at the Congress of Equalization, while the Greek language chose *Dhimotiqi*

<sup>228</sup> Κ. Παπαφίλη, *Λεξικό Αλβανο - Ελληνικό (Albanian-Greek Dictionary)*, Αθήνα, 1997, pg. 14.

<sup>229</sup> Κ. Παπαφίλη, *Λεξικό Αλβανο - Ελληνικό (Albanian – Greek Dictionary)*, Αθήνα, 1997.

as its standard variant), in 1998 at the University of Ioannina in Greece, he published *Αλβανο-Ελληνικό Λεξικό (Albanian-Greek Dictionary)*<sup>230</sup>, as a book under the direct care of the philologist, Jeorgjio Kapsalis.

Like the work (Greek – Albanian Dictionary), published in Ioannina in 1993, this dictionary is also highly praised by the lexicographical and linguistic Albanian and Greek communities, and also by the educated layman, by considering the publication of the work as a great event in the culture of both groups.

**We should admit that, this dictionary, viewed in its entirety, is the most accomplished Albanian – Greek lexicographical work until today**

Lets argue this assertion:

a. The author, in the three dictionaries, doesn't give us any information regarding the number of words contained in any of them (neither for the Albanian – Greek Dictionary published in 1971, nor for the Greek – Albanian Dictionary published in 1993, and also not for the Albanian – Greek Dictionary published in 1998). But given the volume of the Dictionary, which contains 1.310 pages, about 100 pages more than the Greek – Albanian Dictionary of 1993, which contains 50.000 words in Greek and their equivalent in Albanian<sup>231</sup>, we think that this dictionary also **contains 50.000 words or at least up to 45.000**, which means, more words than the “*Dictionary of Today's Albanian Language*” (1980). (From a comparison made superficially in both dictionaries concerning the letter **A**, we see more words in the dictionary of N. Gjini, designations regarding especially the sphere of religion).

b. The dictionary of N. Gjini (**Albanian – Greek Dictionary**) like the other dictionary with the same size of this author (**Greek – Albanian Dictionary**), **is mainly a table dictionary** (this is also of a medium type and not convenient to be carried like a text book by students) and as such *it offers an extraordinary material enough to undertake scientific studies of different fields, in the linguistic or non linguistic fields.*

c. N. Gjini writes this dictionary after he had a long experience in the bilingual lexicography. The author had published the *Albanian-Greek Dictionary* in 1971<sup>232</sup>, and (*Greek –Albanian Dictionary*)<sup>233</sup> but in 1998 he comes with another publication of a different size and much better in every other way, either in the amount of words, in the quality he gives the equivalent Greek word, also in the lexicographical techniques and even the visual representation.

d. In compiling the dictionary N. Gjini has been based on a theoretical scientific literature and **on the best monolingual and bilingual lexicographical publications in Greek and Albanian**, scientific literature which is much richer than the one used in the dictionary published in 1993<sup>234</sup>.

e. The dictionary written by N. Gjini gives the reader, especially the students of Greek nationality who learn Albanian, but also every Greek person who is interested in learning Albanian, a dictionary which contains more than **50.000 entries**. This great corpus of words means that in there it is represented almost the entire material, spiritual, intellectual world of the Albanian people, because the words lead us to the history and to the present situation of this nation, to its culture and psychology, which often revolve on a common sublayer. So, the user of the dictionary not only increases his linguistic competence with words, meanings,

<sup>230</sup> N. Γκίνη, *Αλβανο - Ελληνικό Λεξικό (Albanian-Greek Dictionary)*, Αθήνα, 1998.

<sup>231</sup> J. Thomai, “*Lexicology of the Albanian Language*”, Tiranë, 2006, pg. 326.

<sup>232</sup> N. Gjini, “*Albanian-Greek Dictionary*”, Tiranë, 1971.

<sup>233</sup> N. Γκίνη, *Ελληνο - Αλβανικό Λεξικό (Greek-Albanian Dictionary)*, Ιωαννίνων, 1993.

<sup>234</sup> N. Γκίνη, *Αλβανο – Ελληνικό Λεξικό (Albanian-Greek Dictionary)*, Αθήνα, 1998, pg. XLVII – XLVIII.

Albanian phraseology, but he is also involved and involuntarily becomes part of the Albanian culture.

f. The dictionary has another undeniable merit, because **the entire lexical, semantic material, and explanatory examples etc, belong to the Standard Albanian**, thus giving a very great contribution in this direction. We would like to emphasize this fact, because as we have said, in 1997, only a year ago, in Athens **K. Papafili** publishes *Λεξικό Αλβανο - Ελληνικό (The Albanian-Greek Dictionary)*<sup>235</sup>, a book which had made use of the lexicon of dictionaries written before the 1972, which means prior to the Congress of Orthography of 1972 and thus they do not represent the established Standard.

g. N. Gjini, based on the best tradition of bilingual Albanian lexicography<sup>236</sup>, in a professional way shows that he was able *to move ahead and write not just a simple synonymical bilingual Albanian-Greek Dictionary*, by giving only the words in Albanian and the equivalent lexical correspondent in Greek. He gives in a detailed way the semantic structures of the words, thus rendering the dictionary almost in an explanatory one, in the way he had done with the dictionary published in 1993.<sup>237</sup>

It is known that Albanian is a polysemantic language (compared to the Greek which is a synonymical language), and N. Gjini shows how good he has been in giving not only its lexical richness when confronted with the Greek one, but also in giving the semantic richness, something which is difficult to achieve in bilingual lexicography. There are thousands of words which are given in semantic structures with more than just one meaning, in fact there are a lot of words with more than 5 meanings which in general are content words (meaningful). For example the verb *bie (rashe, rene)* has 20 meanings.

h. The dictionary does not only give the word in Albanian or in Greek, **but has the extraordinary merit of featuring thousands of phraseological units**, in which can be seen not only the distinctive particularities of each language, but mostly it serves as an indicator of the ethnolinguistic richness of the Greek and Albanian languages, etc.

These facts only would suffice to argue what we mentioned above to show the commonalities, but also the distinctions between the languages. The word *zemer* alone has more than 20 phraseological units, where we could mention: *mori zemër / πήρε θάρρος, me gjithë zemër / μ' όλη την καρδιά, πρόθυμα e kam në zemër / τον έχω στην καρδιά, zemër e thjeshtë / απλή καρδιά, e pastër / καθαρή καρδιά, zemër e madhe / μεγάλη καρδιά, zemër fisnike / ευγενική καρδιά, zemër e mirë / καλή καρδιά, zemër e artë / χρυσή καρδιά, with the word *mend* there are about 30 phraseological units, whereas with the word *mendje* there are over 20, among which we would choose: *kam ndër mend / έχω κατά νουν, e lanë mendtë / ξεκούτιανε, αποβλακώθηκε από τα γεράματα, ia mori mendtë / τον ξετρέλανε, του πήρε τα μυαλά, τον μάγεψε, with the word *gojë* there are over 20 phraseological units etc.**

i. The author has masterfully given many examples to illustrate the meaning or the meanings of the words. Their selection has greatly increased the values of the dictionary. The illustrations are simple phrases (two – member syntagms) simple sentences but also a lot of ephemeral words, in the way he has used in the *Greek –Albanian Dictionary*, published in 1993.

j. The dictionary gives the Albanian word marked with all the grammatical elements. But it is very important to stress the fact that when the Greek word is given in the dictionary, although this language is a second language, its main grammatical indicators are also given, by showing first its appartenance to the lexical-grammatical field.

k. The dictionary has another merit. The lexico-graphical material might attract the attention of the scholars of history of Albanian and Greek languages, because the borrowings

<sup>235</sup> Κ. Παπαφίλη, *Λεξικό Αλβανο - Ελληνικό (Albanian-Greek Dictionary)*, Αθήνα, 1997.

<sup>236</sup> Ν. Γκίνη, *Ελληνο - Αλβανικό Λεξικό*, Ιωάννινα, 1993, pg. XLVII – XLVIII.

<sup>237</sup> Ν. Γκίνη, *Ελληνο - Αλβανικό Λεξικό*, Ιωάννινα, 1993.

from Greek language can be detected easily, either those of scientific terminology (it is well known that the majority of terms are Greek or Latin) or those which have entered the language in the old times or in the Byzantine period, or the contemporary ones, which could be related to the revival of terminology of orthodox religion, etc.

The dictionary is the best published so far of the Albanian-Greek kind, also because of some other particularities:

a. The dictionary contains 35 pages of ample information regarding the alphabet of Albanian and Greek and the transcription of phonemes from one language to another, instructions how to use it, especially instructions related to the complementary elements of grammar.

b. The dictionary has an appendix containing a glossary with main **Abbreviations** (like **acronyms**), which are related to the Albanian, Greek and world culture, a phenomenon which is seen for the first time in any Greek-Albanian dictionary.

c. The dictionary has a list of hundreds of units of toponyms, which are related to the world in general, but in particular to the Albanian culture, by giving hundreds of place names of Albania.

d. The dictionary has also another dimension, it is an indicator of very good interstate relationships between Greece and Albania, because it also features the greetings of the presidents of both countries, Mr Rexhep Mejdani, president of the Republic of Albania, and Konstandinos Stefanopulos, president of the Republic of Greece, which view the publication of this dictionary as a positive development in every way.<sup>238</sup>

3. A special multilingual dictionary, where Greek is placed as a second foreign language, after the Bulgarian, is *The Phraseological Dictionary of the Balkans*<sup>239</sup>, compiled by Jani Thomai, Xhevat Lloshi, Rusana Hristova, Kosta Qiriazati e Ana Melonashi, which was published in 1999. The dictionary contains about 5.000 phraseological units in five languages: *Albanian- Bulgarian-Greek-Romanian- Serbo-Croatian*.

According to Sipas J. Thomai “this dictionary is the first of its kind, not only in the linguistics of the Balkans, but also in the European one, it is valuable from the theoretical-scientific and practical point of view”.

We could mention some of the values:

a. The dictionary shows also through phraseology *the affinities that these languages share since ancient times and reinforces the idea of a linguistic community in the Balkans*; over half of these phraseological units are the same considering their construction and meaning in the five languages, the rest is common to 3 or 4 languages.

We should mention here the opinions expressed by lexicographical community, that in dictionaries we discover that “*the Albanian language has greater affinities with Greek in the field of phraseology, and then with Romanian*”, which shows ancient ties between Albanian and these languages; through these linguistic relationships can be understood also some common elements of the history of their peoples, of their ethnoculture and mentality<sup>240</sup>.

The authors of the dictionary were very careful in selecting the most semantically and structurally similar phraseological units<sup>241</sup>. That is why we immediately see the great similarity between Albanian and Greek, which quite often it seems like we have to do with calques: *e ka gojën të ëmbël* έχει γλύκο στόμα, *e ka gjakun të ëmbël* / έχει το αίμα του γλυκό,

<sup>238</sup> N. Γκίβη, *Αλβανο - Ελληνικό Λεξικό (Albanian-Greek Dictionary)*, Αθήνα, 1998.

<sup>239</sup> J. Thomai, Xh. Lloshi, R. Hristova, K. Qiriazati, A. Melonashi, “*The Phraseological Dictionary of the Balkans*”, Tiranë, 1999.

<sup>240</sup> J. Thomai, “*Lexicology of the Albanian language*”, Tiranë, 2006, pg. 328.

<sup>241</sup> J. Thomai, Xh. Lloshi, R. Hristova, K. Qiriazati, A. Melonashi, “*The Phraseological Dictionary of the Balkans*”, Tiranë, 1999, pg. 5-9.

*ëndrra në diell / ονειράτα στον ήλιο, ëndrra me sy hapur / όνειρα με τα μάτια ανοιχτά, nuk pi ujë / δεν πίνει νερό etc.*<sup>242</sup>

Nevertheless, in the phraseological units (which are mostly created by the figurative conversion of the corresponding non-lexicalized syntagm) more than anywhere within the linguistic system it is also seen the peculiarity of each nation, the ethnic elements of the countries are obviously displayed. Here we can mention some examples. Of course there cannot a parallelism in Greek regarding the phraseological unit *flet si e ëma e Zeqos majë thanës*, but the closest phraseological unit to it could be *μιλάει στο βρόντο* (which literally means *to be speaking about lightnings and thunders*), which in Albanian would be translated to *speak in the wind*. In the same way, the unit in Albanian *sot i bën hunjtë nesër i djeg* in Greek could be translated into *σήμερα σου δίνει το λόγο και αύριο τον πατάει* (which word for word means *to give the word today and the break the word tomorrow*, which also exists in Albanian) in Albanian there is *m'u bë mendja dhallë*, whereas in Greek *μου έγινε το μυαλό σαλάτα (ζύδι, κουρκούτι)*, word for word means *my mind became salad (vinegar, porridge)* etc.

The dictionary doesn't have a lexicon with lexemes, nevertheless it has a great importance, because firstly it is of great use to the scholars of the linguistics of the Balkans, but also to all of those who want to learn Albanian in our case (when they are Greek) and Greek (when they are Albanians). But considering the special material it contains it serves also the translators and writers, etc., and all those who need interlanguage comparisons in phraseology.

### Conclusion

*"The Albanian – Greek Dictionary"* of Konstandin Papafili, which was published in Athens in 1997 has the undisputed merit of displaying in a small and very useful volume a relatively great number of words. It is the Bilingual Albanian – Greek Dictionary which up till now has the greatest Albanian lexicon with the greatest number of *lexemes*.

*"The Albanian – Greek Dictionary"* of Niko Gjini which, was published in Ioannina in 1998, viewed in its entirety, is the most accomplished Albanian – Greek lexicographical work until today.

*"The Phraseological Dictionary of the Balkans"* compiled by Jani Thomai, Xhevat Lloshi, Rusana Hristova, Kosta Qiriozati and Ana Melonashi, published in 1999 doesn't have a lexicon with lexemes, nevertheless it has a great importance, because firstly it is of great use to the scholars of the linguistics of the Balkans, but also to all of those who want to learn Albanian in our case (when they are Greek) and Greek (when they are Albanians). But considering the special material it contains it serves also the translators and writers, etc., and all those who need interlanguage comparisons in phraseology.

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<sup>242</sup> The examples have been taken from the book *"Phraseological Dictionary of the Balkans"* J. Thomai, Xh. Lloshi, R. Hristova, K. Qiriazati, A. Melonashi, Tiranë, 1999.

## MODES OF THINKING IN LANGUAGE STUDY

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### Abstract

The concept of language is nothing but a linguistic simplification. It encompasses many realities. Depending on the language spoken, the reality of language is denoted with words belonging to different grammatical categories. The reality implicit in these grammatical categories involves a particular mode of thinking, prompted by the conception of things in accordance with a corresponding mode of being. Because of this it is necessary, then, to distinguish the concept of language as something different from the reality of language and determine the reality or degree of reality of it.

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**Keywords:** Mode of being, mode of thinking, conception of language, speech act, language in its birth, act of knowing

### Introduction

The conception of things has to do with what Coseriu called *the original knowledge of speakers*<sup>243</sup>, that is, *linguistic knowledge*. In this you have to separate, at least, two aspects: a) those aspects of linguistic knowledge having to do with language use, and b) those having to do with *beliefs* in the conception of things. Beliefs, transmitted through the tradition in the technique of speaking by the different languages, constitute the foundation in the conception of things by speakers. Speaking is speaking, saying and knowing. Human subjects speak because they have something to say, and they say something because they are both free and historical to know, conceive of things, say and speak. A human subject is at the same time absolute, that is, free and creative, and historical, a subject who performs himself in participation with others in history, thus contingent and limited. Because of this, a human subject creates his mode of thinking, necessarily free and participated, that is, creative and historical.

The purpose of a linguistic theory is to understand what language *really* is. To do this we must base our theory on the ultimate reality we may find in language analysis, *the radical reality*<sup>244</sup>. The same as with the act of knowing<sup>245</sup>, a theory is nothing but something we add to the things we apprehend and find in the world. Language is nothing but the reality lived, intuited, created, acquired, performed, used and spoken of by speakers.

### Modes of being and modes of thinking

#### *The concept of Being in language study.*

In this paper I want to pose the problem of language from the ultimate and most radical foundation of it. My intention is to answer the following question: *What is language?* A linguist when he wants to study language meets a great difficulty sometimes invincible: his original conception about language is not scientific but taken from his linguistic background. A linguist as a speaker, whatever his language is, has a particular intuitive conception about

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<sup>243</sup> Cf. Coseriu 1988: 66-67; Coseriu 1992: 218.

<sup>244</sup> Cf. § 3.

<sup>245</sup> I would rather use *act of knowing* other than *act of knowledge* to mean that knowledge is active.

language and how it functions, especially in the aspects concerning his native language. The interest the linguist feels to know about language makes him be attentive, as a speaker, to all details in language use in a task lasting all over his life. As a consequence when he tries to study language in a justified manner, that is, as a linguist, he will probably try to justify his original ideas, cultivated by him all over his life. But these ideas are nothing but *beliefs*, something having emerged in us without any rational support on our part<sup>246</sup>. In this sense, the beliefs in force in our tradition of speaking, that is, in our native language, can make us adopt them as if they were reality itself. All languages, any one on its part, transmit a particular conception about things in the world. One of the most important things in that world is language.

In order to avoid all possible beliefs in language study, the linguist must determine if *language really exists, if language can be verified*; he must analyse language to know the *degree of reality* of it; if *language merely manifests itself* and *how and what it manifests itself in*. Language manifests itself in the speaking behaviour of its users. It is nothing abstract but *real*, the language used by speakers. In this sense, and bearing in mind that all speakers bear with them beliefs, we should distinguish three types of behaviour in speakers. First, *speakers live their language*, that is, they identify themselves with the techniques of expression and modes of conceiving of things in their language. Second, their language and the techniques of expression in it are historical systems of speaking, that is, something contingent proper of this or that language, not of language. And third, speakers usually speak of things—thus giving explanation to linguistic facts—in accordance with the mode of thinking in their speech community, their native language.

The techniques of expression of a language bear with them a particular conception of the world, that is, a mode of thinking, a series of beliefs accepted by speakers. As a consequence the original conception of things by linguists is structured in accordance with the original conception of things in force in their native language. Because of this the original conception of linguists must be analysed, revised, rejected or justified. Linguists must radically separate language use from the mode of thinking in their language, that is, they must separate the linguistic behaviour of speakers, *linguistic knowledge*, something manifesting itself in *language use*, and the mode of thinking implicit in the explanation of things and thus in linguistic facts by speakers.

Due to the beliefs transmitted by the western languages the mode of conceiving of things in the western world is peculiar of our civilization. This fact goes beyond language use but it is the support for the conception of things reflected in language use. It constitutes *the mode of thinking* of westerners, the mode of conceiving of things based on a particular conception of what Being is. The mere fact of referring to *language* with a noun makes us conceive of the reality of it as something really existing, something there, something independent from anything else, thus something objective as if it was an entity. The conception of language would be different if the reality of language was denoted by a verb. Compare the different degree of reality in the words *language* and *speaking*. As a matter of fact, in Greek and Latin the reality denoted by the concept *language* was denoted by a verb or an adverb, categories of words used to express different modes of being, an activity or the mode of an activity. For Coseriu, this way of conceiving of the reality of language related much more exactly to the way of being of *real language*. In Greek you could find expressions as *attikísein* (speaking Attic), *barbarísein* (speaking Barbarian) *hellenísein* (speaking Greek)<sup>247</sup>.

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<sup>246</sup> Cf. Ortega y Gasset 2005: 172.

<sup>247</sup> Cf. Coseriu 1992: 78-79.

But in Latin this type of referring to the reality of language is even more exact since the activity of speaking appears separated from its mode: *latine loqui*, *graece loqui* (speaking in the mode of speaking of old Latin people, or the Greek)<sup>248</sup>.

For a modern westerner<sup>249</sup>, the reality of language is thought of as if it was something really existing. In this sense it is fundamental to answer the following question, *does language exist?* (or, *how does it exist?*), *Can language be verified? How does language manifest itself?* The answer to these questions constitutes what we call *the degree of reality of things* (the degree of reality of language, in our case).

### **Modes of thinking: the concept of substantive being**

In the history of Thought—referring this expression to western thought—the concept of Being, that is, the concept of how things are to be conceived of, the mode of being—and thus the mode of thinking—, varies largely due to the intervention of the great thinkers in the western philosophy. The original and underlying conception of things in western languages is what we call the *substantive being*<sup>250</sup>, a concept in force all around the Mediterranean, transmitted by our languages<sup>251</sup>.

The first Greek thinkers, Parmenides of Elea and Heraclitus of Ephesus, 6<sup>th</sup> century BC, conceived of things as if they really existed. Being, for them, was something existing as opposing Nought thus something objective. Parmenides said that you cannot say anything about Being, the only thing you can say is that “Being is and it is impossible for it not to be”; and together with this he added, “Non-Being is not and you cannot even speak of it”<sup>252</sup>. That is, Being and Non-being (=Nought) have the same degree of reality, they both existed at the same level or, said in accordance with Heraclitus’ conception: Being is in opposition to Nought<sup>253</sup>. For Parmenides, Being is one, eternal, immobile, it has no beginning or end<sup>254</sup>. In the history of Thought this conception by Parmenides, meant attributing *lógos* to reality, that is, dispossessing reality of the subjective, thus becoming *lógos*<sup>255</sup> (=content).

For Heraclitus of Ephesus, Being is nothing static or inert but something opposing its contrary. I am in as much as I oppose the world: the world opposes me and obliges me to act in opposition to it. Without the world I would not be<sup>256</sup>. Heraclitus’ conception meant the introduction of *lógos* in reality as well, dispossessing reality of the subjective. With this *lógos* was *common*<sup>257</sup>, that is, something in all human beings.

<sup>248</sup> Ibid.

<sup>249</sup> At least for English, Spanish and French speakers.

<sup>250</sup> Cf. Ortega y Gasset 1971: 38.

<sup>251</sup> The major manifestations of substantive being in the western world can be found in the following three facts: a) the concept of science. Science in the West is linked to technics and technology, that is, science aims at dominating the object of study, that is, things in the world. In contrast to this, you can consider the concept of science in the Asian world, connected to individual happiness, that is, science aims at dominating human passions to be happy. From the point of view of a theory of knowledge you can see that in the West science is objective; in the East it is subjective; b) monotheism. The three monotheist religions were born around the Mediterranean. Monotheist religions are absolute, that is, every one claims to be the true one; and c) things are conceived of as if they existed, for example, nature, something encompassing many things, a “linguistic simplification” of all the things and aspects of things making up what we know as nature.

<sup>252</sup> Cf. Ferrater Mora, *Diccionario de filosofía*.

<sup>253</sup> Cf. Ortega y Gasset 1992: 217.

<sup>254</sup> Cf. Ferrater Mora, *Diccionario de filosofía*.

<sup>255</sup> Cf. Ortega y Gasset, *Obras Completas*, IX: 1063.

<sup>256</sup> “Being in Heraclitus is not quietness or anything inert—[...] Being is contrapositive confrontation. And any thing is in as much as it confronts, nothing possible unless the thing in question makes its opposite act. I am in as much as I oppose my resistance, the World—which on resisting lets me and obliges me to act in opposition. Without it I would not be—. Without its resisting there would not be my insisting”. (José Ortega y Gasset, 1994: 417: 264) (my translation).

<sup>257</sup> Cf. Ortega y Gasset, *Obras completas*, IX: 1063.

This mode of thinking, the concept of substantive being<sup>258</sup>, created innumerable metaphysical problems, one of them, the problem of movement: being cannot change because changing involves that something not existing previously now exists.

Before this untenable situation from the level of the real, Aristotle, 4<sup>th</sup>, c. BC, reacted trying to conciliate both previous conceptions, adding a new one. For Aristotle, the concept of Being, ἐνέργεια ὄν, was at the same time something being in itself (ἐνέργεια κατ' ἑργον) thus not needing of anything else to be (=substance); something executing itself (ἐνέργεια κατ' ἐνέργειαν); and something being the potency of its own performance (ἐνέργεια κατὰ δύναμιν). In spite of this, ἐνέργεια ὄν keeps on its original character: it is something there and something objective<sup>259</sup>.

The concept of substantive being, in force in Greek and Mediterranean cultures—Parmenides, did nothing but formulating what was in force in his speech community—has become the mode of conceiving of things in the western civilization, a concept of Being not in force in other parts of the world outside the western civilization<sup>260</sup>.

Substantive being applied to language makes us think of language as something there, something opposing its contrary (=silence), not needing of anything else to be, something objective, that is, as an entity. In this sense language is thought to constitute part of the world, apt to be described in itself. As a consequence, you can take language as the starting point for its study. As a matter of fact most modern theories about language start with this conception of language<sup>261</sup>.

### The modern mode of being: the Cartesian mode of thinking

Descartes (1596-1650) revised the mode of thinking of substantive being, and proposed the “I” and “Thought” as the radical reality in the mode of thinking. He stated, “cogito, ergo sum”. That is, because I can think I can conclude that I am. In this way and after him, Being is something manifesting in thought based on three pillars, *intuition*<sup>262</sup>, *reason* and *deduction*. To intuit, for Descartes, is realizing necessary connections in things thus appearing evident<sup>263</sup>, that is, executing *reason* in the contemplation of things. When you analyse concepts and find out new connections, then you have *deduction*, a new function of the mind different from *intuition*<sup>264</sup> and *reason*. With this conception the character of philosophy changed: before Descartes philosophy asked for Being—*what is Being?*—but after Descartes philosophy asked for the way how Being is known—*how is Being known?*

<sup>258</sup> Cf. Ortega y Gasset, *Obras Completas*, VII: 339: “The most characteristic expression of the Hellenic concept of being is being as a substance, an immobile and invariable being. Even in the ultimate substance, the beginning of all change and movement, in the Aristotelian God you can find an Entity moving everything but not moving Itself” (my translation).

<sup>259</sup> The concept of Being by Aristotle, ἐνέργεια ὄν, has given the base for different interpretations in 20th century linguistics. For Coseriu, the concept of Being by Aristotle, founded on the conception by Wilhelm von Humboldt, is the base to interpret language as free activity, ἐνέργεια (Cf. Martínez del Castillo 2012: 164-167). For Chomsky, trying to interpret Descartes, this concept of being is the base to conclude that language is innate (Cf. Martínez del Castillo 2010: 227-234).

<sup>260</sup> The concept of Substantive Being does not exist in the tradition of Hopi, people living in Little Colorado valley (cf. Whorf 1956: 258); nor does it exist in Ewe, a language in Togo (cf. Benveniste 2007, vol. I: 71-72), or in primitive Hebrew (cf. Boman 1954, apud Ferrater Mora, *Diccionario de filosofía*).

<sup>261</sup> As a general rule linguistics in the 20<sup>th</sup> century is based on this conception about language (cf. Martínez del Castillo, 2012).

<sup>262</sup> For Ortega y Gasset, the modern way of thinking introduced by Descartes is based on analogy. For him, analogy is the foundation of science. With analogy individual items are used as correlates thus making possible to create an image of the class those individual items belong to (cf. Ortega y Gasset, 1992: 148 and ff.).

<sup>263</sup> Cf. Ortega y Gasset, 1992: 328.

<sup>264</sup> Cf. Ortega y Gasset, 1992: 331.

So, today the concept of Being transmitted by our languages (substantive being) radically opposes the way of thinking introduced by Descartes and philosophy after him. Speakers of western languages refer to the reality of language as something there, something existing in itself, something objective, independent from the reality it appears in, that is, something with no or little connection with its creators, speakers. As a consequence and because of this, you can pose the metaphysical problem of asking if language exists or if it is something created by the human thought.

A metaphysical problem is the one posed in terms of contraposition of the material, given to us by our senses, and the mental. In the apprehension of things, apprehension of Being, our senses play an important role. Immanuel Kant (1724–1804) established two sources of knowledge, *sensibility* and *intellect*, also called, respectively, *receptivity* and *spontaneity*. For Kant, knowledge is performed as *the synthesis of both faculties*, that is, as a unification of the multiple forms of sensibility by means of the intellect through forms *a priori*. The synthesis of *sensibility* and *intellect* is possible because of *imagination*. Imagination is a *creative force* present in the base of both receptivity and spontaneity. In the synthesis of knowledge made by imagination, both faculties converge<sup>265</sup>.

Metaphysical problems can be summarized in the problem of knowledge: *What do we know? Do we know because of our senses? What do our senses contribute with? Does Man know only through his senses or does he create what he says he knows?* At first sight, we can see that human knowledge does not relate to the thing given by our senses. In order to know, it is necessary at least to change the thing given by our senses and add something to it.

The double reality of knowledge stated by Kant is present in language and its verification. We as speakers can verify the existence of language in our daily life. We live, intuit, create, acquire, perform and use language. In this sense language is real. But, on the other hand, language in as much as it appears in the word 'language' and the concept "language" poses the problem of its existence and verification. Language cannot be verified in itself. This means that language does not exist or at least that language does not have concrete existence. Language is good for speaking, saying, knowing and thinking, good for us at manifesting ourselves to others and good for others at manifesting themselves to us. Humans cannot do anything unless through language even when they are alone or think. In this sense, language exists. The problem is to explain how language exists and what extent language is real. The problem with language study thus is to determine the *degree of reality* it has. The reality of language is not simple but complex. It must be guessed out and devised. The first thing to do then is to study language as it manifests itself. We cannot take language as constituting an easy reality. Language is a phenomenon (from φαίνω=make things clear, φανεῖσθαι=show, exhibit oneself, manifest oneself), that is, something existing but mentally, manifesting itself in something else<sup>266</sup>.

### **Modes of thinking in the 20<sup>th</sup> century**

In the history of Thought different modes of thinking have manifested in the 20th century. We can summarize them in three:

a) Being as a phenomenon, that is, Being as manifesting itself. Things are things in so far as they are useful, that is, as they play a function. A chair, for example, made in wood, if we burn to warm up it is not a chair (=a piece of furniture to sit on): it is firewood. Things manifest themselves in front of us;

<sup>265</sup> Cf. Di Cesare, 1999: 35-36.

<sup>266</sup> This is the interpretation of λόγος by M. Heidegger, cf. Heidegger, 2002: 37; cf. also, § 2.

b) Executive Being, the mode of Being in which you live things, thus things acting on you<sup>267</sup>. Something is in the way it is because it executes what it is. Light is something I need, thus being what I expect it to be; nevertheless I shall not consider or mention it unless it is missing.

c) Being as reality. Something is in terms of the action I may execute on it. For Ortega y Gasset, reality means sheer action of the circumstance on me and me on the circumstance<sup>268</sup>. Language is nothing but the thing I create, acquire and use. Its reality consists in my creating and using it. In this sense things are in so far as they relate to the perspective cognizant<sup>269</sup> subjects impose on them.

Language for the speaking subject is to know how to speak, that is, it is *the linguistic knowledge* the speaking subject intuits, lives, creates, acquires, performs, uses and even speaks of. For the listener, language basically is *understanding*. The speaker and the listener live language but differently. Since the speech act is made up of both the speaker and the listener, relieving each other in their respective roles, and since living is conscious, language is both *speaking and understanding*, that is, *διάλογος*<sup>270</sup>.

But, on the contrary, for a linguist, language is merely a *cognizant object*, that is, an object conceived of and apt to constitute the object of a theory. At the same time, if for speakers, language is a unitary reality they “live”, for a linguist, it may be something made up of many aspects. Linguists usually separate different levels constituted by sounds, words and the formation and combination of words, meaning, the production of speech, texts and the content created beyond meaning (saying). Every one of these levels can constitute a branch of knowledge thus forming different disciplines, independent from one another, and to a certain extent independent from the initial conception of language: *phonology, morphology, syntax, semantics, text linguistics* and *linguistics of saying*.

The problem when studying language is analysing what the *reality* of it is, or *what degree of reality* it has. When you refer to language you denote a very vast and complex reality: *a set of connections* you must find out and separate.

### Language study as an act of knowing

For a cognizant subject, to study something is an act of knowing. This is nothing but the attempt to capture the essence, consistency or reality of things. So we can see the following elements. First, *the cognizant subject*: human knowledge is active, something made by an intelligent and creative subject.

Second, *the object known*. For Kant, knowledge is the unification of the thing given to you by your senses and the intellect through forms *a priori*. Forms *a priori* are those statements in the understanding of which you do not need experience. For forms *a priori* to be, it is necessary *the synthetic connection of intuition*<sup>271</sup>. Forms *a priori* are *analytic*, that is, the extent of the content of both the subject and the predicate is the same. For example, you can say  $5+7=12$ . Either if you count the sum in the subject with your fingers or a calculator you will see that the predicate is 12. Analytic statements are necessary and universal, something given in the

<sup>267</sup> “The absolute reality is ‘my life’ consisting in [...] pure execution” (Ortega y Gasset, 1992 [1984]: 127) (my translation).

<sup>268</sup> “Reality consists in purely acting the circumstance on me and me on the circumstance” (José Ortega y Gasset, 1992 [1984]: 127) (my translation).

<sup>269</sup> I'd rather use *cognizant, intellective* and *cognizance* other than *cognitive* and *cognition*. From my point of view the latter should be revised (cf. Martínez del Castillo 2008).

<sup>270</sup> “Saying, λόγος, is nothing but the particular reaction of an individual life. Because of this, in strict terms, there are no argumentations but the one of a subject to another one. [...] Saying, λόγος, is extremely real, extremely human conversation, διάλογος—διάλογος—, *argumentum hominis ad hominem*. Dialogue is λόγος from the point of view of the other, the one next to us” (Ortega y Gasset, 1987: 16) (my translation).

<sup>271</sup> Cf. Kant, 2004: 7-52.

very formulation of them. However they are not evident, something you can verify if you operate with upper numbers.

And third, the *synthetic connection of intuition*. In *extensive* statements, those in which the extent of the predicate goes beyond the thing stated in the subject, the synthesis consists in attributing necessity and universality to sensibility. That is, you add something mental not existing in the thing coming to you through your senses. The synthesis determines the conception of the object known just transformed and made into an image of itself because of imagination<sup>272</sup>. These are *synthetic a priori statements*.

Synthetic *a priori* statements are based on *analogy*<sup>273</sup>. If you know a few examples from experience, all of them similar in their nature, reality, essence or consistency, you can assume that all items constituting the same class (or category) must have the same nature, reality, essence or consistency as the ones you primarily know. Synthetic *a priori* statements can even be made on the base of only an item. In both cases the particular items are made into the image of the class they represent<sup>274</sup>. The reason of this is that on the base of the few examples you experienced, you intuitively and based on analogy define the class of items they belong to. For example, *Oil will float on water*. This statement has *a priori* force in the synthesis made since you add universality and necessity to something you experienced as sporadic and temporary facts. The statement is not analytic but extensive and thought of *a priori*, a *synthetic a priori statement*<sup>275</sup>.

The synthesis of sensibility and intellect is present in the formulation of theories. Synthetic *a priori* statements in science are usually called *assumptions* (=theory). You assume that the object known, once it is added necessity and universality, is in the way stated. Because of this the intellect will look for the execution of it in real things since the statement represents the image, that is, the essence of something real. In this sense a theory is the result of *imagination*, something invented by the scientist.

In the synthesis being made the mode of thinking plays an important role. As we saw earlier, some modes of thinking, especially the substantive mode of being, constitute beliefs. Because of this, assumptions may be based on *beliefs* not formulated or analysed. So the major assignment when analysing a theory, or an act of knowing, is determining the ultimate reason prompting the formulation of the assumption. In this sense, the ultimate reason plays a function similar to what Ortega y Gasset calls *the radical reality*.

### The radical reality

For Ortega y Gasset, human beings do not have a static mode of being. The human way of being is nothing prior to their birth, nothing given or made, but something to be made in struggle with the circumstance human subjects are in. The circumstance they are in is determined by the moment in history it occurs<sup>276</sup>. Any one of the many possible modes of being a human being finds constitutes a fundamental experience, which, once performed, may constitute a limitation and be the reason for a new one. Since human subjects are together-with-others<sup>277</sup>, that is, since they constitute society based on *διάλογος*, language and the mode of thinking in force in a particular speech community are participated<sup>278</sup>. All human subjects living in a speech community at a particular moment of history have similar modes

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<sup>272</sup> Cf. Ibid.

<sup>273</sup> Cf. a discussion on the value of analogy in Ortega y Gasset, 1992: 226-30.

<sup>274</sup> Cf. José Ortega y Gasset, 1992 [1984]: 152.

<sup>275</sup> Cf. Kant, 2004: 47-52.

<sup>276</sup> Cf. Ortega y Gasset, 1996 [1979]: 236-237.

<sup>277</sup> Cf. Coseriu 2006: 44.

<sup>278</sup> Cf. Coseriu 1988: 43.

of thinking. They all share common<sup>279</sup> modes of conceiving of things and the world. This constitutes the historical reason, for Ortega y Gasset<sup>280</sup>, and the condition of “otherness”<sup>281</sup>, for Coseriu.

As a consequence, when you want to know about things in the world, you must look for the ultimate reason things are based on. This has to do with what Ortega y Gasset calls *the radical reality*. He says:

We as human beings live in between a multitude of things and modes of being of things, real modes of being of those things. This obliges us to find out the ultimate reality or radical reality to be used as the meter to graduate all other things, in order to range them all rightly and assign them in Being, to make a hierarchy of them, to settle them down and establish them deep in Being<sup>282</sup>.

In some way or another, our thought is structured. We can base our hierarchy of things known either by ourselves finding out *the radical reality* they are based on, or accept the hierarchy of things given to us in our historical tradition<sup>283</sup>. A linguist must find out the radical reality of language, or else he will accept the ultimate reason his historical mode of thinking bears with it. The radical reality cannot admit anything prior to it. The ultimate reason, as opposing the radical reality, since it was not thought but accepted, entirely depends on the conception you have about things, that is, on the mode of thinking and the implicit mode of Being, received from tradition.

In order to find out the radical reality the question to be made is different in any case. For the mode of thinking of substantive being, the question is, *does language exist? Can language be verified?* On the contrary, for the modern mode of thinking, Being as it is intuited, the question is, *how is language universal and necessary in humans?* For the executive mode of being, the question is, *what is language for speakers? What is language for me as a speaker?* For the mode of thinking of being as manifesting itself, the question is, *how does language manifests itself? Is language anything autonomous or something being given in something else?* And finally, for the mode of thinking of being as reality, the question is, *is language real? What is the degree of reality of language? What is the radical reality language is based on?*

In the following example we can see the role of the ultimate reason, as opposing the radical reality. Language, for a particular linguist, may be a mysterious<sup>284</sup> faculty<sup>285</sup>, a common human possession, varying little across the species<sup>286</sup>, something you can describe only in the process of language learning<sup>287</sup>. Because of this language must answer the innate schemata of learning<sup>288</sup> thus revealing linguistic universals<sup>289</sup> and universal grammar<sup>290</sup>. As a consequence language is innate<sup>291</sup> and natural<sup>292</sup>.

The linguist in question may have experienced that he cannot explain language in a particular moment and then he may have felt entitled to conclude that “language is

<sup>279</sup> Cf. Coseriu 1988: 70.

<sup>280</sup> Cf. Ortega y Gasset 1992: 148-50.

<sup>281</sup> Cf. also Coseriu 2006: 44.

<sup>282</sup> Cf. Ortega y Gasset, 1996: 40-41.

<sup>283</sup> Cf. Coseriu 1988: 70.

<sup>284</sup> Cf. Chomsky, 1992: 68; 1992: 70-71; 1992: 171; Chomsky, 2002: 59.

<sup>285</sup> Cf. Chomsky 1992: 55-56; Chomsky 2002: 47; Chomsky 2000: 87.

<sup>286</sup> Cf. Chomsky 2002: 47.

<sup>287</sup> Cf. Chomsky 1965: 27.

<sup>288</sup> Ibid.

<sup>289</sup> Ibid.

<sup>290</sup> Cf. Chomsky 1965: 25 and 27.

<sup>291</sup> Cf. Chomsky 1965: 25-27.

<sup>292</sup> Ibid.

mysterious". With this assumption, the statement is not about the fact that an individual linguist once experienced the referred to difficulty, but a *synthetic a priori* statement, contemplating connections in it: necessity and universality (=language is and will always be mysterious). Once you have analysed the first assumption you may proceed in the same way with the other assumptions, namely, that language is a faculty, a common human possession, varying little across the species, something you can describe only in the process of language learning, there are linguistic universals revealing a universal grammar, and in consonance with them all, conclude that language is innate and natural.

The problem, then, is finding out whether these assumptions are true. Language, the subject in them all, *does it exist? Can language be verified?*

If you analyse them all you will see that they depend on something previously conceived of. For language to be mysterious, it must be something; for language to be a faculty, it must be something similar to other faculties, they all depending on organs; for language to belong to the human species, it must be something as well since a species manifests itself in individuals with a body; for those linguistic universals and universal grammar to exist, it is necessary that language should exist; for language to be learnt, it should exist, the same as those innate schemata. So you conceive of language as something in the human nature, something objective, existing in human psychology<sup>293</sup> or the psychology of the mind<sup>294</sup>.

The ultimate reason for the existence of language thus is that language is something existing in itself and thus objective. But here the problem lies: *is this conception real?* If language is something objective and natural it must be verified in what it is. *Is language verified in real terms? How can language be verified?*

But language cannot be verified in itself. It can only be verified in speech acts. Prior to the conception of language as something existing in itself, it is the problems of the manifestation of language and the reality of language. Language and its manifestations are merely concepts, something got through abstraction. You will say language, a language, speech or a speech act, when you verify people speaking. At the same time it is the problem of reality of language or the degree of reality it has. And then when we know all this it is necessary to find out the radical reality language is based on.

3.10. The radical reality of language cannot be but human subjects, who speak because they have something to say; say something because they define themselves before the circumstance they are in and compromise before this definition because they are able to know<sup>295</sup>.

## Conclusions

All modes of thinking and the implicit modes of being have to do with the original conception of language:

- a) Speakers intuit language (modern mode of thinking).
- b) Speakers live language (executive mode of thinking).
- c) For speakers, language is *διάλογος*; activity and mode of speaking (mode of thinking of being as manifesting itself).
- d) Speakers create, acquire and use language to perform themselves as human (mode of thinking of being as reality).

<sup>293</sup> Cf. Chomsky 1992: 57; Chomsky 1992: 124; Chomsky 1992: 126; Chomsky 2002: 61-64.

<sup>294</sup> Cf. Chomsky 2002: 61-64.

<sup>295</sup> Cf. Martínez del Castillo 2004. For Coseriu, the radical reality of language is the "speaking being" (cf. Coseriu 1985: 50).

e) Speakers speak of language as a series of entities: language, the English language, meanings, words, speech, speech act, speech sounds, the correct use of words, etc. (substantive mode of thinking).

Correspondingly, all modes of being are necessary in the study of language:

a) Language study involves the creation of a theory, series of *synthetic a priori statements* (modern mode of being).

b) Language study is the description of the linguistic behaviour of speakers, either individually or in participation with others in a speech community (executive being).

c) Language study is nothing but the description of linguistic behaviour since human intelligence and freedom manifest themselves in language (being as manifesting)

d) Language and all aspects in it are to be described in the degree of reality they have in terms of the radical reality they are based on (being as real).

e) The description of language and its manifestations cannot be made unless they are conceived of as entities (substantive being).

That is, human subjects live, intuit, create, acquire, perform, use and even speak of language. Language manifests itself in human freedom and intelligence.

Language is nothing but human subjects who know, define themselves before the circumstance they are in, compromise, say and speak thus making themselves human and manifesting themselves to others.

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## THE HISTORIC BACKGROUND OF “LLAIKO VIMA” NEWSPAPER (1945-2012)

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### Abstract

The aim of this paper is to give a general view of the history of “Llaiko Vima” newspaper of the Ethnic Greek Minority in Albania from the year 1945-2012 in which will be mentioned the general characteristics of “Llaiko Vima” newspaper and mainly its purpose, its publishing team, its circulation, its personality and its ideology, the ideological action frame of its correspondents, its economics and circulation.

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**Keywords:** History, “Llaiko Vima” newspaper, circulation, editors, minority, ideology, economics, rubrics

### Introduction

We are going to present the importance of “Llaiko Vima” newspaper as a philological institution for the Ethnic Greek Minority in Albania. Through this article we are going to give a view of the rubrics and the characteristics, the style, the ideology that was used in this newspaper during communist period and after '90 that was the end of the communist period in Albania.

### Main Text

The first number circulated on 25 May 1945 as a weekly newspaper. It was an “Organ of Democratic Front of the district of Gjirokastra for the Ethnic Greek Minority”. For some years 1948-1954 the newspaper's headquarters of the editorial office was sometimes in Gjirokastra and sometimes in Tirana. When it was transefered in Tirana from a weekly newspaper was changed into a biweekly newspaper. After the year 1954 the headquarters of the newspaper remained in Gjirokastra. In the pages of this newspaper often were published literature, poems, prose and even literary criticism. Most of the important works of the Ethnic Greek Minority, were published for the first time in the pages of “Llaiko Vima” newspaper. In 1956 was opened in the newspaper “Llaiko Vima” “The literature page”. In the year 1988, came out and was published the eight-page newspaper titled “The literary Llaiko Vima”, which circulated as a monthly and fifteen-day supplement of the newspaper “Llaiko Vima”. The newspaper “Llaiko Vima” on 26 August every year, mainly during the communist dictatorship period, celebrated in the same time even its foundation.

The newspaper “Llaiko Vima” was printed for the first time on 25 May 1945, the publication of the newspaper was covered by Filip Lico. He was also even its first editor. As in all the editorial offices of the time the publishers, the editors, journalists, the terrain reporters, so in all the staff were politicized people by one side and people with dreams and hopes that wanted to express their thoughts and contributed for a better and more beautiful future to the other side.



**The first page of “Llaiko Vima” newspaper 25 May 1945**

The “Llaiko Vima” newspaper reflects the press main formal characteristics of the time so in the beginning had a weekly circulation and later biweekly circulation, firstly it was with two pages, then with four pages, for a later period with eight pages, later on with ten pages and in the end with sixteen pages. It is written with a big responsibility and is characterised as one of the best provincial newspapers of the district that is the station of the Ethnic Greek Minority newspaper. The newspaper is a strong device of the Albanian Labour Party in the everyday war of marxist-leninist education of people. For this reason the editorial office of “Llaiko Vima” newspaper was congratulated by the region’s Party Committee for the important role that the Party had given winning the sympathy of mass workers.<sup>296</sup> In 23.05.1970 Enver Hoxha in the name of the Central Committee of the Labour Party of Albania wrote and sent wishes for all the editors and voluntary correspondents of the editorial offices of “Llaiko Vima” newspaper in Gjirokastra.<sup>297</sup>

“Llaiko Vima” newspaper tried to inspire the mass mobilisation and people’s integration in a wider, political-social and economical sphere and in this context, outside the ideological stratification, we can say that “Llaiko Vima”, in some aspects was a patriotic newspaper, democratic and popular.

Its first editor was Filip Liço and was followed by Thodhori Shano, Aleks Lapa, Vasil Çami and Thanas Suxho. After the year 1992 director and editor was Dhimiter Qiqi, the owner Vasili Jatro and nowadays the owner is Thoma Jani. The regular editors of “Llaiko Vima” newspaper were: Dhimiter Llavari, Kristo Vidhuri, Kosta Zavali, Pano Çuka, Menela Dhaliani, Jani Pilo, Vangjel Vozdho, Jani Thanos, Vasil Çami, Andrea Zarballa, Vasil Papa, Thanas Suxho, Niko Anagnosti, Mihal Naçi, Ziso Lluci, Kristina Cikolla, Vangjel Zafirati, Lefter Drazho, etc. and the orthographic writers Sulltana Bresho, Manuela Budri, etc.

“Llaiko Vima” newspaper during the communist regime circulated once a week, every Thursday, later on twice a week. After the year 1990 for a short period continued to circulate twice a week, later was made a biweekly newspaper, every Thursday. Initially the price of the newspaper was 2 leke per page, later 0.30 leke per page, in continuation 1 leke, later on 2 leke, then 5 leke, was done 10 leke, continued with 15 leke and today 20 leke. The first offices of “Llaiko Vima” newspaper included the editorial offices, the Summery of the editorial office material, Archives, and the guest rooms. In “Llaiko Vima” newspaper, in the

<sup>296</sup> “Llaiko Vima”: 29.05.1955, article: “Wishes of the Central Committee of the region for the editorial office “Llaiko Vima””, pg. 1.

<sup>297</sup> “Llaiko Vima”: 24.05.1970, article: “The newspaper “Llaiko Vima” is a living podium and militant of mass workers of the Ethnic Greek Minority”, pg. 1.

upper part of the title was written the slogan: "Death to fashists. Freedom to the people." from 1945-1949. The physiognomy of "Llaiko Vima" newspaper as appearance and content was not much different from the Albanian newspapers of the time and reflects the same characteristics and problems as the contemporary newspapers of the Ethnic Greek Minority in Greek language as, "I foni tis Omonias" (1991), "Orama" (1997), "Romiosini" (1997), "Dhrys" (1999), "Dhimotiki foni" (2002), "Pirros" (2003) etc. "Llaiko Vima" is the first newspaper of Ethnic Greek Minority, and the first newspaper in Greek language that circulates till today.

This newspaper was printed in "Argjiro" typography of Gjirokastra. "Llaiko Vima" newspaper office was near the typography that had even a telephone connection. In the newspaper's office were even the most needed typographic materials for the preparation of writings and a varied documentation of the distribution network, the financial bills and a number of other procedures. The distribution and circulation of the newspaper "Llaiko Vima" was done through the subscription system and in some cases free distribution. The consignment of the pages of "Llaiko Vima" newspaper was done by post. It was published continually from 25 May 1945 till today.

Some of the poets and writers of Ethnic Greek Minority were not paid for their cooperation with the newspaper, but they were morally contentment for their works that were published in the newspaper and this helped them to be honoured and well-known by the wide audience from which they always took warm thankings.

The newspaper's pages were riched by news, writings or different rubrics that were compiled not only by the editors but even by their friends that were in different positions as for example directors, deputy directors, workers of state services, teachers, young people, simple citizens that were interested and registered events, debates or proceses which they sent to the editorial office of the newspaper. In the beginning the newspaper's correspondents were presented with their pseudonyms such as "G. K", "A. N", "L.", "K", "Komentues", "P. Kastriti", "Alqi Anthuli", "Drinioti", "Axhiokami", "Ritis Polamitis", "Dhrinopolitis", etc. The upper pseudonyms prove the footsteps of a voluntary work, full of pasion and satisfaction, who except from their duties and positions that they had in their everyday life, they played even the role of a public personality hidden under the pseudonyms.

As for the readers of "Llaiko Vima" newspaper we can mention the fact that the publishers willingness was at once even an ideological and political directive given by the communist state to influence as much as it could in the biggest number of the Ethnic Greek Minority readers. This was mainly in the format of a basic parametre, which secured the newspaper's self-egzistence. In a way the page of each newspaper was a communication text between the editors and their public.

The communication of "Llaiko Vima" newspaper with the public, in this sense, has the meaning that the public was missed in the formulation of ideology which was declared by the publishers writings and their co-operators. Despite the fact that the thoughts exchange was missed, the confrontation of ideas, so it was missed the communication element with the reader, in the newspaper pages it was expressed for the first time the rubric with the title "Correspondence".

One of the main purposes of "Llaiko Vima" newspaper was to bring in the work places the impact of the build of socialism and also to contribute in the creation of new relationships and the creation of a new social and political climate that dominated all over Albania. This purpose was accomplished even with organization of newspapers correspondents in workplaces, who were responsible to follow the good function of life in their enterprises but even to make visits and inspections in other enterprises.

"Llaiko Vima" newspaper gave a big importance to the events and big actions in people's lives, as it was the collectivisation. The support and the excecution was made in

purpose to advance the Stalin's model that predicted the change of the peasants in land workers. The newspaper supported the politic program for production, material welfare and spiritual development of the workers. It approved without no hesitation the central directives to eliminate the land owners class, encouraged the thought for necessary changes, with all the ways, of the old rural agriculture structures. The collectivisation was presented as the only way for the development and the fast growth of agricultural production and the industrialisation of the country.

The newspaper presented Marxism-Leninism and Stalin's deeds as ideological base of socialism build supporting the theory that the theoretical founding for the creation of communist world outlook came from Carl Marx. According to "Llaiko Vima" newspaper Marx was able to find the code or to interpret the laws of the human society. The newspaper agreed with the saying that every phase of the economical development created new production relations, so in this way it can be found the nature and the contradictions of the capitalist system. The newspaper also created the theory of dialectal materialism, which was the key to understand the real history of the human society. Vladimir Ilitc Lenin and his leninism had a special place at the newspaper. Leninism was presented as a try for the renaissance of marxism and its liberation from uselessness. The values of Lenin and leninism speak about his contribution in the historical events that he lived and leaded but even at his theoretical contribution. The portret of Lenin together with fragments of his works were often published in the newspaper's pages. Lenin was presented as the symbol of war for a new and bright world.

Stalin's presence was realised too, through all the typical, graphic and journalistic characteristics, presenting him as a bright leader, inspirator and beloved parent, advocate of work class, expert of the highest knowledge, the guarantor of the right road and enemies punitive. His word was a source of hope for all the world. Stalin was the leader and the guarantor of the continuation of Lenin work. Often he was presented as Lenin equivalent. Stalin, Lenin and Marx created the admired ideological triple that determined the way inside which was developed the Ethnic Greek Minority life.

The newspaper supports the idea that the rurals won totally their freedom when in the agriculture sector were obliterated the feudal lords, the users, the capitalist monopoly and the land was given to its cultivators. In this way stopped the rural emigration. At the same time was banned the political action of the users as well their speech through press. In the pages of this newspaper were published actions like: the obliteration of illiteracy, the political backwardness, the distinction between the workers, rurals and intellectuals and the gap that divided the intelectual work from the hard works. It was supported the implementation of new laws in the primary education and middle education general and obligatory.

An important chapter of the newspaper was the refusal and prohibition of religion. The basic purpose of "Llaiko Vima" newspaper, from the years 1967 till 1991, was to show with articles and different writings the nature and reactionary character of reliogions with complains and antireligious poems in the cases of the expression of religious feelings. All this had as a basic purpose the tendency to replace religion with the socialist belief. For the newspaper the antireligious attitude was an understandable and a strong political one. In two opposite sides of the spectrum were communism and religion, by one side were the communists, who pretended for the justice of the new socialist society and by the other side were the christians and their caste, that according to propaganda of the time were institutions and organs of use, violence and backwardness.

The newspaper supported the communist concept for the education of the citizens according to the socialist ethics starting with young age. In this way was consolidated the revolutionary vigilance, the military thinking and centralisation spread inside the society circles creating very strong institutions that served the Party.

The newspaper was giving a lot of space to the cultural aspects of different forms as literature (poetry and prose), education, theatre and cinema. For "Llaiko Vima" newspaper different forms of art and education should have an educational character and to be subjected of tries for the education of rurals and workers. The objectives of cultural education and psychologic development of children was the strngthen of feeling of love for the socialist fatherland and the development of the sacrifice belief for fatherland protection.

The newspapers directives for culture people were too many, because the literature creations of the Ethnic Greek Minority creators should emphasise even the dangers that the society had by class enemies.

### **Conclusion**

"Llaiko Vima" newspaper, nowadays is a philological institution, representative that implies:

- an undeniable journalistic-historic fact
- varied and voluminous journalistic activity
- time itinerary covers almost more than half a century
- gathering around itself a wide community of text producers and readers
- varied human biography, directive and journalistic
- a specific status of EGM life outside mothercountry
- community efforts for identification, self-development and integration
- a specific stage of Greek language ethno-culture of origin

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## **DIALECTICAL UNITY OF LANGUAGE AND SPEECH (ON THE MATERIAL OF WORDS ENDING ON THE SUFFIX -LY IN ENGLISH LANGUAGE)**

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### **Abstract**

In English language adjectives do not have completely expressed morphological indicators while adverbs have a complex morphological structure; otherwise saying, in qualitative adverbs the stem of attributive adjectives is complicated with the suffix -ly. The relation between adjectives and adverbs is quite often realized in word formation. In this case a word with the suffix -ly is considered as an adverb derived from a qualitative adverb with the help of the rather productive suffix. The fact that adjectives have the corresponding words ending on the suffix -ly indicates that we deal with such derived words which have already been established in the language and have lexicographically been fixed as linguistic units. Analysis of the material on language and speech levels showed that in English language there are words ending on the suffix -ly which are already derived from adjectives, are fixed in the dictionary and develop their meanings. On the other hand, these are those adjectives that do not have fixed parallel forms with -ly suffix, but there is the inexhaustible possibility of formation such words in speech. Being widely used in speech, such formations on their turn can be placed in dictionaries. Thus, vector of direction in this case can go not from language to speech as it mostly happens, but from speech to language. This fact once more proves dialectical unity of language and speech, that though being different phenomena, they are inseparable.

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**Keywords:** Suffix, Adverbial, Adjectival, Grammatical category, Lexical category

### **Introduction**

From the first glance it may seem that adjectives that express quality (“wonderful”, “haughty”, “outstanding”, etc.) differ from qualitative adverbs (“wonderfully”, “haughtily”, “outstandingly”, etc.) not only semantically, but also by the nature of their combinability with other words in speech. Qualitative adjectives are combined with nouns, whereas qualitative adverbs – with verbs and adjectives. In this case we deal with rather complex morphological relations.

It is a well-known fact that in English language adjectives do not have completely expressed morphological indicators while adverbs have a complex morphological structure; otherwise saying, in qualitative adverbs the stem of attributive adjectives is complicated with the suffix -ly. It can be considered that in this case we deal with two different parts of speech, but with one (adjective) which can be presented in two forms: adjectival form with nouns (“quick speech”) and adverbial form with verbs (“speaks quickly”) and adjectives (“profoundly ignorant”). In both cases quality is defined: in the first case the quality of a noun and in the second case - the quality of a verb or an adjective.

On the other hand, the relation between adjectives and adverbs is quite often realized in word formation. In this case a word with the suffix -ly is considered as an adverb derived from a qualitative adverb with the help of the rather productive suffix.

Investigations in lexicology give us the opportunity to raise a question concerning attributive expression of quality with nouns and verbs. This issue should be discussed on the background of grammatical and lexical morphological relations. The main difference between lexical morphological categories and grammatical categories is that the first of them are realized on the metasemiotic level; though grammatical categories can also have the metasemiotic function in certain contexts, i.e. they serve not only pure grammatical meanings, but also stylistic co-meanings. Grammatical morphological categories develop stylistic co-meanings adherently, i.e. are realized only in the given context, while lexical morphological categories have these co-meanings inherently, i.e. they are characteristic features of the given form.

While discussing formation with the suffix *-ly*, the question should be set in the following way: what is the marked form of juxtaposition while adjectival and adverbial expression of quality? Is it realization of grammatical morphological or lexical morphological category? Is attributive expression of quality with nouns and verbs realized with the help of one word in different grammatical forms or with the help of two words which are inseparable related in the sphere of grammatical categories?

To study this issue, first of all we analyzed the dictionary material and then the material from literature. So, we compared materials on language and speech levels.

It seems that both, adjectival and adverbial forms can be derived with the help of the suffix *-ly*; though, cases of adjectives with *-ly* suffix are very few (“motherly”, “daughterly”, “daily”, “yearly”, etc.), but adverbial formation with the same suffix are met very often. In the first case *-ly* is a non-productive suffix and in the second one – highly productive. This is a clear example how one and the same suffix can be non-productive in once case, and highly productive – in the other.

In Oxford Dictionary were met 2034 adjectives that have the corresponding forms with the suffix *-ly*. Among them, in 1713 cases adjectives have parallel adverbial forms with this suffix without any definition; simply the mark “adv” is stated. For instance,

abnormal (adj) ..... *-ly* (adv)

brutal (adj) ..... *-ly* (adv)

splendid (adj) ..... *-ly* (adv)

affable (adj) ..... *-ly* (adv)

In 321 cases, words ending on *-ly* have not only the mark “adv”, but also definition and illustration phraseology. The definition shows the semantic relation between an adjective and an adverb. For instance,

**consequent** (adj) – following something as a result or an effect.

**consequently** (adv) – as a result; therefore: *My car broke and consequently I arrived rather early.*

**blunt** (adj) – 1. without a sharp edge or a point; 2 frank and direct.

**bluntly** (adv) – in a blunt manner. *To put it bluntly, your work isn't good enough.*

Very rarely, but still exist cases when the words on *-ly* have branched structure and their relation with adjectives is not observed. Such adjectives have corresponding homonymous adverbial forms, i.e. adverbs without the suffix *-ly* and the corresponding adverbs with *-ly* obtain different meanings. For instance,

**late** (adj) – 1. after the expected or usual time; 2. towards the end of a period of time.

**late** (adv) – 1. after the expected or usual time; 2. towards the end of a period of time.

**lately** (adv) – in recent times; recently.

Thus, on the language level, some adverbs have definitions and illustration materials, some – only the mark “adv” and some develop branched structure.

It is noteworthy that without such modification, formation with *-ly* suffix would be the marked form of the grammatical category. But, as it has already been mentioned, *-ly* is

among highly productive suffixes together with the suffixes “-ness”, “-less”, “-like”, “-full”, etc. Thus, -ly is described as the suffix that is added to stems what results in deriving new words.

The fact that adjectives have the corresponding words ending on the suffix -ly indicates that we deal with such derived words which have already been established in the language and have lexicographically been fixed as linguistic units.

If we had confined to the analysis of only dictionary materials, we would have made a methodological mistake as we would have not paid attention to the dialectical unity of language and speech. In such case we would have considered only that structure that has a word which is already fixed in dictionaries and those processes that are permanently going on and on in the language. Otherwise saying, we would not have discussed the morphological categories that are the most important problem and without which it is impossible to study the real functioning of the language.

A great number of adjectives having no corresponding forms ending on -ly suffix was met in the dictionary. After analyzing them, we came to the conclusion that such formations were not fixed because of morphological and semantic restrictions. Morphological restrictions are spread mostly on such adjectives that ending on the following suffixes: -ly “beggarly”, -like “child-like”, -ior “interior”, -most “backmost”. As for the suffixes -ian/-ean, -ese, -ist, they are effected by semantic restrictions. The thing is that all these suffixes are used for describing a person from the point of view of a) national or geographic properties “American”, “European”, Italian”, “Chinese” (here can be mentioned the suffix -ish in case of semantically similar formations “Irish”, “Spanish”, “English”), b) political convictions “communist”, “fascist”; c) the adjectives derived from the proper names of real or fictional people “Victorian”, “Elizabethan”, “Machiavellian”, “Cyclopean”, “Liliputian”. One more semantic group of adjectives that does form adverbs on -ly is the names of diseases: “allergic”, “asthmatic”, “diabetic”, etc.

The question aroused: can such formations (adverbial forms of the above mentioned adjectives) exist in general or is it impossible to form such adverbial forms that are not fixed in dictionaries?

For this purpose we compared dictionary material with the material found in literature. It turned out that in literature, i.e. on the speech level can be met such words, such formations that are not fixed in dictionaries, i.e. on the language level. Otherwise saying, the above described restrictions are obliterated on the speech level. For instance,

“He bowed his head as he passed though, and said as he always did **interiorly**, ‘Lift up your hands!’”

“‘Pity’, said the Colonel **asthmatically**, ‘Pity!’”

“He seemed to be **Irishly** foolish”.

“‘We have to use every way to achieve it!’ he said Machiavellianly..”

## Conclusion

After analyzing the material on both levels – language and speech levels – we can conclude that in English language there are words ending on the suffix -ly which are already derived from adjectives, are fixed in the dictionary and develop their meanings. On the other hand, these are those adjectives that do not have fixed parallel forms with -ly suffix, but there is the inexhaustible possibility of formation such words in speech. Being widely used in speech, such formations on their turn can be placed in dictionaries. Thus, vector of direction in this case can go not from language to speech as it mostly happens, but from speech to language. This fact once more proves dialectical unity of language and speech, that though being different phenomena, they are inseparable.

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## THE ANALYSIS OF HAMIT YERGALIYEV POETRY

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### Abstract

A poet, having left an original trace in the history of Kazakh literature is Hamit Yergaliyev. A real poet is the voice and spirit of the nation. The poet who did not manage to become the voice of the nation is just poems redactor.

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**Keywords:** Kazakh poetry, Hamit Yergaliyev, Kazakh literature

### Introduction

It is natural that every poet has its own nature, his own subject matter and his own world outlook. Not every poet can become a calling word and the voice of the nation. Somebody writes well about nature phenomena, another – about love and the third about interweaving of a human soul and the other about beauty. But nevertheless a real poet should find and recover the melody and character of the same nature phenomena and the same love and interweaving of a human soul and even the beauty. It is doubtless that poems of the poet Hamit Yergaliyev show and reveal the soul of Kazakh people. Kazakh mentality is present in all his poetry. Even the most elementary thing in the poet's poems is highly glorified.

### Main Text

Hamit Yergaliyev (1916-1997) was born on the 14<sup>th</sup> of October 1916 in the region of Novobogat (Kamyskala) of Atyrau region. At the age of seven he learnt to read and write from a village teacher Sabyr Zhumashev. If to base on the writings made by himself a gifted boy Hamit from his early age could read such poems as “Kyz Zhibek”, “Shakir-Shakirat”, “Kula Mergen”, “Torehan”. He was reading them to his 90 year old grandmother Sarbi and mother Bagdagul in the manner that his grandfather Tama Doszhan and a singer story teller Aralbai did.

His ancestor Koiys Kaldaybayev was both a poet and a composer and a performer. He also learnt and executed the works in the manner of this person, who was distributed among the people as “Koiystyn konyry” (“Low pleasant one of Koiys”). As it is mentioned in the poet's recollections when he was nine years old his brother-in-law Smadiyar the thieves have stolen his only big Arabian camel and he has written a poem “Nardyn zary” (“The grief of an Arabian camel”) on behalf of offended master of the camel in a double rhyme half of the page. Judging from the fact that there were people who learnt it by heart it is felt that this verse was sharp and easy, in spite of the fact that it was written by a boy poet. Also at the age of nine he has written for his cousin Yesenzhan Nurgaliyev the words of love, addressed to his beloved and he was “praised” for that. This again stipulates the fact that the boy poet since his early childhood was close to poetic creative art. Unfortunately those verses were not preserved. Later when he was learning carpentry at Gurjyev department of part-time education he wrote poems that he had written down. But the poet does not evaluate those poems as the works that have revealed his poetic talent. Before the war he has written such dastans as “Duniye tenselgende” (“When the world worries”), “Shyndagy sulu” (“A beautiful girl at the top of the mountain”), “Akyrap” (“October”). In his recollections the poet writes:

“Many of the poems of those times, written for social-political themes were published by Ural and Gurjyev regional newspapers. It is possible that the first original voice of a future poet was traced in these words of somebody of the ancestors. But as a matter of fact the period that has opened my eyes was during the first years of Great Patriotic war. It was the time when the fate of the people had the most harsh ordeal and I wanted to express with the poetic language the sorrow and power, the faith in the victory of our heroic people. There were my poems that filled in a thick note-book when I was a troop commander at first and then a squadron commander of a horse army in the rear and then at the front” [1, 6]. This note-book full of poems was lost in the places of hot battles for Budapest, where he was wounded together with map-board where topographical map was. The poet wrote: “I think that the source of my poetic origin remained in this note-book. It looks like that all the warmest and full of deep thoughts, hot feelings, words about my dearest mother, about the hero warrior, about my beloved, about the baby, about the friends, about compatriots and finally about the Motherland, all this was in this notebook ...” [1, 7].

Of course there is no doubt that the poems written during the period of youth ardour, fervor were hot and flaming. The poems written by the poet later were also peculiar of the fact that they were full of feelings.

“In spite of the fact that I started writing long before Great Patriotic war, I agree with the specialists critics who state that my poetic way started during this period. It is true that I began to feel my responsibility in from of my people just during this very period. In this case the life of my people has made a poet of me, his sorrowful sighs and struggle, his wounds and the victory. All this that I outlived both by my mind and body was the reason of the fact that there are civil motives in my creative work” [1, 6].

After graduating from oil working department in 1939, he studied at Kazakh state university. He took part in Great Patriotic war. He also worked as an essayist in the newspaper “Socialist Kazakhstan”, the head of the editorial poetic department in the Union of Kazakhstan writers. He remembers the following things about the years of work in the newspaper “Socialist Kazakhstan”: I still remember. During those years working in the editorial office I met nearly all public figures of literature, science and art. This newspaper introduced me to my elder brothers and sisters of the artistic world, with such noble people Satbayev, Margulan, Kasteyev, Kazhymukan, Mariya Zhagorkyzy, Bazanova, Ilijyas Omarov, Nurmolda Aldarbergenova and has raised me to the level when you are recognized. It allowed me to travel all over the Republic and has introduced me to its economic, political and social life and has taught me to look deep into working farmer psychology. It has shown to me what is good and what is bad. It has taught me to tell the truth. All this has opened a poetic channel of my creative work. After all this I started to write my own poems one by one with great eagerness like a man who was thirsty for a long time and that has come to a transparent spring. Such works of the poet as “Father’s feelings”, “Young mother”, “On the great way”, “A girl from our village”, “Your river”, the first book “Kurmangazy”, translations of classic literature were written during the period of work in the editorial office of the newspaper “Socialist Kazakhstan”.

Since 1959 and till the end of his life he was busy with creative activity. His poems were first published in 1936. More than 40 books and collections of translations have been published since that time. The poet has also written in prose genre. His several stories, fiction essays and publicist articles were published in a separate book. He has written the following poems “Father’s feelings” (1947), “On the great way” (1949), “A girl from our village” (1959), “Kurmangazy” (1958), “The poem of melody” (1970), etc. Nearly all of his works are translated into Russian. His several books were published in Moscow.

As a translator he was able to inform the Kazakh reader the works of Pushkin and Lermontov, Shakespeare and Byron, Nauai and Mayakovskiy. He participated in the

translation into Kazakh Kyrgyz epos "Manas", karakalpak epos "Forty girls". He was awarded the title of the National Kazakhstan writer in 1986.

He is one of those who was holding a pen together with weapon during those hard days of war. Hamit Yergaliyev wrote his first works during the years of Great Patriotic war

Struggling in fire with cruel, ruthless and dangerous enemy our poets have created poems. These were new poems who did not exist in Kazakh literature before: they were new from the point of view of the theme, contents, rhythm and stress. Poems that have come from fighting holes became the news for Kazakh poetry. When we speak about new turns in the 40-s in our literature we mean them... Our researchers managed to recognize them precisely and write about it. Nowadays it is impossible to understand and dip in Kazakh poetry without Hamit and consider Hamit outside Kazakh poetry.

The themes of the poet's poems are various. Having studied the contents of poems collections that were published in different years we can meet there love to the Motherland, native people, great human values, social-historic truth being outlives by those people and this land, love and youth, duty in front of the parents and civil duty, depicted with special artistic skill.

Many researchers, critics, poets and writers have devoted their works to H. Yergaliyev creative art. The poet Nurlan Orazalin said: "The further the mountains are, the higher their peaks become. The same happens to the creative work of every personality whose thinking and world outlook becomes wider with time and becomes more lively. Hamit Yergaliyev poetic world is a rich world of fruitful poems, many-sided and full of soulful feelings that become brighter with time" [2, 355]. T. Medetbekov evaluates him in the following way: "He is the poet of real truth who opens his soul and heart through the poems" [3, 365].

There are lines in his poems where you can see civil and poetic character and the essence of the poet. He impleaches his personal joy, grief, sorrow and happiness with joy, grief, sorrow and happiness of the whole humanity. Such lines can often be met in the poet's poems. He managed to show his civil creed which is written with the capital letter.

If to speak about the peculiarities that H. Yergaliyev poems are characteristic of it is necessary to say that he evaluates the measures of life and time in his own special way. Flow of thought, feelings conflict, insult for transience of life in the poet's poems attract special attention through the mood and thoughts of the lyric character, interweaving with masterful pictures, eloquent recollections.

H. Yergaliyev is one of the poets who has a special place in Kazakh poetry. Generally if to consider poetic peculiarity in the framework of the individual style Hamit is a writer who has formed his own personal style with his poetic and talented power. In H. Yergaliyev's poems there is a view and breath of Kazakh steppe, the cell of our forefathers, the life of it is depicted with peculiar verbal patterns. The poet praises the picture of the steppe in a lively movement, in the framework of that steppe. One of the characteristics that H. Yergaliyev's poems are peculiar of is to reflect about present day, sinking in the nation's history.

T. Shapayev who conducted systemic analysis of Kazakh lyrics of the 1980-s speaking about the national character of Kazakh poetry has made the following conclusion: "If the steppe is a nation's essence and the symbol of national spirit, then the village (aul) is its life, picture, full of contents and soul. Steppe is a village (aul). If to tell the truth then for our poetry this theme is the unique impartible notion. This steppe, this village have become the arsenal of poetic investigations" [4, 135]. This steppe and this village are praised in H. Yergaliyev's poetry. But he did not just praised them, he praised them with great poetic talent and great skill. In poetic world of the poet we can see the integral picture of the national steppe. Steppe is depicted with in the unity with the nation in the poet's poems.

## Conclusion

In all the poet's poems we can see that he has participated in the war and experienced the grief of this historical period of his nation, lived out the strokes of fate. We would like also to point out that the leading direction of Hamit's lyrics is deep celebration by him civil subject. He is a poet realist, who is freely looking at the modern world.

H. Yergaliyev is able to submit every detail to the main objective in his poem. The form of his poems is in integral unity with the contents. The poet can choose the form, corresponding to the topic, chosen by him.

Every new book by Hamit is a new side of already familiar to us poetic pattern. Not only new poems, but the appearance, look, character and actions of the new characters show up with their own distinctness. We think that young generation of poets has a lot to derive from his poetic works. In this connection we consider it necessary to mention the opinion of a well-known poet G. Kaiyrbekov: "It is necessary to say that Hamit in his poetic activity is the trainer for the youth, their constant critic, adviser, giving instructions like an elder brother".

Poetry does not acknowledge ageing. Hamit Yergaliyev has given a lot to Kazakh poetry. In one word, if to take the whole work of the poet whatever them it is, it is a piece of art of high level from the point of view of artistic solution, variously covering the events of a definite period. The subject of poetic works of this outstanding poet, many-sided Hamit, turned out to be from the point of view of the author's thought deeply and truly studied and if possible completely executed and full of poetic beauty.

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## SOME PARALLELS IN THE WORKS OF AKAKI TSERETELI AND ADAM MITSKEVICH

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### Abstract

This paper presents research on the closeness of poetic world that developed between most prominent poets Akaki Tsereteli and Adam Mitskevich. Namely, an emphasis is placed on spiritual closeness of Georgian and Polish peoples. Some general parallels between Akaki Tsereteli's poem *Bagrat the Great* and Adam Mitskevich's poem *Konrad Wallenrod* which intensify patriotic spirit are extensively considered in the work. A review of existing scholarly literature is presented and conclusions based on biographical data of two great creators are offered.

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**Keywords:** General parallels, Akaki Tsereteli, Adam Mitskevich

### Introduction

The outstanding feature of the 19<sup>th</sup> century was the creation of nation-states in Europe. It should be noted that the formation of nation-states in Europe was accompanied by a rather complex process of democratization of civil society. European literature reflected these sweeping changes in political, economical and social life in its own way and, at the same time, gave direction.

The role of fiction in the formation of a public opinion in European countries grew considerably in the first half of the 19<sup>th</sup> century. The works of Byron, Hugo, Heine, Schiller, Petefi, Mitskevich, Pushkin and Gogol contributed to awakening of patriotic spirit, peoples self-identification, their strife for the formation of national state and, what is important, preparation of the European society for democratic changes.

The works of the classics of European literature did a great impact on 19th century Georgian literature. In our view, it may be said that the beginning of this influence is to be sought in substantial similarity of the stereotypes of European and Georgian-Caucasian mentality in general.

While studying the peculiarities of Akaki Tsereteli's historical poems, our attention attracted the supposition about the kinship between Akaki Tsereteli's poem *Bagrat the Great* (1875) and Adam Mitskevich's poem *Konrad Wallenrod* (1828) that was put forward by a well-known scholar of the first half of the 19<sup>th</sup> century Sergi Gorgadze. Namely, he pointed out that Mitskevich devoted to him (Konrad Wallenrod) the whole poem which was created under Byron's influence. Akaki himself must have written the poem *Bagrat the Great* under the influence of this poem [1]. Sergi Gorgadze expressed this supposition in the letter devoted to Akaki's life and creative activity that was published in volume II of Akaki Tsereteli's selected works.

Sergi Gorgadze, as is seen, just supposes about the existence of a certain relation between *Bagrat the Great* and *Konrad Wallenrod*. In our view it is likely that A.Mitskevich's poem gave certain stimulus to Akaki's creative mood.

It should be mentioned from the very beginning that the Polish people were highly respected by the Georgians and generally, Caucasians. It should be noted that in the thirties,

forties and sixties of the 19<sup>th</sup> century lots of Polish participants of the uprising and members of a secret patriotic organizations took refuge in the Caucasus, namely Georgia. The majority of them were noble educated people. Thus, in the first half of the 19<sup>th</sup> century rather close relationship was established between the Georgians and Poles. As it turns out from Akaki Tsereteli's autobiographical novel "The Story of My Life", his teacher Kazimir Rodziewicz a political refugee from Poland had a wide influence on the formation of his consciousness and civil morality [2]. In his novel Akaki criticizes the teachers of the Kutaisi Gymnasium of that time and then continues: "It is clear that the younger generation enforced to study in such conditions would fail to get proper education in this gymnasium, if there were not at least one bright spot in this darkness. And this was a Pole Rodziewicz" [3].

According to Akaki's narration Rodziewicz taught him Mathematics but he paid special attention to general education of his students as well. "He talked about other things and tried to awaken us," recalls Akaki [4]. As we know, Akaki wrote an essay in the gymnasium in which he criticized king's officials. The teachers meeting disapproved of his essay. Rodziewicz was the only person who supported the daring student. He asked the Gymnasium board to offer the study of Latin to Akaki, as a brilliant student, so he could later continue his studies at the University.

In "The Story of My Life" Akaki tells us one extremely important story. Once, by chance, he witnessed a frank conversation between a French teacher Monsieur Teresis and Rodziewicz remembering the great French revolution and heroic history of Poland. Rodziewicz wished he chose a military carrier and served his homeland as *Konrad*. This conversation seems to have great impression on Akaki. He writes: "Once I heard this, I just didn't feel like myself! I could not sleep that night... I immediately left the Gymnasium that surprised everyone, and from morning till night I followed Rodziewicz everywhere. I stayed with him for four months, but these four months were more fruitful for me than eight years spent in the gymnasium" [5].

Thus, we can assume that it was Rodziewicz from whom Akaki had learnt about the name of the main character of Adam Mitskwich's poem - *Konrad*, the fighter for independence of his native land. As Akaki himself mentions, he spent four months with Rodziewicz. It is impossible to imagine that Polish teacher would not talk about great Polish writer Adam Mitskevich and his creative works with his disciple. However, it can be also assumed that Akaki became familiar with Mitskwich's poem from the journal "Sovremenik" because according to Niko Nikoladze's memoirs the teacher of Zoology in Kutaisi gymnasium N.S.Lezhava founded the library for senior students. Thanks to this library the students got familiar with progressive journals, including "Sovremenik". It should be noted that it was in the literary journal "Sovremenik" (#69, 1858) that *Konrad Wallenrod* translated by Shershenevich was published. This is considered the most perfect translation of all other translations. Generally, translation of Mitskevich into Russian and Georgian languages has rather interesting history on which we are going to focus our attention later.

Adam Mitskevich's poem *Konrad Wallenrod* and Akaki Tsereteli's poem *Bagrat the Great* are narrative poems based on historical chronicles. The main purpose of both Georgian and Polish poet was to display a hero who struggles for freedom and independence of his native country. When remembering heroic past, both writers tried to inspire hope for future in people. Both heroes became role models for future generations, and the struggle for independence is understood in these poems as main designation of man's life.

The plot structure of Adam Mitskevich's poem *Konrad Wallenrod* is rather complicated. The writer shows *Konrad*'s biography, his personality from various angles and does not follow chronology in rendering the events development. Thus, the reader's impression of *Konrad* is formed gradually.

It is interesting to note that both Adam Mitskevich's and Akaki Tsereteli's ancestors directly participated in the struggle for independence in Poland and Georgia, respectively. Adam Mitskevich's father, Mikołaj Mitskiewich, was a comrade-in-arms of the national hero of Poland, Tadeusz Kustiaško (1746-1817). Akaki Tsereteli's ancestors both from father's and mother's line were the representatives of the old noble Georgia family.

Adam Mitskevich's poem *Konrad Wallenrod* is a piece that evokes strong emotions. As was mentioned above, the writer develops the plot in a very complicated and interesting way.

While in Kaunas, Adam Mitskevich collected different kinds of historical materials. In the postscript to *Konrad Wallenrod* he stated: "We have called our story historical, for the characters of the actors, and all the more important circumstances mentioned therein, are sketched according to history" [6].

It should be mentioned that there is much confusion in historical sources, namely, Konrad Wallenrod's background is not known and his death is also wrapped in mystery.

Historical materials about Konrad are contradictory. Some sources characterize him as an arrogant and severe man, others – as a kind, clever and brave person.

From historical sources, it is still unclear what Konrad Wallenrod's great authority was based on in the Teutonic Order of German Crusaders and why he behaved so strange during the struggle with Lithuanians, etc.

In Mitskevich's opinion it is possible to recognize Konrad's Lithuanian background and then it will become clear that he had entered the Order to take vengeance on it. As is known, the poem *Konrad Wallenrod* was finished by Adam Mitskevich during his exile in Russia. It is interesting to note that this poem with patriotic sentiment he devoted to the Decembrists Galinsky and Zaleski [7].

When we talk about Adam Mitskevich's and Akaki Tsereteli's creativity, one cannot but remember the following fact. While in Odessa, Mitskevich visited Mikheil Vorontsov, who then was governor general of Novorossiysk. The Polish poet deeply sympathized with him. As is known Akaki also had great respect to Vorontsov because he considered him a progressive statesman.

In Akaki Tsereteli's poem *Bagrat the Great* historical events are rendered according to the data preserved in old Georgian sources. Akaki did not make corrections in the development of historical events.

Mitskevich wrote the poem *Konrad Wallenrod* in 1826-1827. This piece of work belongs to the so-called "poetic narration" genre. The origination of this genre in Polish literature is associated with Adam Mitskevich himself with his first poem *Grazyna* (a heroic narrative of a Lithuanian woman) which was published in 1823.

The poem *Konrad Wallenrod* depicts the struggle of Lithuanians against the German oppressors. The action takes place in the 19<sup>th</sup> century.

As an epigram to the poem *Konrad Wallenrod* is a motto drawn from the work of the well-known Italian thinker and politician Niccolò Machiavelli (1469-1527) *The Prince*: "You shall know that there are two ways of fighting – you must be a fox and a lion".

In the first lines of the poem introduction makes possible to determine the time of the events development described in the poem:

*A hundred years have passed since first the Order  
Waded in blood of Northern heathenesse;*

As Lithuania is known to have been a target of raids conducted by the German Crusaders - Teutonic Order since the 13<sup>th</sup> century, naturally, we may suppose that the events described in the poem take place in the 14<sup>th</sup> century.

In a preface to the poems *Grazyna* and *Konrad Wallenrod* the author indicates a well-known historical fact that the Grand Duke of Lithuania, Mindaugas adopted Christianity in

1252 and soon was crowned King of Lithuania with permission from the Roman Pope. It should be noted that the anointment of the first King of Lithuania occurred in the town of Novogrudok. It was near this town that farmstead where Adam Mitskevich was born [8].

Thus, the reference to the Lithuanians as pagans in the 14<sup>th</sup> century can be considered as anachronism.

According to Adam Mitskevich's poem, despite the fact that Konrad Wallenrod is a stranger, the Teutonic Order nominates him Grand-Master.

One of the main characters of Adam Mitskevich's poem *Konrad Wallenrod* is the Lithuanian Wajdelote or bard, the monk Halban who is presented by the author as a major character helping Konrad in the formation of patriotic sentiments. Halban had been long in German captivity and they used him as a translator since that.

Konrad himself sings old Lithuanian songs. When Grand-Master of the Teutonic Order flies into a rage, only Halban's songs calm him down. Mitskevich depicts an old Halban as a strong person who loves his motherland infinitely and whose poetry inspires Konrad on heroic deeds.

At nights the Grand-Master Konrad usually listens to the songs of a solitary, mysterious maiden in a tower and re-sounds them in a foreign language. As was mentioned above, this poem by Adam Mitskevich has rather complicated plot frame which arouses certain interest in the reader. The conversation with an unknown woman in a foreign language indicates that there is some big secret associated with Konrad Wallenrod.

The poet gives a description of a grand repast on the festival day of the patron saint of the Teutonic order – on 23 April where an unknown old Lithuanian bard performs his songs before the German knights.

The old Wajdelot is singing a new ballad on the new tune for the German knights. The song begins with the victory of the Lithuanian troop over Germans. Two Germans – a young man and an old one flee to flee to be received at the castle of the Lithuanian Duke Kiejstut.

The younger does not know his surname and background. He just remembers that his house was in a Lithuanian city, the German lose, the people were perished and the small boy was kidnapped. The boy was raised by the Grand Master of the Teutonic Order, Vinrich as his own son. The boy was called Walter and nicknamed Alf. As was mentioned, Mitskevich's version concerning Konrad's background was invented by the writer himself.

It is true compared with Adam Mitskevich's poem *Konrad Wallenrod* Akaki Tsereteli's *Bagrat the Great* is a small size work but historical event described in the poem – how Timur Leng captured the king Bagrat the Great, is an event equivalent to the struggle of the Lithuanian people against Teutonic Order. At the same time with the aim of developing the plot of Akaki's poem he did not change historical accounts related to Bagrat the Great. Actually Akaki gives poetic form to the story narrated in the *Kartlis Tskhovreba* (The Life of Georgia) and adds new color to the scanty reports of the chronicle.

Adam Mitskevich displays an old bard Halban as one of the main characters of *Konrad Wallenrod* who brought up a Lithuanian boy Walter Alf and kindled in him vengeance with Lithuanian songs. The old Lithuanian singer narrates that Wajdelote calls already grown up Walter to patience, tells him to learn the Germans' war-craft well and gain the Order's confidence. In one of the battles having heard the Lithuanian marching song Walter's heart broke down and together with old Wajdelote goes on the side of Lithuanians.

Walter falls in love with Lithuanian ruler Kiejstut's daughter, Aldona. Adam Mitskevich describes with special poetic feeling how Walter is listening to the words of his native Lithuanian language. He tells Aldona about Christian faith. Walter woos Aldona and makes a beautiful garden for her. Aldona's father the Duke Kiejstut likes Walter because he is educated, valiant and skilled, rampart mounds. With his blessings they get married.

The old minstrel hunter tells the Germans that this is not the end of the story and goes on with Walter's adventures. In the spring when Germans again march on Lithuania, besiege Kowno (Kaunas), then destroy the walls of the town, rob the town and burn it. The Lithuanian army retreats. Walter holds discourse with Kiejstut and his devoted friend Halban, and then opens his secret plan to Aldona. Aldona retires to a solitary tower of Christian monastery on the banks of the Niemen. The content of an unknown old man's Lithuanian song unfolds to the reader the mystery of Konrad Wallenrod's behavior. Adam Mitskevich makes the reader a participant of the final resolution of the narrative plot, prepares in advance to comprehend the act of the protagonist's sacrifice.

In Akaki Tsereteli's poem *Bagrat the Great* as was already mentioned literary invention, nuances created by writer's imagination have little place. The poem is mainly focused on the king's sacrifice. At the same time, of special importance is the fact that Akaki tries to put into the mouth of the enemy Timur Lang positive characteristics of the Georgians. We consider this literary device to be skillfully used by Georgian poet because the praise expressed by an enemy is far more important than the praise performed by own bard. This device once more emphasizes Akaki's great talent and poetic taste.

The old Lithuanian Weijdelote continues his song and tells that after that night Walter Alf and his devoted bard Wajjdelot Halban disappeared. At the end he asks if all these sacrifices were in vain.

After the feast Great-Master Konrad Wallenrod himself is singing the ballad taught in Castile about heroic deeds of the Moors' king Almanzor. The ballad tells about the Spaniards struggle against the Moors. Only one city – Granada resists the Spaniards. Finally the Spaniards crumble its walls too and erect a cross on the minaret. Plague will spread in Granada.

The Moors' king Almazor flees. The Spaniards are feasting when a strange knight comes. This knight is the defeated Arab King Almanzor. He sues for peace and surrenders to the Spaniards, agreeing to serve their God and visits their captain in the tent.

The Spaniards are seduced with these words and embrace him. Only then does Almanzor confess that he has the plague. Thus the Arab avenged himself. The victory of the Spaniards changes into grief because the plague is spreading in their army.

Konrad Wallenros addresses the German knights who gather around the table – what if some day the Lithuanians come to mingle the poison in the wine. The Germans were amazed with Grand-master's wrath but they thought that the old Lithuanian singer made him angry. The knights failed to find Wajjdelote.

The Germans could not grasp the meaning of the ballad about the Moors king Almanzor sang by Konrad.

The murderous war between Lithuanians and Germans starts. The war drags on and because of intense cold German Crusaders could not fight. Everybody blame Konrad for defeat because he failed to take Wilna (Vilnius). Konrad returns defeated.

The secret tribunal of the Crusaders of the Teutonic Order accuses Konrad Wallenrod of treason. The tribunal has found out that every night Konrad hold a conversation in the language of Lithuania with the maiden shut up in the tower. He has secretly plotted with Witold and betrayed Germans. The main thing that the tribunal has discovered was that Konrad accompanied Count Wallenrod in Palestine, killed the Count and gained fame as Wallenrod. From Palestine he reached Spain and struggles with the Moors.

In the meantime, Konrad again hurries to the white tower, and calls his dear Aldona. He asks Aldona to descend from the tower and run off with him, but she refuses his request, and she has sworn an oath to God. Konrad returns to the castle.

The final of the poem is tragic. Konrad, locked in a chamber with Halban, drinks poisoned wine and then, offers it to Halban. Weijdelts refuses to drink poisoned wine and tells Walter/Konrad Wallenrod:

“No, no, I will survive even thee, my son!  
And live, so that the glory of thy deed,  
I to the world may tell, to ages show”.

Konrad and Aldona die simultaneously, Konrad in the fortress and Aldona in the white tower.

As was mentioned patriotic aspiration of Akaki Tsereteli's poem *Bagrat the Great* and Adam Mitskevich's poem *Konrad Wallenrod* and the main purpose to inspire the reader with the wish to struggle and hope for victory, create a certain attitude brings these two works together. At the same time, it is to be taken into consideration the fact that as is known, Adam Mitskevich's creative work made certain influence not only on Polish but generally on ideological development of the European civil society, its literary taste. Mitskevich's popularity in Russia would give the Georgian reader an opportunity to become familiar with his creativity.

Akaki Tsereteli's poem *Bagrat the Great* renders historical fact which is rather briefly described in the *Kartlis Tskhovreba*, namely the writer gives an account of the Georgian king Bagrat V named Bagrat the Great, who reigned in 1360. Georgian historical writers refer to Bagrat as Great. In 1386 Timur Leng captured King Bagrat. It should be mentioned that along with Bagrat, the Mongols took prisoner Queen Ana and her younger brother David. Thus, King Bagrat's decision to convert to Islam and then take vengeance really demonstrates his persistence and courage because his wife and son were with him.

Unfortunately the autograph of Akaki Tsereteli's poem *Bagrat the Great* does not exist but its publication has an interesting history. The poem was first published in the newspaper *Droeba* in 1875 (#41). It is noteworthy that in the same year in *Droeba* #28 and #29 there was published a letter of a well known Georgian public man, pedagogue and historian, Dimitri Janashvili *Bagrat the Great*. The scholars consider that it was Dimitri Janashvili's letter that inspired Akaki to write the poem.

The editor of the *Droeba*, a well known Georgian journalist, Sergi Meskhi used unusual way for that time, he devoted the issue of the newspaper totally to Akaki's poem *Bagrat the Great* and printed the newspaper with special advertisement –“ an extraordinary issue” [9]

In 1875, April 7, Sergi Meskhi sent one copy of the newspaper *Droeba* to his bride Keke –Ekaterine Tumanishvili who went to Switzerland at that time for study. He was so much impressed with this poem that devoted the whole newspaper solely to this poem and asked for his bride's opinion.

As is seen in the history of Georgian journalism the poem *Bagrat the Great* is connected with extremely interesting fact associated with the form of publication of literary work.

We should mentioned that as Ioseb Grishashvili found out Akaki's poem *Bagrat the Great* prior to publication was read at the first literary party (more precisely at charitable party of literary reading, M.Q.) held in Tbilisi on 4 April, 1875. The participants of this party were: Dimitri Kipiani, Akaki Tsereteli, Ili Chavchavadze, Rapiel Eristavi, David Eristavi, Petre Umikashvili. The total sum of this party was given in favor of Georgian scene [10].

Akaki's appearance in the charitable party found resonance in the literary magazine “Kavkazi”. In response to unjustified criticism in *Kavkazi* Akaki published a letter in the *Droeba* of 1875 #42 where he underlined that Georgian society who laughed at clerk's lack of talent reflected in satirical scenes, listened to historical poem Bagrat the Great with big interest.

In the *Bagrat the Great* Akaki idealizes both the main character – King Bagrat and the whole Georgian people. Such well-pronounced idealization was generally characteristic for the literature of those peoples who were oriented at the creation of national statehood. The idealization of the past both for Akaki Tsereteli and Adam Mitskevich was one of the most important means for rising morals of the contemporary society.

It is known that Adam Mitskevich wrote ballads on the motive of Polish folk poetry. Like Akaki's creativity, in Mitskevich's poetry the influence of the folklore is well-pronounced. "In the opinion of Polish critics with positive attitude, Mitskevich raised Polish literature and gave it true Polish form", wrote well known Georgian scholar professor Mikheil Kveselava [11].

As a well-known Russian scholar V.Stasevich stated, for creation of Konrad Wallenrod Adam Mitskevich used various kinds of Polish Lithuanian and German historical sources, the samples of folklore. At the same time he used the compositions of Diusberg and Kotsbsu [12].

Akaki Tsereteli's poem *Bagrat the Great* is a very dynamic composition. Akaki gives laconic characterization of the time of Bagrat V's life and activity.

According to Akaki Tsereteli's poem the monk Isaak is opposed to Bagrat's decision to renounce Christ and convert to Islam:

"But if one cannot sacrifice to homeland, he is not a patriot" [13].

It is a historically known fact that after taking Bagrat in prison Timur Lang again marched on Georgia with his troops. Mongols burnt people in Kvabta gorge church alive, and destroyed Svetitskhoveli and other churches.

It should be mentioned that Akaki explains Timur Leng's unheard-of cruelty by his envy. Akaki uses really great literary device convention – with the mouth of the enemy praises Georgians. In fiction praise to the positive features of the defeated people by the winner is undoubtedly effective method.

In the "Life of Kartli" the chronicler gives scanty description of Bagrat's heroism but at the same time he renders king Bagrat's thoughts about vengeance [14]. In our opinion, these words may have been preserved as rendering and the chronicler made use of them in his work later. Akaki's Bagrat is represented just as such courageous and cheerful man.

## Conclusion

Thus, in our view Akaki Tsereteli's poem *Bagrat the Great* (is an original work and it is not created under the influence of and Adam Mitskevich's poem *Konrad Wallenrod*. However, as we mentioned above, common attitude and the purpose of creation to arise patriotic feelings in people is common for both works. The intensification of patriotic feeling is essential for creation of national state of modern European type both in Georgian and Polish society.

Generally, the demonstration of a great respect for the Polish people and, particularly Adam Mitskevich, is Akaki's appeal to the Poles in 1908 at the party arranged for the celebration of his jubilee in Baku: "I felt drawn to write at the age of 12. There appeared some force which drew me forth to the bright ideas. This awakening force was breathed by a wizard and this wizard was your favorite writer Adam Mitskevich. Due to this, I recall with deep respect not only the great writer but those people who brought him up.

Tough history of his homeland made close for Akaki the world of the great poet of Poland whose pain and joy resonated deeply with him.

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## QUALITY EVALUATION OF NEW VEGETARIAN BEAN SPREADS

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### Abstract

Vegetarianism is a growing trend in Latvia but there is a lack of spread like products for vegetarians. Common beans (*Phaseolus vulgaris* L.) which are popular among Latvian consumers and rich in important macro- and micronutrients could be a good raw material for vegetarian spread-like products but are not represented in foreign or Latvian food company products yet. The aim of this research is to develop new vegetarian spreads using commercially available beans in Latvia and to subject the newly developed bean spreads to physicochemical and nutritional evaluation. Four bean spreads were developed using white beans: classic, with basil, with curry, and with sun-dried tomatoes. The results show that bean spreads contain 7.74 g protein, 7.30 g fat, 9.48 g total dietary fiber, 8.92 g carbohydrates per serving (100 g) on average. Energy value of new vegetarian bean spreads ranges from 153.27 kcal 100 g<sup>-1</sup> (641.28 kJ) to 166.27 kcal 100 g<sup>-1</sup> (695.67 kJ). A serving of bean spreads provides 13 % of protein, 33-35 % of total dietary fiber, 13-15 % of fat, 3 % of carbohydrates and 8% of energy value of one's recommended daily nutrient intake. Common white beans are an optimal raw material for new vegetarian bean spread production.

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**Keywords:** Beans, vegetarian spreads, nutritional evaluation

### Introduction

According to the latest estimates about 3 to 5% of Latvian population identify themselves as vegetarian. Vegetarianism is the practice of abstaining from the consumption of meat – red meat, poultry, seafood and the flesh of any other animal; it may also include abstention from by-products of animal slaughter (Craig, 2010). Vegans are the most strict vegetarians abstaining from any kind of animal flesh, dairy products, eggs, or any other products which are derived from animals. Lacto-ovo-vegetarians allow both dairy products and eggs in their diet, lacto- vegetarians consume dairy products but avoid eggs, and ovo-vegetarians eat eggs but abstain from dairy products in return (Marsh et al., 2012). A properly planned vegetarian diet is healthful, nutritionally adequate, and provides health benefits in the prevention and treatment for such diseases as diabetes, cancer and coronary heart disease (McEvoy et al., 2012; Rizzo et al., 2011).

For diversification of vegetarian diet there is a variety of plant-derived protein products available in the world: tofu, soy-based vegetarian meat substitutes, peanut butter, seitan, tempeh and hummus. Meat alternative ingredients are nutritious with some offering specific health benefits. As well as increasing consumer choice, such products therefore have the potential to contribute to overall public health (Van Roost, 2003). The main plant protein spread-like product is hummus which is very popular in the Middle East and Mediterranean countries (Zubaida, 2011). There are about 10 plant protein spreads commercially available in Latvia that differ very much in nutritional value and ingredients.

As common beans (*Phaseolus vulgaris* L.) are the most important source of protein for vegetarians; furthermore they are a rich and fairly inexpensive source of carbohydrates, dietary fibre, minerals and vitamins (Fageria et al., 2010; Gepts et al., 2008), common beans could be a good raw material for vegetarian spread-like products as they are not represented in foreign or Latvian food company products yet.

The aim of this study is to develop new vegetarian plant spreads using commercially available beans in Latvia and to subject the newly developed bean spreads to physicochemical and nutritional evaluation.

### Materials and methods

For bean spread production the following materials were used: white beans (*Phaseolus vulgaris* L.) (harvested in 2012), *Extra virgin* canola oil, 5% citric acid solution, drinking water, and salt, as well as additional additives – frozen fresh basil, curry powder, and sun-dried tomatoes.

Dry white beans were soaked in water at  $18\pm 2$  °C for 15 h, then rinsed and boiled until tender (about  $110\pm 5$  minutes). Cooked beans were then grinded in a food processor and the homogeneous bean paste cooled to  $60\pm 5$  °C. Other ingredients were added to the bean paste; oil and salt were added at the end of mixing in the food processor. Vegetarian bean spreads were packed in  $200\pm 5$  g polypropylene cups and stored at  $3\pm 1$  °C for 12 h prior to physicochemical evaluation (Kirse, Karklina, 2013).

Vegetarian bean spreads were made using common white beans (75.0-89.0 %), water (5.0-7.0 %), unsaturated canola oil (4.0-7.0 %), 5% citric acid solution (2.0-2.5 %), basil (0.8-1.5 %), curry powder (0.5-1.1 %), sun-dried tomatoes (5.5-8.5 %), and salt (0.03-0.08 %).

Four different kinds of bean spreads were developed: classic bean spread, bean spread with basil, bean spread with curry, and bean spread with sun-dried tomatoes.

The following physicochemical parameters of new bean spreads were determined according to standard methods: moisture content (AOAC 925.098), protein content (AACC 46-20), fat content (AOAC 2003.06), total dietary fiber content (AOAC 994.13); carbohydrates were determined by difference.

Nutritional value was calculated according to Regulation (EU) No 1169/2011 of the European Parliament and of the Council of 25 October 2011 on the provision of food information to consumers and EU CIAA *The GDA Labelling Initiative*.

The obtained data processing was performed using mathematical and statistical methods with IBM SPSS Statistics 20.0. All data is expressed as the mean value  $\pm$  standard deviation of triplicate determinations. The data was analysed using analysis of variance (ANOVA) and Tukey's test; differences among results are considered significant if p-value  $< \alpha_{0.05}$ . For interpretation of results it is assumed that  $\alpha=0.05$  with 95% confidence (Næs et al., 2011).

### Results and discussion

The best known plant protein spread-like products in Latvia are hummus (contains chickpeas, sesame oil, canola oil, salt and food additives) and vegetarian gourmet pate (contains plant oil, water, plant protein, starch, salt and food additives) both of which contain 2-6.5 % protein, 4-12 % carbohydrates and 29-30 % fat with energy value of 294-335 kcal  $100\text{ g}^{-1}$  (1230-1400 kJ  $100\text{ g}^{-1}$ ). Most plant spread-like products contain 2-7 % protein, 4-12 % carbohydrates and 10-33 % fat per 100 g portion. Chemical parameters of newly developed vegetarian bean spreads are given in Table 1.

Table 1. Chemical parameters of vegetarian bean spreads.

BEAN SPREADS	Classic bean spread	Bean spread with basil	Bean spread with curry	Bean spread with sun-dried tomatoes
Moisture, %	66.95 ± 0.10 <sup>A*</sup>	66.81 ± 0.12 <sup>A</sup>	66.47 ± 0.15 <sup>A</sup>	66.50 ± 0.20 <sup>A</sup>
Protein, g 100 g <sup>-1</sup>	7.91 ± 0.06 <sup>A</sup>	7.69 ± 0.17 <sup>A</sup>	7.74 ± 0.15 <sup>A</sup>	7.62 ± 0.09 <sup>A</sup>
Fat, g 100 g <sup>-1</sup>	7.06 ± 0.09 <sup>A</sup>	7.02 ± 0.01 <sup>A</sup>	7.04 ± 0.08 <sup>A</sup>	8.60 ± 0.10 <sup>B</sup>
Total dietary fiber, g 100 g <sup>-1</sup>	9.48 ± 0.08 <sup>A</sup>	9.26 ± 0.08 <sup>A</sup>	9.35 ± 0.08 <sup>A</sup>	9.83 ± 0.10 <sup>A</sup>
Carbohydrates, g 100 g <sup>-1</sup>	8.60 ± 0.05 <sup>A</sup>	9.06 ± 0.09 <sup>A</sup>	9.56 ± 0.09 <sup>A</sup>	8.45 ± 0.07 <sup>A</sup>

\* – mean values within a row not sharing a superscript letter are significantly different ( $p < 0.05$ )

Moisture content in new vegetarian bean spreads ranges from 66.47 to 66.95 %; there are no significant differences among the moisture content in bean spreads ( $p = 0.310$ ) and the moisture content between bean spreads and cooked beans (Deshpande, Cheryan, 1986) ( $p = 0.201$ ).

Classic bean spread has the highest content of protein ( $7.91 \pm 0.06$  g 100 g<sup>-1</sup>) and protein content in bean spreads is not significantly different or dependent on additives used, i.e., basil, curry or sun-dried tomatoes ( $p = 0.078$ ). Commercially available vegetarian spread-like products contain less protein than new bean spreads ( $p = 0.030$ ). Since the amino acid imbalance of beans limits bean protein biological value (Priman et al, 2001), further studies would be useful to analyse protein fractions and amino acid composition in bean spreads.

Fat content in vegetarian bean spreads is significantly higher comparing with dry and cooked beans ( $p < 0.001$ ) because of the oil added for creamy texture. The average fat content in bean spreads is  $7.48 \pm 0.72$  g 100 g<sup>-1</sup>; bean spread with sun-dried tomatoes contains significantly more fat ( $p = 0.002$ ) than other bean spreads because sun-dried tomatoes in oil are used as an ingredient resulting in higher total fat content. When compared to commercially available vegetarian spread-like products, bean spreads are low in fat ( $p = 0.001$ ).

New vegetarian bean spreads contain  $9.48 \pm 0.25$  g 100 g<sup>-1</sup> total dietary fiber on average. Added ingredients do not influence total dietary fiber content ( $p = 0.910$ ). Commercially available vegetarian spread-like products are not labelled as containing fiber even if they contain fiber. Carbohydrates available for digestion by human enzymes account to less than 10 g 100 g<sup>-1</sup> of new bean spreads; bean spreads are low in carbohydrates.

Products can be labelled as a *source of protein* (Commission Directive 2008/100/EC; Regulation No 1924/2006) if at least 12 % of the energy value of the food is provided by protein. A claim that a food is a *source of fibre* can be made if the product contains  $\geq 3.0$  g fiber 100 g<sup>-1</sup>, and *high in fiber* if the product contains  $\geq 6.0$  g fiber 100 g<sup>-1</sup>; also a food is *energy-reduced* if the energy value of the product is reduced by at least 30%.

A serving of bean spreads (100 g) provides 13 % of daily protein needs (2000 kcal diet) and bean spreads are a *source of protein* accounting to 18% of the energy value provided by protein. Fiber content in new vegetarian bean spreads is high and they can be labelled as *high in fiber*. Soluble and insoluble fiber ratio in cooked beans is about 1 : 3.2 (Wang et al., 2010) that corresponds to European Guidelines on cardiovascular disease prevention in clinical practice (Perk et al., 2012); the ratio is maintained in the new vegetarian bean spreads.

Classic bean spread contains  $153.27 \pm 0.10$  kcal 100 g<sup>-1</sup> ( $641.28 \pm 0.42$  kJ). Nutritional value of bean spread with basil, curry, and sun-dried tomatoes is  $153.92 \pm 0.35$  kcal 100 g<sup>-1</sup> ( $644.00 \pm 1.46$  kJ),  $155.31 \pm 0.51$  kcal 100 g<sup>-1</sup> ( $649.82 \pm 2.13$  kJ) and  $166.27 \pm 0.92$  kcal 100 g<sup>-1</sup> ( $695.67 \pm 3.85$  kJ) respectively. There are commercially available vegetarian spread-like products containing as much as twice the amount of calories per 100 g serving as shown in Figure 1; most of the calories come from fat.



Figure 1: Nutritional information in calories of different plant protein spread-like products available in Latvia and new vegetarian bean spreads:

A – classic bean spread, B – bean spread with curry, C – bean spread with basil, D – bean spread with sun-dried tomatoes, E – *HUM-HUM* hummus, F – *Wdfit* Pasztet sojowy, G – *Naturkost* Curry-Ananas Brotaufstrich, H – *Zwergenwiese* Basilikum Streich, I – *Allos* Gourmet Pastete, J – *Marno* Vegetarian Gourmet Pastete.

New bean spreads are *energy-reduced* products as their energy value is reduced by at least 43% of commercially available vegetarian spread-like products' energy value.

The results of this study suggest that bean spreads are a good source of protein and dietary fiber with reduced energy value. A serving of bean spreads provides 13 % of protein, 33-35 % of total dietary fiber, 13-15 % of fat, 3 % of carbohydrates and 8% of energy value of one's recommended daily nutrient intake.

## Conclusion

Newly developed vegetarian bean spreads show higher protein and lower fat content when compared to commercially available vegetarian spread-like products. The results support the assumption that using beans commercially available in Latvia and the developed technology for bean spread preparation it is possible to obtain products with high quality. Physicochemical parameters and nutritional evaluation positions common white beans (*Phaseolus vulgaris* L.) as an optimal raw material for new vegetarian bean spread production.

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# **RICE TERRACES MACRO-INVERTEBRATES AS INDICATOR OF WATER QUALITY IN INDIGENOUS COMMUNITIES OF THE CORDILLERA REGION NORTH LUZON, PHILIPPINES**

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## **Abstract**

The Cordillera region is the cradle of rice terraces in the Philippines Island of Southeast Asia as shown by the famous Banaue Rice Terraces. Diverse organisms including macro-invertebrates need these unique habitats to survive and complete their life cycles, and water quality contribute to this diversity. Two study sites were established based on accessibility. Sampling plots were based on altitudinal gradients. The taxon composition and richness of macro-invertebrates, index of similarity and pollution status of these sites were determined. Samples were handpicked and collected using the indigenous method. Collected samples were identified using standard books and monographs and taxonomic keys provided by Myer et al. The samples were grouped to taxa based on the Environmental Protection Agency adopting the Ireland EPA biotic system for macro-invertebrates. There were 15 macro-invertebrates species belonging to 14 genera under 9 taxa. The sites show similarity index of 61.5 percent indicating more taxa at the most accessible sites probably due to human introduction. The biotic index of the sites indicated a moderately polluted status. This implies the indigenous practice of recycling back organic litters back to the rice fields. These indigenous practices could have maintained the food web and at the same time preservig the biological diversity in the rice terraces of the Cordillera Region.

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**Keywords:** Macro-invertebrates, taxon richness, pollution status, food web, rice terraces

## **Introduction**

The website <http://en.goldenmap.com/Bioindicator> (2012) reported that macro-invertebrates are convenient indicators of the ecological health of a water body since these are always present and are easy to collect and identify. These macro-invertebrates have different sensitive levels to various environmental stressors. The following bioassessment methods are based on macro invertebrates. The US EPA (1999) developed and published the Rapid Bio-assessment Protocols based on macro-invertebrates to design assessment of water quality. The Southern African Scoring System (SASS) was used in South Africa to assess water quality. Likewise, the SIGNAL method was developed and used by researchers to monitor water health of Australia.

The Environmental Protection Agency (EPA) of Ireland reported that macro-invertebrates have annual life cycles in different bodies of water and respond to

environmental stressors in varied ways which were used in assessing water quality in the different states.

The Wetland Health Evaluation Program (2012) stressed that macro-invertebrates are good indicators of conditions of wetlands and other water bodies because they respond to different kinds of pollution, even chemical pollution and physical disturbances of the sites, wetland structure and hydrology.

Helgen (2002)] enumerated the following advantages of using macro-invertebrates for biological assessment; these are widely distributed and completed their lifecycles in varied types of wetlands thus directly exposed to the physical conditions such as pollution, aside from important component of the wetland food webs.

*Amerasinghe and Bambaradeniya (2003) in their review of the biodiversity associated with the rice field agro-ecosystem in Asian countries theorize that the biota of rice fields are considered opportunistic that can react physiologically and behaviorally to drastic conditions and possess the ability to recover rapidly to external disturbances such as pollutants thus considered with high resilience stability though influenced by allogenic and autogenic factors.*

Rice terraces abound in mountainous parts of the Cordillera Region as the source of food supply. These rice terraces are rich in aquatic fauna. The important roles of rice terraces aquatic fauna in the food web, its sizes, life spans, habitat distributions and make it a practical biological indicator in monitoring water quality.

Thus, this study was conducted to determine the taxon composition and richness of macro-invertebrates, index of similarity and pollution status of the rice terraces. This study is important to show the interconnectedness of macro-invertebrates and water quality in rice terraces as maybe influenced by existing indigenous farming practices.

## Materials and methods

This study was conducted in January to May 2012 in selected rice terraces of the Kalinga Province, Cordillera Northern Luzon, Philippines. Global Positioning System (GPS) receiver revealed that site 1 has the coordinates of 17° 20' 0.57" N to 121° 10' 04.7" E and site 2 has 17° 22' 36.3" N to 121° 11' 30.7" E.

Materials used in this study include, Global Positioning System (GPS) receiver (76CSX Garmin) for determining the coordinates, altitude and distance, collecting bags, and an indigenous sieve for collecting macro-invertebrates samples in rice fields.

Two study sites were established based on accessibility. GPS reading revealed that site 1 was 1.36 km away from site 2. Sampling fields in each site were selected based on elevation gradient. Samples of macro-invertebrates in the plowed fields were collected using the indigenous way, while macro-invertebrates in newly transplanted fields were handpicked and identified directly.

The taxa composition was determined by identifying the existing macro-invertebrates in the study sites using standard books, monographs and the taxonomic keys provided by Myers et al (2012).

The taxon index of similarity was determined adopting the formula proposed by Sorensen using taxon instead of species.

$$\text{Index of similarity} = \frac{2k}{a+b} (100)$$

Where; k= Number of taxa common to sites A and B

a=number of taxa for site 1 and;

b=number of taxa for site 2

The following biotic system for macro-invertebrates was adopted from Ireland EPA Q value score as reported by Ryan (2002).

Q5 = Unpolluted, Class A, is assigned if; (a) Groups A and B are the dominant forms, at least three Group A taxa are present in at least fair numbers. (b) At least one Group A taxon is common or numerous, (c) Group C is not more than common, (d) Groups D and E are scarce/few or absent.

Q4 = Unpolluted, Class A, is assigned if; a) At least one Group A taxon is present in at least fair numbers, (b) Group B taxa are dominant or numerous, (c) Group C is numerous or common, (d) Group D may be present in small numbers, (e) Group E is scarce/few or absent

Q3-4 = Slightly polluted, Class B, is assigned if; (a) At least one Group A taxon are present in at least small numbers, (b) Group B (Baetidae) is dominant or numerous, (c) Group C is numerous (*Gammarus*, Simuliidae usually are co-dominant), (d) Group D may be present in fair numbers, (e) Group E is scarce/few or absent.

Q3 = Moderately polluted, Class C, is assigned if; (a) Group A is absent (single specimens may be ignored), (b) Except for *B. rhodani*, which may be numerous or dominant, Group B is scarce/few or absent, (c) Group C dominant, *Gammarus*, *Hydropsyche* and other species may be fungus infested, (d) Group D may be common, (e) Group E may be present in small/few numbers.

Q2 = Seriously polluted, Class D, is assigned if; (a) Group A is absent, (b) Group B is absent, (c) Group C is scarce/few or absent, (d) Group D is dominant, (e) Group E may be common or numerous.

Q1 = Seriously polluted, Class D, is assigned if; (a) Group A is absent, (b) Group B is absent, (c) Group C is absent, (d) Groups D is scarce/few or absent, (e) Group E is dominant.

## Results and Discussions

Table 1 presents the taxon composition of macro-invertebrates. It shows 15 macro-invertebrates species belonging to 9 taxa. Gastropoda and odonata have the highest number of 4 species each while lamellibranchiata, orthoptera, hemiptera, coleoptera, hirudinae, oligochaeta and crustacea has 1 species each.

Obviously, the macro-invertebrates composition is dominated by arthropods followed by mollusks (Amerasinghe and Bambaradeniya, 2003).

Among the gastropoda, both the introduced invasive golden apple snail *Pomacea sp* and the native edible snail *Pila sp* are present in the study sites. This was contrary to the report of Joshi (2007) that golden snails have displaced the edible native snail in Luzon.

Rogel (2005) reported the presence of macro-invertebrates rice paddies such as snails, shrimps, leeches, crickets and even freshwater crabs. In the website [http://rmbn.nus.edu.sg/biodiversitii/bio/fw\\_crab.html](http://rmbn.nus.edu.sg/biodiversitii/bio/fw_crab.html) (2012) freshwater crabs are considered as important environmental markers for rainforests and indicators of water quality.

Table 1. Taxon composition of macro-invertebrates of the study sites

Common names	Scientific name	Taxon (EPA)
Golden snail	<i>Pomacea spp.</i>	Gastropoda
Native snail	<i>Pila spp.</i>	Gastropoda
Kuskusileng	<i>Physa spp.</i>	Gastropoda
Liddeg	<i>Melanoides spp.</i>	Gastropoda
Fingernail clams	<i>Sphaerium spp.</i>	Lamellibranchiata
Dragonfly	<i>Orthetrum spp.</i>	Odonata
Red tailed damselfly	<i>Pseudagrion spp.</i>	Odonata
White tailed damselfly	<i>Ischnura spp.</i>	Odonata
Blued tailed damselfly	<i>Ischnura spp.</i>	Odonata
Mole cricket	<i>Gryllus spp.</i>	Orthoptera
Water striders	<i>Gerris spp.</i>	Hemiptera
Water beetles	<i>Dytiscus spp.</i>	Coleoptera
Leech	<i>Hirudo spp.</i>	Hirudinae

Tubificid worm	<i>Tubifex spp.</i>	Oligochaeta
Rice paddy crab	<i>Somanniathelphusa spp.</i>	Crustacea

Table 2 presents the altitude and taxon richness of the study sites. Site 1 has a higher altitude of 1,061 meters above sea level (masl) and site 2 has altitude of 815 masl.

Site 2 has the highest number of taxa of 7 compared to site 1 with only 6. The following taxa are found in site 1 namely; odonata, hemiptera, gastropoda, coleoptera, hirudinae and lamelibranchiate while site 2 has odonata, hemiptera, gastropoda, coleoptera, oligochaeta, orthoptera and crustacea.

Table 2. Altitude and taxon richness of the study sites

Study sites	Altitude (meters above sea level)	Taxon richness
Site 1	1,061	6
Site 2	815	7

*This difference in taxa richness could be attributed to the adaptation mechanisms and presence of macro-invertebrates colonizers. The cultivation of rice fields for a long time has enabled colonizers from marshes, ponds and streams tolerate sudden changes in rice field ecosystems (Helgen, 2002)*

Table 3 presents the taxon index of similarity of the study sites. It shows an index similarity of 61.50 percent. The 4 taxa hemiptera, gastropoda, coleoptera and odonata are present in both study sites. Taxa hirudinae and lamelibranchiate are shown in site 1 while the 3 different taxa orthoptera, oligochaeta and crustacea are present in site 2. This index can probably be attributed to the difference in location, elevation and accessibility of the sites. Site 2 is located just above the village while site 1 is 1.36 km away based on GPS readings. Besides, site 1 is isolated at the eastern slope of a mountain that is 246 meters higher than site 2. Suren (1994) found out that macro-invertebrates declined with altitude in western Nepal and that streams flowing through terraced lands had lower number of insect families.

Table 3. Taxon index of similarity of the study sites

Study sites	Index of similarity (%)
Site 1	61.5
Site 2	

Likewise,  
that macro-

Moore (2003) noted  
invertebrate richness

was highest in the agricultural streams than urbanized areas in Maryland USA.

A tubificid worm of taxon oligochaeta for example was observed in accessible field samples with dung of carabao that grazed nearby.

Table 4 shows the equivalent pollution status of site 1 based on the biotic index (quality rating) of the faunal group. It shows a 3 faunal groups B, C and D. The most tolerant macro-invertebrates to organic pollution belonging to Group C have the highest frequency range of 12.50 to 100.00 percent with dominant to excessive populations. This is followed by Group B, the less sensitive group to organic pollution, with an occurrence frequency of 12.5 to 37.5 percent with few populations. Lastly, Group D, the very tolerant groups to organic pollution, has the lowest frequency range of 12.50 to 25.00 percent with few populations. This finding confirms that *Physa sp* (kuskusileng) of the taxa Gastropoda is tolerant to pollution as reported in the <http://mkohl1.net/Physidae.html>.

Table 4. The equivalent pollution status of site 1 based on the biotic index (quality rating) of the faunal group

Common names	Taxa	Faunal Group	Occurrence in field plots <i>F</i> (%)	Population	Biotic index	Pollution Status
Red tailed damselfly	Odonata	B	3 37.50	Few	Q3	Moderate Pollution
White tailed damselfly	Odonata	B	2 25.00			
Blued tailed damselfly	Odonata	B	2 25.00			
Dragonfly	Odonata	B	1 12.50			
Water striders	Hemiptera	C	8 100.00	Dominant to excessive		
Native kuhol	Gastropoda	C	7 87.50			
Liddeg	Gastropoda	C	7 87.50			
Water beetles	Coleoptera	C	5 62.50			
Golden kuhol	Gastropoda	C	1 12.50			
Leech	Hirudinae	D	2 25.00	Few		
Kuskusileng	Gastropoda	D	2 25.00			
Clam	Lamellibranchiata	D	1 12.50			

*F*- frequency, B- Less Sensitive, C-Tolerant, D-Very tolerant

The presence of the most tolerant in abundant number with few less sensitive and very tolerant groups indicate a biotic index of Q3 with a status of moderate pollution.

This moderate pollution status of the sites could be explained by the practice of the indigenous farmers of putting organic matter back into the field to decompose. These organic matters include dried weeds, rice straw and even animal manure. This finding tends to support the observations of Amerasinghe and Bambaradeniya (2003) claimed that rice field ecosystem is also influenced by climatic factors and agronomic practices. Climatic factors include solar radiation, temperature, relative humidity, and wind velocity controls evapotranspiration while precipitation affects water chemistry, thus affecting the composition of the faunal composition. Agronomic practices control the overall ecology and biodiversity of the rice field ecosystem. These practices affect the hydrology, rice plant growth, water chemistry, soil fertility and biodiversity of rice fields. Indigenous farmers in the region allow their organic wastes to decompose in the field during field preparation as organic pollutants. Wilson et al (2008) found out that greater biodiversity existed in organic farms of Australia compared to farms applied with chemicals at the early stages of growing season. Likewise, Roxas et al (2005) found out that in Barangay Tipolo, Misamis Occidental where farmers used chemicals, the rice fields harbored very low number of macro-invertebrates that include pea cockle, water stick insect, golden snail (kuhol) and bugs.

Likewise, *Melanopsis sp* was reported to feed on detritus and algae by the website [http://www.allesumdiesschneck.de/html/melanopsis\\_praemorsa\\_english.html](http://www.allesumdiesschneck.de/html/melanopsis_praemorsa_english.html) (2012) citing the observation of Behrendt.

Table 5 shows the equivalent pollution status of site 2 based on the biotic index of the faunal group. It can be gleaned that there are 3 faunal groups B, C and D. Faunal group C, the most tolerant macro-invertebrates to organic pollution, has the highest frequency range of 17 to 100.00 percent with dominant to excessive populations. This is followed by group B, the less sensitive group to organic pollution, with an occurrence frequency of 17 to 33 percent with few populations. The very tolerant Group D has the frequency range of 17 to 50 percent with few populations. The most tolerant tubificid worm of Group E has a frequency of 33 percent.

Table 5. The equivalent pollution status of Site 2 based on the biotic index (quality rating) of the faunal group

Common names	Taxa	Faunal group	Occurrence		Number	Biotic index	Pollution Status
			F	%			
White tailed damselfly	Odonata	B	2	33	Few	Q3	Moderate Pollution
Red tailed damselfly	Odonata	B	1	17			
Blued tailed damselfly	Odonata	B	1	17			
Water striders	Hemiptera	C	6	100	Dominant to excessive		
Liddeg	Gastropoda	C	5	83			
Native kuhol	Gastropoda	C	2	33			
Water beetles	Coleoptera	C	2	33			
Golden kuhol	Gastropoda	C	1	17			
Crabs	Crustacea	C	1	17			
Kuskusileng	Gastropoda	D	3	50			
Mole cricket	Orthoptera	D	1	17	Few		
Tubificid worm	oligochaeta	E	2	33	Few		

B- Less sensitive, C-Tolerant, D- Very tolerant, E-Most tolerant

This finding confirms that *Physa* sp (*kuskusileng*) of Group D is tolerant to pollution as reported in the website <http://mkohl1.net/Physidae.html> (2012). Tubificids were found by Ito et al (2010) to be higher in density in two rice fields with organic farming in Japan. The abundant number of the most tolerant macro invertebrates with few less sensitive and very tolerant groups indicates a biotic index of Q3 with a status of moderate pollution.

Both sites indicate a status of moderate pollution. Field observations revealed that site 2 has been transplanted with rice earlier than site 1 that was on the process of being transplanted. This shows that the rice terraces nearest to the village are tended first before those distant fields.

## Conclusions

Macro-invertebrate biotic index shows a moderate pollution status of the Cordillera region rice terraces. This indicates the existing indigenous farming practices of recycling organic wastes back to the fields that probably maintains the food web thus preserving the diversity of macro-invertebrates.

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## THE POTENTIAL OF TITHONIA DIVERSIFOLIA (WILD SUNFLOWER) AS ORGANIC FOLIAR FERTILIZER

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### Abstract

Indigenous farming practices include the use of wild plants like sunflowers to sustain crop production. This practice becomes the present trend in sustainable agriculture aside from promoting healthful living, safe environment and improving economic condition. This study was conducted to determine the potential of *Thitonia diversifolia* (wild sunflower) as organic foliar fertilizer using pechay (*Brassica rapa L.*) as experimental plant. The randomized complete block design was used with the mixture ratio of water with sunflower leaves and stems as treatments with three replications including positive and negative treatments. The different treatments were applied to a pechay plant. The weight and height of the pechay plant were measured after application. The treatment weight and height means were compared using the analysis of variance. Significant means were further compared using the least significant difference. The gathered data were analyzed using the SPSS version 12. Results showed that of the experimental treatments, the mixture ratio of 1.5kg sunflower leaves to 1L water had the highest pechay plant weight and height means which do not significantly differ to that of the positive control treatment. This shows a comparable potential of *Thitonia diversifolia* (wild sunflower) as foliar fertilizer that can be tested in other crops.

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**Keywords:** Indigenous farming, sustainable agriculture, organic foliar fertilizer

### Introduction

*Tithonia diversifolia* is a scientific name for a sunflower which belongs to the genus of annual and perennial herbs of composite flowers. This genus is thought to be native to South America. There are about 67 sunflower species worldwide (Microsoft Corporation, 2006).

In Kenya, Wanjiru (2003) reported that farmers in the outskirts of Kenya have discovered that wild sunflower (*Tithonia diversifolia*) replenishes soil fertility and increase their crop yields. Likewise, African scientists tested a wild sunflower plant and found out substantial amount of nitrogen and have the ability to enhance phosphorus availability in soil.

Sunflower is reported to have nitrogen (N), phosphorous (P) and potassium (K) the required elements to make a complete fertilizer (Erpel P. 2009). In India, one tonne of fresh leaves and tender stems was reported by Nagarajah and Nazar (2013) to provide 5 kg N, 1 kg P<sub>2</sub>O<sub>5</sub> and 10 kg K<sub>2</sub>O. Philippine Rice researchers have found out that sunflower leaves have high nitrogen content (2.9 percent oven dry weight) and that fresh sunflower can be given an equivalent of 60 N kg/ha. (<http://www.aseanbiotechnology.info/News/24000932.htm> 26/12/2004/). Moreover, Nyasimi et al. (1997) reported that *Tithonia diversifolia* leaves (dry matter) contain an average of

Nitrogen (N) 3.17 percent, Phosphorus (P) 0.3 percent, Potassium (K) 3.22 percent, Calcium (Ca) 2.0 percent and Magnesium (Mg) 0.3 percent.

Organic farming, like the use of wild sunflower, is being encouraged by concerned agencies for environmental, health and economic reasons. In the Cordillera Region, sunflowers thrive along the roadsides. Farmers in Ifugao and Mountain Province have been using this wild sunflower (*Tithonia diversifolia*) to fertilize rice, vegetables, and sweet potato (<http://www.philstar.com/agriculture/267547/wild-sunflower>).

In indigenous communities of Kalinga, wild sunflowers are found in spaces between and around rice paddies. These are mixed with the rice fields before planting to rot as fertilizers.

This paper presents the results of the study on the effects of wild sunflower as foliar fertilizer to the weight and height of *Brassica rapa* L

### Materials and methods

The randomized complete block design (RCBD) was used in this study. The mixture ratios of the different sunflower parts were used as treatments with three replications as follows; Treatment 1 (T1) = 1.5kg chopped leaves to 1L of tap water, Treatment 2 (T2) = 1.5kg chopped stems to 1 L of tap water, Treatment 3 (T3) = 0.75Kg leaves + 0.75 Kg soft stems + 1L tap water, Treatment 4 (T4) plain tap water as negative control and Treatment 5 (T5) 1g urea (commercial) to tap 1L tap water as positive control.

Materials used in this study include graduated cylinder, 2 feet ½ foot wooden box, knife, chopping board, containers, analytical balance (BBL-51), composite soil samples and *Brassica rapa* L. (Black Behi) seeds.

Fifteen wooden boxes were filled with homogenized composite soil samples. The pechay seeds were germinated and transplanted after 7 days. Pechay seedlings were planted in each box. The experimental treatments were prepared following the indicated above ratio. Fresh leaves and stems of the sunflower growing in one area were separately weighed and chopped. The chopped samples were placed in separate containers following the above treatment ratio. The mixtures were left undisturbed for 2 days. The positive control treatment was prepared based on the indicated mixture ratio. The treatments were applied to the transplanted pechay plants two times a day. After 15 days, the pechay plants were harvested and measured in terms of weight and height. The analysis of variance (Anova) was used to compare the means of the different treatments. Significant means were further compared using the Least Significant Difference (LSD). The SPSS version 12 was used to analyze the gathered data for interpretation.

### Results and Discussions

Table 1 presents the different treatment ratios used a foliar fertilizer. It shows that T3 has the lowest mean weight of 4.3139 followed by T4 with 5.1062, T2 with 5.3316, T5 with 7.2561 while T1 has the highest weight mean of 8.7682 g.

Table 1. Pechay plant mean weight and height among the different mixture ratios

Mixtures (Treatments)	Weight/yield (g)	Height (mm)
Treatment 3 (T3)	4.3139	156.3333
Treatment 4 (T4)	5.1062	170.3333
Treatment 2 (T2)	5.3316	169.0000
Treatment 5 (T5)	7.2561	177.6667
Treatment 1 (T1)	8.7682	196.3333
Total Mean	6.1552	173.9333

As to the mean height of pechay plant, T3 has the lowest mean height of 156.3333 followed by T2 with 169.0000 and T4 with 170.3333, furthermore T5 has a mean height of 177.6667 while T1 having now the highest mean of 196.3333.

Part of this study is to determine what mixture ration can increase the weight and height of the pechay plant.

Table 2. Difference of pechay plant mean weight and height among the different mixture ratios

Mixtures (Treatments)	Weight/yield (g)	Height (mm)
Treatment 3 (T3)	4.3139A	156.3333A
Treatment 4 (T4)	5.1062A	170.3333A
Treatment 2 (T2)	5.3316A	169.0000A
Treatment 5 (T5)	7.2561B	177.6667AB
Treatment1 (T1)	8.7682B	196.3333B
Total Mean	6.1552	173.9333
F-ratio	9.244**	3.646*
P	0.002	0.044

\*\*=Significant at 0.01

\*=Significant at 0.05

Note: Means with the same letter are not significantly different (LSD)

Among the experimental treatments, Table 2 shows that T1 has a significantly high weight compared to the other treatments ( $F=9.244$ ,  $P\leq 0.002$ ). Likewise in terms of height, T1 has a significantly longer stem height than the other treatments ( $F=3.646$ ,  $P\leq 0.044$ ). The mean weight and stem height of T5 are comparable to the positive control treatment commercial fertilizer urea (T5). These similarities apparently indicate the same effects of both treatments to pechay plant probably due to the presence of common nutritional contents of sunflower leaves and urea.

Nyasimi et al. (1997) reported experimental studies in Kenya that wild sunflower used as green manure consistently increased crop yield.

Liasu, M.O. and Achakzai, A.K.K (2007) applied *T. diversifolia* leaf mulch and fertilizer to potted tomato plants and found out a significant increase in the number of leaves and height.

In Nigeria, Ademiluyi, B.O. and Omotoso, S.O. (2007) reported a higher vegetative and reproductive growth of maize in the *Tithonia* incorporated soil in terms of height and stem girth than under the NPK fertilizer soils.

## Conclusions

Results of this study indicate that wild sunflower plant leaves water extract can be used as alternative source of organic foliar fertilizer to increase yield of leafy vegetables like pechay plant.

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# MACROFLORAL BIODIVERSITY CONSERVATION IN IFUGAO

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## Abstract

Any biodiversity conservation effort starts from baseline information. A biodiversity study was then conducted in the province of Ifugao, Philippines to provide first hand information on the status of macrofloral biodiversity in the area. Rapid assessment using plot method was used in the inventory of macrofloral species. Ethnobotanical survey of key informants was also conducted to record knowledge of community members on the uses of plant species found in the locality.

Results revealed 69 families 134 genera and 214 species of macroflora. Shannon's diversity index for trees and shrubs showed 3.59 to 3.7 corresponding to relatively high diversity. Of the species recorded, 36 were endemic to the Philippines, 4 vulnerable based on the 2010 IUCN red list and under CITES Appendix II. Forest areas with lower elevation showed higher species diversity than those with higher elevation. Description of species importance values, dominance, similarity index and floristic checklist were provided.

Ethnobotanical survey revealed 38 species used as food plants, 25 species used as medicinal plants, 26 species with socio-cultural importance, 2 species identified as source of strong fiber, 5 species with pesticidal properties, and 1 species utilized as organic fertilizer. Issues and problems related to macrofloral biodiversity and suggested solution actions were described.

The forest areas in Ifugao are still rich in macrofloral diversity and can serve as a vital source for re-vegetation activities in areas with low plant density and diversity status. Leaving the remaining forest untouched and restoration of denuded forest cover in the other parts of Ifugao is vital in supporting macrofloral diversity conservation while mitigating climate change.

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**Keywords:** Macrofloral biodiversity, Ethnobotany

## Introduction

### Rationale

Biodiversity plays various important roles beneficial to human being that extends far beyond mere sources of raw materials (Selliers 2005). Despite this fact, human actions caused loss of biodiversity at steadily increasing rate. Human activities cause the decline of animal and plant populations everywhere to the extent that extinction of some species could be due to such human activities.

Fortunately, concern on biodiversity loss is increasing worldwide because of its negative effects in almost all human wellbeing like health, energy and food security, vulnerability to climate change and calamities, access to clean environment, water and raw materials. It is believed that limiting biodiversity loss while promoting human wellbeing is possible.

Since direct actions towards limiting or reducing biodiversity loss are undertaken at the local level, it is important to strengthen the institutional capabilities at the local level for

successful planning and implementation of sustainable biodiversity conservation programs. Planning for biodiversity conservation program requires baseline information on existing biological resources. Such information will serve as input during the planning process for biodiversity conservation and for effective implementation, management and monitoring. Biodiversity assessment is thus the stepping stone towards biodiversity conservation.

The foregoing justifies the need for macrofloral biodiversity assessment in Ifugao as input in the proper management and conservation of its biological resources. Information on the current status of biological resources is limited and must be enhanced so that the kind and realistic level of biodiversity in the area can be established.

Macrofloral biodiversity assessment will provide first hand scientific knowledge on species richness and diversity of the resources in the area. Further, the results will provide a deeper understanding on these parameters to serve as guide for biodiversity advocates, communities, and institutions in designing protection and conservation strategies of macrofloral resources such as possible sustainable use of the resources without depleting their population in their natural habitat.

### **Objectives**

In support to biodiversity conservation efforts at the local level, a macrofloral biodiversity assessment was conducted to provide first hand information on the status of biodiversity and conservation issues in the province of Ifugao, Philippines. Specifically, it aims to:

1. Provide data on the species richness and diversity of macroflora in selected sites in Ifugao,
2. Record knowledge of community members on the uses of plant species found in the locality,
3. Document issues and problems and suggested action solutions related to macrofloral biodiversity conservation.

### **Methodology**

#### **Location of Study Sites**

The study was conducted in the province of Ifugao, one of the provinces of the Cordillera Administrative Region in Northern Philippines, specifically located at longitude between 120°50' and 121°32' and latitude between 16°35' and 17°01'. It has a total land area of 251,778 hectares of which, about 90% or 226,369 hectares were forestland and 25,409 hectares were classified certified Alienable and Disposable land. The province is generally mountainous except in the eastern part which has hilly and rolling topography. Ifugao is about 330 kilometers from Manila and is accessible by land transportation. It has eleven municipalities and 175 barangays with a total population of about 165 thousand.

Macrofloral biodiversity assessment was conducted in three municipalities of Ifugao particularly in Alfonso Lista, Kiangan, and Mayoyao representing low (<500 m asl), medium (500-1000 m asl) and high (>1000 m asl) elevation forest ecosystems, respectively.

#### **Macrofloral survey**

Rapid assessment of macrofloral species (trees and shrubs) using plot method was employed in the inventory. Three main inventory plot of 20 x 100 m along the slope was established per study site. Within the main plot, three (3) 20x20 m quadrats were established for tree profiling, and 3 5x5m subquadrats per quadrat were established for the inventory of trees and shrubs. Tree identification was done at each 20 x 20m quadrat and in the 5 x 5 m subquadrats. The process includes locating, identifying and measuring diameter at breast height, total height and crown cover of all trees with a diameter at breast height (dbh) of 5 cm

and above. Nomenclature and classification were based on Rojo, (1999) and Fernando (2004).

Ethnobotanical interview using key informants (10 respondents per municipality) were also conducted to ascertain the socioeconomic and cultural uses of the plant species, the factors and activities related to the macrofloral biodiversity loss, and suggested action solutions to floral biodiversity conservation. This was followed by a focused group discussion to verify the findings.

## Results and discussions

### Macrofloral Biodiversity in Ifugao

The inventory of macroflora in Ifugao revealed a total of 69 families, 134 genera and 214 species. There were 191 species of trees and shrubs belonging to 54 families and 121 genera. All the species surveyed were angiosperms except for Benguet Pine (*Pinus Kesiya*). Of the 54 families of trees and shrubs, Euphorbiaceae had the most number of genera (15) and individuals (24) followed by Rubiaceae with 7 genera and 9 species, and Meliaceae with 6 genera and 11 species. Family Moraceae had only 3 genera but with 21 species. Of the 121 genera, *Ficus* had the most number of species (17) followed by *Syzygium* with 9 species. Of the species recorded, 37 were endemic to the Philippines, and 4 species (*Lithocarpus ovalis*, *Ziziphus talanai*, *Sandoricum vidalii*, *Dillenia philippinensis*) were vulnerable under IUCN red list of 2010. Six species of palm was recorded in the inventory. One rattan species known as Lituko (*Calamus manillensis*) with edible fruits was recorded in the sampling plots at Kiangan, and another locally known as Barit (*Calamus sp.*) was recorded in Alfonso Lista, Ifugao. There were 8 species recorded belonging to the fern family and 8 species belonging to grasses, herbs and vines. The giant fern (*Cyathea contaminans*) is under CITES Appendix II.

Table 1 shows the number of species and the diversity indices for the forest ecosystems in the three municipalities of Ifugao. The diversity index ranges from 3.59 to 3.7 indicating relatively high species diversity. Of the 191 species of tree and shrubs recorded, forest in Alfonso Lista, a remnant of a Dipterocarp forest and representing low elevation had the highest number of species (89) followed by forest in Kiangan representing medium elevation with 86 species. Forest in Mayoyao representing high elevation had the least number of species (74). A total of 3,466 individuals were surveyed distributed to 1197, 1535 and 734 individuals for Alfonso Lista, Kiangan, and Mayoyao forests, respectively. Forest in Kiangan had the highest species density and total number of individuals. This could be explained by the fact that ‘muyong’ or private woodlot owners ensure that their respective ‘muyong’ are adequately stocked with trees, shrubs and other perceived important plant species. Owners also practice cultural management practices to ensure best growth of their preferred plants (Daniels & Cabute, 2010). The result supports the finding of Rondolo (2001) who found out that the ‘muyong’ contained 264 species of plants of all kinds, mainly indigenous, belonging to 71 plant families with *Euphorbiaceae*, *moraceae* and *Meliaceae* as the most dominant families. The findings was also in agreement with Taguling (2011) wherein ‘muyong’ in Banue, Ifugao had the highest diversity index and with the highest number of species compared to communal and mossy forests.

Table 1. Number of species and diversity indices for tree and shrubs.

Indicators	Namnama, A. Lista	Nagacadan, Kiangan	Bato, Mayoyao	Grand Total
No. of Species (S)	89	86	74	191
Total No. of Individuals	1197	1535	734	3466
<b>Shannon's Index</b>				
Shannon's Index <sub>observed</sub>	3.59	3.7	3.6	4.48
Shannon's Index <sub>max</sub>	4.49	4.45	4.30	5.25
Evenness'	0.8	0.83	0.84	0.85

### Species Similarity and Differences Between Study Sites

Table 2 shows the quantitative and qualitative species similarity analysis. The quantitative and qualitative measures indicate that species found in Kiangnan were more similar to species found in Mayoyao. This findings could be explain by the fact that the elevation of the sampling sites in the forest areas of Kiangnan and Mayoyao has only a difference of 313 m, thus, many species that will thrive in the forest areas of Kiangnan will also thrive in the forest areas of Mayoyao. On the other hand, many species found in A. Lista may not be able to thrive in Kiangnan and Mayoyao due to their relatively high difference elevation.

**Table 2.** Percent similarity matrix among study sites (%)

Jaccard measure (qualitative data)				
	A.	Lista	Kiangnan	Mayoyao
A. Lista	1		0.129	0.101
Kiangnan	0.051		1	0.26
Mayoyao	0.029		0.165	1
Morisita- Horn measure (quantitative data)				

Further data analysis showed that there were 40 out of 191 species that were singletons or represented by one individual. This indicates the rarity of the species at least at the study sites.

There were 159 species that were found unique in each project site. That is, 64 species out of 191 species were only found in Alfonso Lista, 52 species found only in Kiangnan and 43 species found only in Mayoyao. Data further revealed that there were 10 species that occur in all sites, 10 species common to A. Lista and Kiangnan, 5 species common to A. Lista and Mayoyao and 14 species common to Kiangnan and Mayoyao (Table 3). The information provides what species can be grown in the different project sites.

**Table 3.** Species of Trees and Shrubs Common to study sites

<b>Species Common to All Study Sites</b>				
Name of Species	A. Lista	Kiangnan	Mayoyao	Grand Total
<i>Eurya amplixicaulis</i>	1	9	54	64
<i>Pygeum sp.</i>	1	43	15	59
<i>Turpinia ovalifolia</i>	4	41	7	52
<i>Canarium asperum</i>	24	6	21	51
<i>Litsea perrottetii</i>	17	12	15	44
<i>Ficus glaberrima</i>	3	10	16	29
<i>Semecarpus cuneiformis</i>	3	23	3	29
<i>Linociera philippinensis</i>	12	7	3	22
<i>Leea aculeate</i>	11	7	1	19
<i>Wikstroemia lanceolata</i>	1	13	4	18
<b>Species Common to A. Lista and Kiangnan</b>				
Name of Species	A. Lista	Kiangnan	Mayoyao	Grand Total
<i>Syzygium santosii</i>	21	86		107
<i>Ervatamia ecarinata</i>	60	3		63
<i>Syzygium polycephaloides</i>	17	32		49
<i>Canthium dicoccum</i>	34	7		41
<i>Clerodendrum minahassae</i>	4	16		20
<i>Artocarpus ovata</i>	2	15		17
<i>Pterospermum niveum</i>	7	9		16
<i>Pterocarpus indicus</i>	8	8		16
<i>Mangifera altissima</i>	6	6		12
<i>Garcinia benthami</i>	1	5		6

<b>Species Common to A. Lista and Mayoyao</b>				
Name of Species	A. Lista	Kiangan	Mayoyao	Grand Total
<i>Grevia setacea</i>	12		6	18
<i>Ficus irisana</i>	3		9	12
<i>Eurya obovata</i>	1		10	11
<i>Pipturus arborescens</i>	2		8	10
<i>Ficus septica</i>	1		6	7
<b>Species Common to Kiangan and Mayoyao</b>				
Name of Species	A. Lista	Kiangan	Mayoyao	Grand Total
<i>Lithocarpus ovalis</i>		123	11	134
<i>Garcinia rhizophoroides</i>		34	40	74
<i>Palaquium luzoniense</i>		69	2	71
<i>Litsea quercoides</i>		27	30	57
<i>Macaranga bicolor</i>		42	11	53
<i>Callicarpa formosana</i>		6	46	52
<i>Elaeocarpus argenteus</i>		8	18	26
<i>Viburnum luzonicum</i>		20	2	22
<i>Palquium sp.</i>		7	13	20
<i>Evodia benguetensis</i>		3	9	12
<i>Evodia dubia</i>		5	7	12
<i>Bridelia glauca</i>		6	2	8
<i>Premna integrifolia</i>		3	1	4
<i>Viburnum odoratissimum</i>		3	1	4

### Species Dominance

Species dominance in a forest may indicate its succession stage. Since dominance is dependent on the basal area, tree species with high diameter and density values also had high dominance values. In the forest of A. Lista, *Cleistanthus ovatus* showed the highest dominance at 0.832 m<sup>2</sup> followed by *Dysoxylum arborescens* with a basal area of 0.490 m<sup>2</sup>. The locally known Palayon (*Lithocarpus ovalis*) with a basal area of 0.620 m<sup>2</sup> was the most dominant species in Kiangan followed *Sandoricum vidalii* and *Evodia benguetensis* at 0.376 m<sup>2</sup> and 0.348 m<sup>2</sup>, respectively. The *Cynometra sp.*, *Deutzia pulchra* and *Astronia williamsii* had the highest dominance value at 0.710, 0.375, and 0.371 m<sup>2</sup>, respectively in Mayoyao.

The higher dominance values observed for foregoing species was due to the greater number of bigger sizes compared to the other species. The very few numbers of big trees in Mayoyao and A. Lista was due mainly to the continued utilization the bigger diameter trees for domestic use by the community. It was further known through key informant interview that the study sites in the two areas were considered communal forest, thus everyone has the access, unlike in Kiangan in which the sampling sites were “muyong” or private woodlots owned by certain family, thus the utilization of trees therein is regulated by the owner and nobody can use the resources found therein without permission from the owner.

In Alfonso Lista, the first 20 species with the highest dominance value has a total of 4.414 m<sup>2</sup> and accounts for 80% of the total dominance value of all species. Similarly in Kiangan, the total dominance value (5.082 m<sup>2</sup>) of the first 20 species with the highest dominance also accounts for 80% of the total dominance value of all species. The total dominance value (3.926 m<sup>2</sup>) of the first 20 species in barangay Bato, Mayoyao accounts for 85% of the total dominance value of all species therein.

### Species Importance Values

The top 10 species with the highest Species Importance Value (SIV) in the three municipalities is shown in Table 4. Results showed that Palayon (*Lithocarpus sp.*) had the highest species importance value (12.45%), followed by *Dysoxylum arborescens* with SIV of 10.82 and *Laportea sp.* at 9.74. Generally the result of the analysis showed similar or lower SIV values when compared to SIV values obtained by Taguling (2009) and relatively lower

compared to other tropical tree inventories for both lowland and upland forests, which range from 12.5 to 52.4 as cited by Arances et al. (2004).

The species importance value is dependent on the number of tree per sampling area (density), the degree of occurrence of species per sampling site (relative frequency), and the relative dominance of each species which is derived from the data on diameter of each species. Of these factors, the low species importance value obtained from this assessment can be attributed most to the few number of large-diameter trees in the sampling sites resulting to low relative dominance.

**Table 4.** Top 10 lists of species with the highest Species Importance Value (SIV) in all the barangay project sites.

	Species	RD	RF	Rdom	SIV
1	<i>Lithocarpus ovalis</i>	3.99	4.02	4.44	12.45
2	<i>Dysoxylum arborescens</i>	3.69	3.72	3.41	10.82
3	<i>Laportea sp.</i>	4.43	4.47	0.83	9.74
4	<i>Canarium asperum</i>	1.52	1.53	6.01	9.06
5	<i>Cleistanthus ovatus</i>	0.98	0.99	5.78	7.75
6	<i>Dasymaschalon oblongatum</i>	3.33	3.36	0.55	7.24
7	<i>Syzygium santosii</i>	3.18	3.21	0.49	6.89
8	<i>Garcinia rhizophoroides</i>	2.20	2.22	2.28	6.71
9	<i>Deutzia pulchra</i>	1.96	1.98	2.60	6.55
10	<i>Cynometra sp.</i>	0.77	0.78	4.93	6.49

RD – Relative Density

RF - Relative Frequency

Rdom – Relative Dominance

SIV – Species importance Value

### Ethonobotany of Floral Species

Ethnobotanical survey was conducted purposely to record knowledge of community members on the uses of plant species found in the locality. Results showed 38 food plants, 25 species of medicinal/pesticidal plants, and 26 species with socio-cultural importance. Most of the inventoried trees are generally used as firewood/charcoal making but 21 species were specifically identified purposely for handicraft and furniture, and 45 species use as source of lumber and for housing construction. Two (2) species (*Grevia setacea*, *Wikstroemia lanceolata*) were identified as source of strong bark fiber for tying and four (4) species (*Pittosporum ramosii*, *Linociera philippinensis*, *Homalanthus alpines*, *Sandoricum vidalii*) were identified with pesticidal properties. The leaves of “tukbo” (*Croton colubrinoides*) are being used to control rats in rice fields. Succulent leaves and stems of “fuloh” (*Baccaurea philippinensis*) are being utilized as organic fertilizer.

### Food Plants

A total of 38 plant species were identified as food plants. Most of the food plants encountered in the sampling plots were wild fruit-bearing trees and most of the fruits are eaten raw. Trees and shrubs bearing edible fruits include *Saurauia bontocensis*, *Evodia meliaefolia*, *Vaccinium jagori*, *Morinda bracteata*, *Antidesma pentandrum*, *Syzygium polycephaloides*, *Saurauia elegans*, *Antidesma bunius*, *Garcinia benthami*, *Syzygium samarangense*, *Pterospermum niveum*, *Bischofia javanica*, and others. Shoots of palm species and species of grasses, ferns and herbs are used as vegetables and often cooked. The fruit of Lituko (*Calamus manillensis*) is the only fruit sold in commercial scale and is considered the most economically important food plant species as it gives additional income to farmers. Of the wild vegetable food plants, species now popular in the market as organic vegetables include the locally known *Amti* (*Solanum nigrum*), Kunde or wild patchay (*Rorippa indica*), wild ampalaya (*Momordica sp.*) and pako (*Diplazium esculentum*). While community people do not depend so much on wild food plants, they have high knowledge on these plants and some of which are becoming good additional source of income to some farmers.

### Medicinal Plants

There were 25 plant species identified as medicinal and often used as alternative medicine. Species used to cure wound and scratches include *Neonauclea media*, *Streblus asper*, *Mallotus Philippinensis*, *Cyathea contaminans*, and *Pterocarpus indicus*. The species *Ficus pseudopalma* is used to treat kidney stone and diabetes. Cough is often treated with sour fruit of *Syzygium polycephaloides*, *Garcinia*, *Medenilla pendulla*, and leaves of *Premna odorata*. Skin infection is treated using *Pittosporum ramose*. Internal parasites are eradicated using decoction of *Mallotus Philippinensis* and *Garcinia benthami*. Hypertension is remedied using leaf decoction of *Trema orientalis* and *Syzygium polycephaloides*. Dysentery is treated with bark and root decoction of *Macaranga tanarius* or *Premna odorata*, *Zanthoxylum ovicennae*, and *Lithocarpus sp.* The locally known plant “pukag” (*Kleinhovia hospital*) is used as eyewash and to treat irregular menstruation. *Ficus septica* is used to treat asthma and headache. Malaria is treated with decoction of “Halahala” (*Zanthoxylum ovicennae*). Boil is treated with *Timonius arboreus* and *Ficus septica*. Scabies is treated with *Artocarpus communis*, *Bischofia javanica* and *Mallotus Philippinensis*. There are ailments that can be cured by more than one species and there are species that can cure more than one kind of illness. Key informants revealed that there is a decreasing interest and knowledge on the use of medicinal plants among the younger generations. They use to ask the older folks what species can be used to treat a certain illness. When asked why, they prefer to refer their illness to health workers and use commercial drugs.

### Socio-culturally Important Species

There were 26 plant species identified to have high socio-cultural importance. A particular species is used depending on the socio-cultural occasion such as during feast, wake & burial, marriage, birth, and the like. The plant or its parts are either used directly during sociocultural rites or serve as a raw material in making items used in such rites. To mention a few, the leaves of “dongla” (*Cordyline fruticosa*) and *Macaranga sp.* are often used in most indigenous religious rites. The hard wood of “palayon” (*Lithocarpus sp.*) and *Evodia meliaefolia* are used in making “punhib-at” or wooden stick use to beat the gongs during ceremonies while the wood of “tobah” (*Artocarpus ovata*) is used in making “pattung” a wooden instrument used during “Him-ung” rites. The wood of *Pterocarpus indicus* (Udyo) is used to make ‘bulol’ – a human-like wood carving used in indigenous religious rites and *Hagabi*, a large wooden chair indicating the high social status of a family. The species of *Ficus variegata*, *Pavetta parvifolia*, *Pometia pinnata* and other species are used make wooden containers and images used in indigenous religious rites. *Calamus manillensis* is used to make various handicrafts such as “gamugamun” - a birth ritual material, and “innanga, halichong, and pallongan”- all useful during various activities, ceremonies and festivities. In settling disputes, succulent stem of runo (*Miscanthus chinensis*) is used during the ceremony. After a lot of prayers, two competing individuals will throw runo shoots one against another. The one hit is the sinner/offender. Sharing the fruit of “moma” (*Areca cathecu*) is used as a sign of greetings and courtesy, vital in maintaining unity between and among community members.

### Issues and Problems on Floral Biodiversity Conservation

All key informants believed that biodiversity contributes directly or indirectly to many aspects of human welfare by providing raw materials, food and health-related benefits and conducive environment.

Despite the wide range of benefits from biodiversity, key informants revealed that in general, there is a decreasing trend in biodiversity in terms of species and population of

species. Key informants were asked what factors that leads to decline in floral biodiversity. The factors mentioned are grouped into the following:

1. Overexploitation. Continued utilization especially those preferred species leads to overexploitation of floral resources. Harvest of macrofloral resources as raw material for general construction, handicraft and other uses are the direct causes of decline in floral biodiversity population. This is propelled by increasing demand for these resources as population of community increases. The most affected floral species include all trees with large diameter, and species most preferred for handicrafts, lumber, and furniture.

2. Land use alteration. Clearings of portion of forest for agriculture is the most serious problem in Alfonso Lista, where direct observation showed that slash and burn is being practiced in the forested areas of barangay Namnama. Slash and burn was also observed in Mayoyao. Land use alteration is considered not a serious problem in Kiangan.

3. Forest fire. Forest fire occurs due to burning of clearings for agriculture and usually it is not done intentionally. The effect is similar to land use alteration where almost all species of plants and animals are affected. Open grassland areas and areas undergoing natural revegetation are usually the areas susceptible to forest fire especially during summer or prolonged drought.

4. Limited Knowledge on the global value of floral biodiversity. Except for sociocultural and economic values, key informants revealed that most members of the community had limited knowledge on other values of macrofloral biodiversity in a wider perspective such as environmental protection, carbon sequestration, climate change mitigation, and the like. Limited information dissemination was undertaken in their respective barangays.

5. Limited capacity of barangay government units. Though national environmental laws and even local government ordinances for biodiversity protection were existing, the barangay government units cannot implement such laws due to their limited financial, physical, and manpower resources. They cannot even guard their territory from outsiders who would do illegal cutting of timber.

6. Lack of sustainable livelihood and alternative source of income. Key informants revealed that due to absence of sustainable livelihood and source of income, people tend to look up into the available natural resources as source of their subsistence and income.

### **Suggested Action Solutions for Macrofloral Biodiversity Conservation**

On action solutions for macrofloral biodiversity conservation, key informants suggested the following potential interventions at the local level as ranked by the respondents:

1. Assistance on the sustainable use of macrofloral resources
2. Capacitating local residents to take active role in protecting the remaining forests and its biodiversity from outsiders
3. Information campaign on permanent demarcation between agricultural and forest zones and implementing strictly no encroachment laws and policies.
4. Individual/Family protection and management of claimed forest areas
5. Planning and implementation of community concerted efforts in restoring poorly vegetated areas.
6. Inculcating to one's self the value of sustainable use of macrofloral resources
7. Information education campaign on the importance of floral biodiversity at the local and global scale
8. Information campaign on controlled burning

Verification made to the number one suggestion above showed that the community needs technical and financial support for sustainable livelihood options to include:

1. Technical and financial support to the community for the establishment of sustainable community nursery using indigenous species. Community people are in need of technical and financial support for them to establish a sustainable community nursery as a potential livelihood option and as a sustainable source of planting material for reforestation and enrichment planting activities. They need technical assistance on the appropriate propagation and management practices for some indigenous species.

The suggested action solution is possible since ethnobotany interview revealed a number of macrofloral species that were observed to be fast-growing and are economically important. Such species can be used for handicraft making, wood carving, and cheap source of food, medicine, pesticide, and fiber. The species can therefore be grown in nursery to be used by the community in reforestation and enrichment planting in the “muyong” or private woodlots and communal forests. As a potential livelihood option, seedling production of indigenous species for sale can provide the needed planting materials for reforestation and related activities. The used of indigenous species in reforestation and similar activities is being promoted by various government agencies like the DENR and other environment-concern institutions promoting biodiversity conservation.

2. Technical and financial support to community for the establishment of agroforestry. Key informants disclosed that they lack the necessary technical and financial resources needed in the establishment of sustainable agroforestry farms.

During the interviews, key informants identified macrofloral species that could be managed as additional source of income. Such species include wild food plants, medicinal and pesticidal plants, source of fiber, or raw materials for handicraft making. With appropriate technical and financial supports, these economic plants can be mass-propagated as additional source of income for the community. Organic farming of wild food plants such as Apaku (*Diplazium esculentum*), amti (*Solanum nigrum*), wild patchay (*Rorrriippa indicia*), and the like could serve as short term or cash crops, and establishment of multistorey agroforestry of wild fruit plants, medicinal, pesticidal and fiber plants; including fast growing species for wood carving and handicraft could serve as long-term crops of farmers and the community. The foregoing will not only serve as an additional sustainable livelihood option because it allows the use of plant resources without depleting their natural population, but will also serve as an ex situ conservation strategy for the remaining macrofloral biodiversity resources in the forest.

## Conclusions

Ifugao forests are still rich in macrofloral biodiversity which could be source of resources for in situ and ex situ conservation in Ifugao and other parts of the Cordillera region.

Higher macrofloral species richness is located at lower elevation with warmer climate. Species density is highest in forest areas where “muyong” or private woodlot system of forest ownership and management is widely practiced. Floral species composition differs in terms of elevation and only few species are common to all study sites and between municipalities with different elevations.

Aside from the common uses of macrofloral species, ethno-botany of most plants is known to the community.

Local threats to floral biodiversity loss include continued utilization of resources, slash and burn agriculture, forest burning, limited capabilities of barangay local government, and lack of sustainable livelihood and additional sources of income leading to dependence of some community members to natural resources.

Sustainable livelihood using macrofloral resources can be developed with adequate technical and financial support to the community.

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**Appendix Table 1. Master list of macrofloral species found in Ifugao**

Trees and Shrubs					
	Family Name	Scientific Name	Common Name	Local Name	Ethno-botany
1	Aceraceae	<i>Acer laurinum</i> Hassk.	Baliag/Phil. Maple	Balakawon	L
2	Actinidiaceae	* <i>Saurauia bontocensis</i> Merr.	Deguai	Dogwe	F,M, Fg
3	Actinidiaceae	<i>Saurauia clementis</i> Merr.	Kalimug-usa	Uniden. (Like dogwe)	
4	Actinidiaceae	* <i>Saurauia elegans</i> (Choisy) F.-Vill.	Uyok	Bfenor	F
5	Amygdalaceae	<i>Pygeum</i> sp.	Lagong buhukan	Bini/Kalacheng	L
6	Anacardiaceae	<i>Buchanania arborescens</i> Blume	Balinghasai	Falehangay	L
7	Anacardiaceae	<i>Dracontomelon dao</i> (Blanco) Merr. & Rolfe	Dao	Dao	L
8	Anacardiaceae	<i>Mangifera altissima</i> Blanco	Pahunan	Malabutnu/Maramangga	L
9	Anacardiaceae	<i>Semecarpus cuneiformis</i> Blanco	Ligas	Kamiling	
10	Anacardiaceae	<i>Semecarpus</i> sp.		Lobhong	
11	Annonaceae	<i>Dasymaschalon oblongatum</i> Merr.	Sagot	Laphi	
12	Annonaceae	<i>Goniothalamus gigantifolius</i> Merr.	Bigus-laparan	Uniden. (Like Lobhatan)	
13	Annonaceae	<i>Goniothalamus trunciflorus</i> Merr.	Bigus-silangan	Lobhatan (bl)	
14	Annonaceae	<i>Polyalthia elmeri</i> Merr.	Bangar	Bangar	
15	Anonaceae	<i>Mithrepora</i> sp.		Ananaseng	
16	Apocynaceae	<i>Ervatamia ecarinata</i> (Merr.) Pich.		Busbusilak	
17	Apocynaceae	<i>Wrightia laniti</i> (Blanco) Merr.	Lanete	Liho-lihod	L
18	Betulaceae	<i>Alnus japonica</i>	Alnus	Arnos	H, Fg

19	Burseraceae	<i>Canarium asperum</i> Benth.	Pagsahingin	Kantong	L
20	Caprifoliaceae	<i>Viburnum luzonicum</i> Rolfe	Atalba	Atolba	
21	Caprifoliaceae	<i>Viburnum odoratissimum</i> Ker-Gawl.	Idog	Laglagim/Manmanuk	
22	Celtidaceae	* <i>Celtis luzonica</i> Warb.	Maikmo	Maragawed	
23	Combretaceae	<i>Terminalia foetidissima</i> Griff.	Talisai-gubat	Bunut	
24	Cunonciaceae	<i>Weinmannia luzoniensis</i> Vid.	Itangan	Uniden. (Like Tafangawon)	L
25	Dilleniaceae	** <i>Dillenia philippinensis</i> Rolfe	Katmon	Ukapon	F, L
26	Dipterocarpaceae	<i>Dipterocarpus validus</i> Blume	Hagakhak	Holog	L,H
27	Dipterocarpaceae	<i>Shorea contorta</i> (Vid.) Merr. & Rolfe	White lauan	Apnit	L
28	Dipterocarpaceae	<i>Shorea guiso</i> (Blanco) Blume	Guijo	Kuriwit	L
29	Ebenaceae	* <i>Diospyros philippinensis</i> (Desr.) Gurke	Kamagong	Amagong	H,L
30	Ebenaceae	<i>Diospyros</i> sp.		Palegonggong	SC,H
31	Ebenaceae	<i>Diospyros longiciliata</i> Merr.	Itom-itom	Unden. (like Laphi)	
32	Ebenaceae	<i>Diospyros pilosantha</i> Blanco	Bolong-eta	Ngitian	H
33	Ehretiaceae	<i>Ehretia polyantha</i> A. DC. (Merr.)	Tanaua	Tungtungar	
34	Ehretiaceae	<i>Ehretia</i> sp.		Tungtungar (Bigger leaf)	
35	Elaeocarpaceae	* <i>Elaeocarpus argenteus</i> Merr.	Bakani	Adawe	SC, H, Fg
36	Elaeocarpaceae	* <i>Elaeocarpus bontocensis</i> Merr.	Kalumbaya	Hawili	F,M,
37	Elaeocarpaceae	<i>Elaeocarpus</i> sp.		Fitugan	
38	Ericaceae	<i>Vaccinium cumingianum</i> Vid.	Gutung	Luhung	
39	Ericaceae	<i>Vaccinium jagori</i> Warb.	Gatmo	Gutmo	F,L
40	Euphorbiaceae	<i>Antidesma bunius</i> (Linn.) Spreng.	Bignai	Bignay/Bunne	F,
41	Euphorbiaceae	<i>Antidesma pentandrum</i> (Blanco) Merr.	Bignai- pogo	Arusip	F
42	Euphorbiaceae	* <i>Baccaurea philippinensis</i> Merr.	Baloiboi	Fuloh/Buluh	SC, Fe
43	Euphorbiaceae	<i>Bischofia javanica</i> Blume	Tuai	Tuwol	F,M,SC,H
44	Euphorbiaceae	<i>Breynia rhamnoides</i> (Retz.) Muell.-Arg.	Matang-hipon	Mugmugog	
45	Euphorbiaceae	<i>Bridelia minutiflora</i> Hook f.	Subiang	Putukan	L
46	Euphorbiaceae	* <i>Calophyllum whitfordii</i> Merr.	Pamintaogen	Pamiklaten	
47	Euphorbiaceae	<i>Claoxylon purpureum</i> Merr.	Anot-ot	Marasili	
48	Euphorbiaceae	* <i>Cleistanthus ovatus</i> C. B. Rob.	Aniatam-initlog	Ngarusangis	L
49	Euphorbiaceae	<i>Croton colubrinoides</i> Merr.	Tukbo	Tukbo	SC,P
50	Euphorbiaceae	<i>Glochidion gigantifolium</i> (Vid.) Merr.	Bagnang-laparan	Podpod	SC,
51	Euphorbiaceae	<i>Glochidion longistylum</i> C. B. Rob.	Nigad	Gopgopak	
52	Euphorbiaceae	<i>Glochidion mindorensis</i> C. B. Rob.	Litok	Churnuwan/dulnuan	L
53	Euphorbiaceae	<i>Homalanthus alpinus</i> Elm.	Buta	But-butua	P, Fg
54	Euphorbiaceae	* <i>Macaranga bicolor</i> Muell.--Arg.	Hamindang	Almumuhung	
55	Euphorbiaceae	<i>Macaranga grandifolia</i> (Blanco) Merr.	Takip-asin	Bolwang	SC, Fg
56	Euphorbiaceae	<i>Macaranga ramiflora</i>	Ginabang	Samak 1 (Red petiole)	Fg
57	Euphorbiaceae	<i>Macaranga sinensis</i>	Binungang-pula	Anablon	SC,
58	Euphorbiaceae	<i>Macaranga tanarius</i> Muell.-Arg.	Binunga	Samak	M
59	Euphorbiaceae	<i>Mallotus multiglandulosus</i> Hurus.	Alim	Alim	Fg
60	Euphorbiaceae	* <i>Mallotus Philippinensis</i> (Lam.) Muell.-Arg.	Banato	Anitap (bl)	M,
61	Euphorbiaceae	<i>Mallotus</i> sp.		Uniden.(Like banato)	
62	Euphorbiaceae	* <i>Neotrewia cumingii</i> Pax & K. Hoffm.	Apanang	Hayaput	F
63	Euphorbiaceae	<i>Phyllanthus curanii</i>	Baluha	Faloy/baluha	Fg
64	Fabaceae	<i>Azelia rhomboidea</i> (Blanco) Vid.	Tindalo	Tindalo	L,H
65	Fabaceae	<i>Erythrina orientalis</i> Merr.	Dapdap	Gabgab	L, Fg
66	Fabaceae	<i>Pithecellobium subcoriaceum</i> Thw.		Kupitan	L
67	Fabaceae	<i>Pterocarpus indicus</i> Willd.	Narra	Udyo	M, SC,L,H
68	Fagaceae	<i>Lithocarpus benettii</i> (Miq) Rehd.	Pangnan	Palayon balawan	SC,L
69	Fagaceae	<i>Lithocarpus luzoniensis</i> (Merr.) Rehd.	Kilog	Uniden. (Like Palayon)	

70	Fagaceae	** <i>Lithocarpus Ovalis</i> (Blanco) Rehd.	Maggasiriki	Palayon/Palajon	M, SC,L
71	Guttiferae	<i>Cratoxylum formosum</i> Benth. & Hook. F.	Salinggogon	Aligguy/aliguyon	L
72	Guttiferae	<i>Garcinia benthami</i> Pierre	Bunog	Bili/Bulon	F,M, L
73	Guttiferae	<i>Garcinia rhizoporoides</i> Elm.	Bogaia	Duple/Dalayon	
74	Guttiferae	<i>Garcinia venulosa</i> (Blanco) Choisy	Gatasan	Gatasan	L
75	Icacinaceae	<i>Gomphandra apoensis</i>	Marumai	Uniden. (Like anabiong)	
76	Lamiaceae	<i>Clerodendron sp</i>		Igwa	
77	Lamiaceae	<i>Premna integrifolia</i> Blanco	Alagau-gubat	Atingol (sl)	
78	Lamiaceae	<i>Premna odorata</i> Blanco	Alagau	Atingol (bl)	M,SC,
79	Lamiaceae	<i>Vitex parviflora</i> Juss.	Molave	Amugawon	L
80	Lauraceae	<i>Litsea glutinosa</i>	Sablod	Gugu	
81	Lauraceae	<i>Litsea perrottetii</i> (Blume) F.-Vill.	Marang	Bakan	L,H, Fg
82	Lauraceae	<i>Litsea quercoides</i> Elm.	Klamagan	Umug	H
83	Lauraceae	* <i>Machilus philippinensis</i> Merr.	Kulilisiau	Balakawon (2)	L
84	Lauraceae	<i>Neolitsea Vidalii</i> Merr.	Puso-puso	Tempo	L
85	Lauraceae	<i>Nothaphoebe malabonga</i> (Blanco) Merr.	Malabunga	Uniden.(like avocado)	H
86	Leeaceae	<i>Leea guinensis</i> G. Don	Amamali	Anga-ang	
87	Leguminosae	<i>Abarema clypearia</i> Koaterm. forma prainiana (Merr.)	Kamanigum	Aplit	
88	Leguminosae	<i>Cynometra sp.</i>		Fahog/Bahug	H, Fg
89	Leguminosae	<i>Cynometra warburgii</i> Harms	Siping	Fagwaloy	
90	Magnoliaceae	* <i>Talauma angatensis</i> (Blanco) F. - Vill.	Malapinya	Kaklaang	H
91	Malvaceae	<i>Urena lobata</i> Linn.	Dalupang	Payyukut	
92	Melastomataceae	<i>Astronia candolleana</i> Cogn.	Talanak	Talanak	
93	Melastomataceae	* <i>Medenilla clementis</i>	Bayangbong	Fallangfang (not eaten)	M,
94	Melastomataceae	* <i>Medenilla pendulla</i>		Fallangfang (eaten)	S
95	Melastomataceae	<i>Memecylon lanceolatum</i> Blanco	Digeg	Fugi	
96	Meliaceae	* <i>Aglaia diffusa</i> Merr.	Malasaging	Uniden.(like Buhila)	
97	Meliaceae	<i>Aglaia llanosiana</i> C. DC.	Bayanti	Balanti/Falanti	SC,
98	Meliaceae	<i>Aphanamixis perrottetiana</i> A. Juss.	Kangko	Buhakal	
99	Meliaceae	* <i>Chisocheton benguetense</i> Elm.	Katong-matsin	Bataukan	
100	Meliaceae	<i>Chisocheton sp.</i>		Uniden.(Like Kalantas)	
101	Meliaceae	* <i>Dysoxylum arborescens</i> (Blume) Miq.	Kalimutain	Uniden.(like Alinaw)	
102	Meliaceae	<i>Dysoxylum octandrum</i> (Blanco) Merr.	Himamau	Luwit	H
103	Meliaceae	<i>Dysoxylum revolutum</i> Elm.	Buntog	Palobfan	
104	Meliaceae	<i>Dysoxylum sp.</i>		Halapadon	
105	Meliaceae	<i>Epicharis triangularis</i> (Merr) Harns	Bitog	Uniden. (Rhomboid leaf)	
106	Meliaceae	** <i>Sandoricum vidalii</i> Merr.	Malasantol	Bakuwog	L,P
107	Moraceae	<i>Artocarpus communis</i> J.R. & G. Forst.	Rimas	Pakak	V,M,L
108	Moraceae	<i>Artocarpus ovata</i> Blanco	Anubing	Tobak	SC, Fg
109	Moraceae	<i>Artocarpus rubrovenia</i> Warb.	Kalulot	Tobak (smaller leaf)	
110	Moraceae	<i>Artocarpus sp.</i>		Uniden. (like Tobak )	
111	Moraceae	<i>Ficus balete</i> Merr.	Balete	Balite	
112	Moraceae	* <i>Ficus benguetensis</i> Merr.	Tabul	Chaga	
113	Moraceae	<i>Ficus botryocarpa</i> Miq.	Basikong	Rafe	M
114	Moraceae	<i>Ficus congesta</i> Roxb.	Malatibig	Upah	
115	Moraceae	<i>Ficus cumingii</i> Miq.	Is-is ibon	Ba-e	
116	Moraceae	<i>Ficus cumingii</i> Var. <i>worcesteri</i> Corner	Kalapak	Pewe (2)	
117	Moraceae	<i>Ficus glaberima</i> Blume	Baleteng linis	Ihit	
118	Moraceae	<i>Ficus gul</i> Laut. & K. Schum.	Butli	Palahipa	
119	Moraceae	* <i>Ficus irisana</i> Elm.	Aplas	Apla	SC,
120	Moraceae	<i>Ficus minahassae</i> (Teijsm. & de Vr.) Miq.	Hagimit	Alimit	SC,
121	Moraceae	* <i>Ficus nota</i> (Blanco) Merr.	Tibig	Labfoy	
122	Moraceae	<i>Ficus pseudopalma</i> Blanco	Niog-niogon	Niniog	V,M

123	Moraceae	* <i>Ficus septica</i> Burm. F.	Hauili	Liwliw	M
124	Moraceae	<i>Ficus sp.</i>		Attabong	
125	Moraceae	<i>Ficus ulmifolia</i> Lam.	Is-is	Latbang	
126	Moraceae	<i>Ficus variegata</i> Blume	Tangisang-bayauak	Ludping/Loppeng	SC, Fg
127	Moraceae	<i>Streblus asper</i> Lour.	Kalios	Akikid	M,
128	Myrsinaceae	<i>Ardisia castaneifolia</i> Mez.	Bayoktoan	Koloklong (bl)	L
129	Myrsinaceae	<i>Ardisia zambalensis</i> Merr.	Pamutul	Koloklong (sl)	
130	Myrsinaceae	<i>Maesa sp.</i>		Olaggit	
131	Myrtaceae	<i>Syzygium calcicola</i> (Merr.) Merr.	Kalogkog	Uniden (Like Apatot)	
132	Myrtaceae	<i>Syzygium ebaloi</i> Merr.	Arinaya	Uniden. (Like Bultik)	L
133	Myrtaceae	<i>Syzygium jambos</i> (L.) Arst.	Tampui	Tampoy	H
134	Myrtaceae	* <i>Syzygium polycephaloides</i> (C. B. Rob.) Merr.	Lipote	Atu-ang/Bulinayo	F, M
135	Myrtaceae	* <i>Syzygium samarangense</i> Merr. & Perru	Makopa	Bulinayo (big)	F,
136	Myrtaceae	<i>Syzygium santosii</i> (Merr.) Merr.	Bultik	Bultik (orig)	L
137	Myrtaceae	<i>Syzygium sp.</i>		Muh-ning	L
138	Myrtaceae	<i>Syzygium sp.</i>		Parunapin	
139	Myrtaceae	<i>Syzygium sp.</i> (Elm.) Merr.	Lamutong-linis	Bultik (bl)	F,L
140	Oleaceae	* <i>Linociera philippinensis</i> Merr.	Kurutan	Dol-ak	P
141	Pinaceae	<i>Pinus insularis</i> Endl.	Benguet pine	Halong/Bolbol	L,H
142	Pittosporaceae	<i>Pittosporum ramosii</i> Merr.	Albon	Poh-wi (bl)	M,SC,L,P
143	Proteaceae	<i>Helicia robusta</i> (Roxb.) Blume	Salimai-lakihan	Ulatton	H
144	Rhamnaceae	<i>Ziziphus sp.</i>		Uniden. (Prickly young trunk)	
145	Rhamnaceae	** <i>Ziziphus talanai</i> (Blanco) Merr.	Balakat	Dir-an	L
146	Rosaceae	<i>Ariobotrya luzonensis</i> (Mer.) Nakai	Bitgi	Uniden. (Like butgi)	
147	Rubiaceae	<i>Canthium dicocum</i> (Gaern.) Merr.	Malakape	Marakape	
148	Rubiaceae	<i>Canthium subcapitatum</i> (Merr.) Merr.	Apaipai	Buhila (bl)	
149	Rubiaceae	<i>Coffea arabica</i> L.	Kape	Kape	F
150	Rubiaceae	<i>Morinda bracteata</i> Roxb.	Noni	Apatot	F,M
151	Rubiaceae	* <i>Neonauclea media</i> (Havil.) Merr.	Wisak	Analtap	M,
152	Rubiaceae	<i>Neonauclea sp.</i>		Anitap (sl)	
153	Rubiaceae	* <i>Pavetta parvifolia</i> Vid.	Gusokan-liitan	Lajo	SC,
154	Rubiaceae	<i>Praravinia sp.</i>		Uniden. (Leaf pointed)	
155	Rubiaceae	<i>Timonius arboreus</i> Elm.	Mabalod	Tikom	M,
156	Rutaceae	<i>Evodia benguetensis</i> Elm.	Sidi	Kurdadannum (bl)	H
157	Rutaceae	<i>Evodia dubia</i> Merr.	Sidi-sidi	Kurdadannum (ml)	
158	Rutaceae	* <i>Evodia meliaefolia</i> (Hance) Benth.	Galiguian	Galiwgiwon	F,SC,L
159	Rutaceae	<i>Micromelum curanii</i> Elm.	Alas	Pangimbulawon	
160	Rutaceae	<i>Severinia retusa</i> (Merr.) Swingle	Malarayap-kutab	Marakaburaw	F,
161	Rutaceae	<i>Zanthoxylum oviceanae</i> (Lam.) DC.	Kangai	Hala-hala	M,
162	Sapindaceae	* <i>Aphania philippinensis</i> Radlk.	Onaba	Uhiyan (bl)	
163	Sapindaceae	<i>Aphania sp.</i>		Uhiyan (sl)	
164	Sapindaceae	* <i>Pometia pinnata</i> Forst & Forst	Malugai	Tabfangagon	SC,L
165	Sapindaceae	<i>Sapindus saponaria</i> L. forma <i>microcarpa</i> Radlk.	Kusibeng	Banaba	
166	Sapotaceae	<i>Madhuca Betis</i> (Blanco) Macbr. & Merr.	Betis	Uniden. (Like Alim)	
167	Sapotaceae	* <i>Manilkara merilliana</i> H. J. Lam	Duyok-duyok	Kala-otet	F, L
168	Sapotaceae	* <i>Palaquium luzoniense</i> (F.-Vill) Vid.	Nato	Dalakan/Chala-an	L, Fg
169	Sapotaceae	<i>Palquium sp.</i>	Benguet Dungaw	Bakallung	
170	Sapotaceae	<i>Pouteria macrantha</i> (Merr.) Baehni	White nato	Jessa	
171	Saxifragaceae	<i>Deutzia pulchra</i> Vid.	Alatin	Hana-ti	M,
172	Staphyleaceae	<i>Turpinia ovalifolia</i> Elm.	Anongo	Kurdadannum	H
173	Sterculiaceae	<i>Kleinhovia hospita</i> L.	Tan-ag	Pukag	M

174	Sterculiaceae	<i>Pterospermum diversifolium</i> Blume	Bayok	Faluy (small leaf)	H
175	Sterculiaceae	<i>Pterospermum niveum</i> Vid.	Bayok-bayokan	Kunakun	F, L
176	Sterculiaceae	* <i>Sterculia brevipetiolata</i> Merr.	Panakitin	Botoptok	
177	Sterculiaceae	* <i>Sterculia philippinensis</i> Merr.	Banilad	Ludjungan	
178	Symplocaceae	* <i>Symplocos luzonensis</i> Rolfe	Balokbok--gulod	Hoghog	
179	Symplocaceae	<i>Symplocos</i> sp.		Hangachan	
180	Theaceae	<i>Eurya amplixicaulis</i> Moore	Halinghington	Halinghington (sl)	
181	Theaceae	* <i>Eurya obovata</i>	Tabsik	Halinghington (bl)	
182	Thymelaeaceae	* <i>Wikstroemia lanceolata</i> Merr.	Salagong sibat	Huka/Hu-a	SC, Fi
183	Tiliaceae	<i>Grevia setacea</i> Merr.	Anilau	Alinaw	Fi, Fg
184	Ulmaceae	<i>Trema orientalis</i> (L.) Blume	Anabiong	Analdung	H, Fg
185	Urticaceae	<i>Laportea</i> sp.		Uniden. (White flowers)	
186	Urticaceae	<i>Leucosyke capitellata</i> (Poir.) Wedd.	Alagasi	Ulahi	
187	Urticaceae	<i>Leucosyke</i> sp.		Lahi	
188	Urticaceae	<i>Pipturus arborens</i> (Link) C. B. Rob.	Dalunot	Layjon	L
189	Urticaceae	<i>Villebrunea trinervis</i> Wedd.	Alilaua	Langahinga	
190	Verbenaceae	<i>Clerodendrum minahassae</i> Binn.	Bagauak	Kutbabangul	M
191	Verbenaceae	<i>Melastoma bensonii</i>		Butgi/Bfogytayyon	F
<b>Palms</b>					
	<b>Family Name</b>	<b>Scientific Name</b>	<b>Common Name</b>	<b>Local Name</b>	<b>Ethnobotany</b>
192	Agavaceae	<i>Cordyline fruticosa</i> L.	Tungkodpare	Dongla	SC,
193	Arecaceae	<i>Areca cathecu</i>	Bunga	Moma	F,V,SC
194	Arecaceae	<i>Areca macrocalyx</i>		Gatile	V,
195	Arecaceae	<i>Calamus Manillensis</i> H. Wendl.	Lituko	Lituko	V,SC
196	Arecaceae	<i>Calamus</i> sp.		Barit	V,
197	Arecaceae	<i>Caryota cumingii</i> Lodd.	Takipan	Bangi	V,SC,
<b>Ferns</b>					
198	Aspleniaceae	<i>Asplenium macrophyllum</i>		Itang	
199	Aspleniaceae	<i>Asplenium nidus</i>	Pakpak-lawin	Hawing	
200	Athyriaceae	<i>Diplazium esculentum</i> (Retz.) Sw.	Pako	Pako (sl)	V,
201	Athyriaceae	<i>Diplazium</i> sp.		Pako/apapat (big leaf edible)	V,
202	Cyatheaceae	*** <i>Cyathea contaminans</i>	Giant fern	Katibanglan/Atibfanglan	M,
203	Cyatheaceae	<i>Cyathea fuliginosa</i>	Giant Fern	Tifanglan 2	M, SC,
205	Dennstaedtiaceae	<i>Pteridium</i> sp.		Pako (ml)	V,
206	Polypodiaceae	<i>Crypsinus glaucus</i>		Patpatitig	
<b>Grasses/Herbs/Vines</b>					
207	Brassicaceae	<i>Rorippa indica</i>		Kunde/Wild patchay	V,
208	Cucurbitaceae	<i>Momordica balsamina</i>	Ampalayang ligaw	Parya	V, M,
209	Poaceae	<i>Miscanthus chinensis</i>	Runo	Bila-u/Runo	F, SC,
210	Rosaceae	<i>Rubus rosaefolius</i> Hayata	Wild strawberry	Pinit	F
211	Smilacaceae	<i>Smilax</i> sp.	Banag	Luktu/Tugi	F
212	Solanaceae	<i>Solanum nigrum</i> Linn.	Kama-kamatisan	Amti	V,
213	Vitaceae	<i>Vitis flexuosa</i>		Ariwat	F,
214	Zingiberaceae	<i>Alpinia</i> sp.	Tagbak	Kallowag	F

\* Endemic species      \*\* Vulnerable      \*\*\* CITES Appendix II  
 Ethnobotany: F – Food plant, V – vegetable, M – Medicinal, SC – Sociocultural,  
 Fi – Fiber plant, L – Lumber, P – Pesticidal plant, H – For Handicraft  
 Fe – Organic fertilizer      Fg – Fast-growing

## AVAILABILITY, PREPARATION AND USES OF HERBAL PLANTS IN KALINGA, PHILIPPINES

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### Abstract

The study determined the level of awareness of the residents on the availability of the herbal plants; and level of knowledge on the preparation and uses of the herbal plants. It used the descriptive method of research with the questionnaire as main data gathering tool. Used the 3 point scale, weighted mean, and Chi-square ( $\chi^2$ ) with 5% significant level as statistical treatment and analysis.

The residents were very aware of the availability of the (6) six herbal plants namely: *akapulko* (*Cassia, alata L*), *ampalaya* (*Momordica charantia*), *bawang* (*allium Sativum*), *bayabas* *Psidium guavida L*, *tsaang gubat* *Carmona retusa*, and *Yerba (hierba) Buena* (*Mentha cordifolia*) ; very knowledgeable on the preparation of the selected herbal plants by decoction and compression but only knowledgeable on the preparation by infusion; not knowledgeable on the uses of *akapulko* to cure cough, and as mouthwash and purgative; not knowledgeable on the anti-pyretic effect of *ampalaya* ; knowledgeable the uses of *bawang* ; and not knowledgeable on the use of *bayabas* to prevent nose bleeding. No significant relationship on the level of awareness on the availability, and knowledge on the preparation and uses of the selected herbal plants with the profile of the respondents were determined except ethnic origin.

Dissemination and information campaign on *tsaang gubat* and *yerba Buena*; conduct of trainings on the preparation of herbal plants by infusion; information on the use of *akapulko* to cure cough, and as mouthwash and purgative, *ampalaya* as an anti-pyretic, and *bayabas* to prevent nose bleeding; conduct of more parallel studies; and program on the production and dispersal of herbal plants were recommended.

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**Keywords:** Herbal medicine, awareness, herbal product development, health care

### Introduction

People in the province have long been using medicinal plants even before western pharmaceutical companies manufactured drugs from plants for the following reasons: first, these are widely available in the place; second, the various preparations made from these plants work for certain illnesses such as cough, fever, wounds or massaged to relieve the pain associated with osteoarthritis; third, they are cheaper than drugs manufactured by foreign pharmaceutical corporations.

In 1992, the Department of Health circulated a list of “Ten scientifically validated” Philippine herbal plants, which includes *akapulco*, *ampalaya*, *bawang*, *bayabas*, *lagundi*, *niyug-niyogan*, *sambong*, *tsaang gubat*, *ulasimang bato*, and *yerba Buena*. These herbal plants are used as alternative and first aid medicines among the Kalinga people.

**The Six Herbal Plants Under Study**



**Figure I. Acapulco (*Cassia, alata* L)**



**Figure II. Ampalaya (*Momordica charantia*)**



**Figure III. Bawang or Garlic (*allium Sativum*)**



**Figure V. Tsaang gubat (*Carmona retusa*)**



**Figure IV. Bayabas or Guava (*Psidium guajava* L)**



**Figure VI. Yerba (hierba) Buena (*Mentha cordifolia*)**

### **Significance of the study**

The study is beneficial to community people for they will learn the medicinal value of herbal plants which can greatly help them financially especially that the herbal plants abound in the locality; Nurse educators, Rural Health Midwives who are partners of the community in promoting health nursing will be reinforced in their know-how on the preparation and uses of the herbal plants; and the education sector who serves as a medium for information and dissemination to learners about herbal plants will have instructional materials which can be perpetuated from generation to generation.

### **Objectives of the study**

Determined the level of awareness on the availability and level of knowledge on the preparation, and uses of the selected herbal plants under study, namely: *Akapulko* (Ringworm bush), *Ampalaya* (Bitter gourd), *Bawang* (Garlic), *Bayabas* (Guava), *Tsaang Gubat* (Tea), and *Yerba Buena* (Peppermint)

Determined significant relationships on the awareness of the availability of the herbal plants, knowledge on the preparation, and uses to the respondents' profile of age, gender, civil status, educational attainment, ethnic origin, and occupation.

**HYPOTHESIS:** The level of awareness on the availability, and knowledge on the preparation and uses of the herbal plants are not significantly associated to the respondents' profile

### **Framework of the study**

The study was anchored on two theories, the Thompsonianism Theory (Thompson, 1981) which stated that a disease is a result of a decrease derangement of the vital fluids, brought about by loss of animal heat. The resulting symptoms are interpreted as efforts of the vital force to get rid of the toxic encumbrances generated. The Physiomedicalism Theory came as the second major stream of thought in herbal medicine. Ultimately this new system of herbal medicine retained much of what had been accepted as fundamental in the Thompsonianism Theory. Thus, herbal function was thought of as aggregate expression of vital force, acting through cellular metabolism to maintain the functional integrity of the entire organism.

### **Methodology**

- Conduct of preliminary field visit/ Ocular survey
- Interview
- Use of Questionnaire
- Data organizing and analysis
- Result write up and reporting

### **Treatment of data and statistical analysis**

The 3 point scale and Weighted Mean were used to quantify the responses. Significant relationship of the availability, preparation and use of the selected herbal plants to the respondents' profile were determined using the Chi-Square ( $\chi^2$ ) with 5% significant level.

### **Results and discussions**

Awareness on the Availability of the Selected Herbal Plants



Bawang	Anti-hypertensive	2.68	Very Knowledgeable
	Asthma	1.82	Knowledgeable
	Cough and colds	1.74	Knowledgeable
	Headache	1.58	Knowledgeable
	Sore throat	1.58	Knowledgeable
	Toothache	2.08	Knowledgeable
	Mosquito bite	1.60	Knowledgeable
Bayabas	Anti-Diarrhea	2.70	Very Knowledgeable
	Aromatic bath	2.78	Very Knowledgeable
	Nose bleeding		
	Tooth ache	1.48	Not Knowledgeable
	Wounds		
	Vaginal wash	1.88	Knowledgeable
		2.68	Very Knowledgeable
		2.52	Very Knowledgeable
Tsaang Gubat	Anti-Diarrhea	1.84	Knowledgeable
	Stomach ache	2.00	Knowledgeable
Yerba Buena	Arthritis	1.72	Knowledgeable
	Cough and colds		Knowledgeable
	Fever	2.02	
	Headache	1.68	Knowledgeable
	Insect bites	1.72	Knowledgeable
	Stomachache	1.72	Knowledgeable
	Swollen Gums	1.74	Knowledgeable
	Toothache	1.70	Knowledgeable
		1.76	knowledgeable\

### Relationship of the Awareness and Knowledge on the Preparation and Uses of the Herbal Plants to Respondents' Profile

**Table IVa.** Relationship between the Awareness on the Availability of the Selected Herbal Plants and the Respondents' Profile (n=50)

Variables	Computed Chi-square	Chi-square (.05)
Age	5.348 <sup>ns</sup>	18.307
Gender	0.989 <sup>ns</sup>	11.070
Civil status	2.525 <sup>ns</sup>	18.307
ethnic origin	12.052*	11.070
Educational	0.842 <sup>ns</sup>	18.307
Attainment	10.934 <sup>ns</sup>	24.996
Occupation		

Legend: \*-significant; ns –not significant

Statistical analysis (Table 5a) using the Chi-square test of independence shows no relationship of the awareness on the availability of the herbal plants with the respondents' profile except ethnic origin.

**Table IVb.** Relationship between the Knowledge on the Preparation of the selected herbal plants and the Respondents' Profile (n=50)

Variables	Computed Chi-square	Chi-square (.05)
Age	4.920 <sup>ns</sup>	9.488
Gender	1.559 <sup>ns</sup>	5.991
Civil status	1.239 <sup>ns</sup>	9.488
Ethnic Origin	6.558*	5.991
Educational	1.431 <sup>ns</sup>	9.488
Attainment	9.900 <sup>ns</sup>	12.594
Occupation		

No significant relationship was determined on the level of knowledge on the preparation of the herbal plants except origin where the highlanders were significantly more knowledgeable than the lowlanders.

**Table IVcs.** Relationship between the Knowledge on the Use of Selected Plants and Respondents' Profile

VARIABLES/ HERBAL PLANTS	<i>Akapulko</i>		<i>Ampalaya</i>		<i>Bawang</i>		<i>Bayabas</i>		<i>Tsaang Gubat</i>		<i>Yerba Buena</i>	
	X <sup>2</sup> c	.05	X <sup>2</sup> c	.05	X <sup>2</sup> c	.05	X <sup>2</sup> c	.05	X <sup>2</sup> c	.05	X <sup>2</sup> c	.05
1. Age	3.96	25.00	1.77	15.51	4.21	21.03	6.52	18.31	7.83	5.99	3.56	23.69
2. Gender	0.97	7.82	0.68	9.49	1.65	12.59	1.36	11.07	1.10	3.84	0.60	14.08
3. Civil Status	2.14	18.30	2.34	15.51	1.66	21.03	1.29	18.31	3.06	5.99	13.26	23.69
4. Educational Attainment	3.80	18.31	4.75	15.51	5.63	21.03	7.52	18.31	8.98	5.99	4.00	23.69
5. Ethnic Origin	0.74	7.82	0.52	9.49	0.70	12.59	11.5	11.07	0.28	3.84	2.71	14.07
6. Occupation	3.08	25.00	25.9	15.51	11.8	21.03	2.60	25.00	3.67	5.99	7.06	23.69

Table IVc indicates no significant relationships between the knowledge on the uses of the herbal plants with the respondents' profile as indicated by the computed chi-square values along the selected profiles which are consistently lower than the significant values. The null hypothesis is therefore accepted at .05 significant levels.

### Conclusions

The respondents were very aware on the availability of *bayabas*, *bawang* and *ampalaya*, but moderately aware of *akapulko*, *tsaang gubat*, and *yerba Buena*

Very knowledgeable on the preparation of the herbal plants by decoction and compression except infusion

Not knowledgeable on the uses of *akapulko* to cure cough, and as mouthwash and purgative; on the anti-pyretic effect of *ampalaya*; and use of *bayabas* to prevent nose bleeding

### Recommendations

Strengthen dissemination and information campaign on *tsaang gubat* and *yerba Buena*  
Conduct trainings on the preparation of the herbal plants by infusion

Strengthen information on the uses of *akapulko* to cure cough, and as mouthwash and purgative; *ampalaya* as anti-pyretic; and *bayabas* to prevent nose bleeding

Program on herbal demo farm, production and dispersal

Inclusion of medicinal plant conservation in their biodiversity planning and implementation of policies on medicinal plants by the National Government.

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## ***SCHIZOSTACHYUM LUMAMPAO* (BYUYU): ITS DIVERSE ETHNO-BOTANICAL USES BY LUBUAGAN SUB TRIBE OF KALINGA IN NORTH LUZON PHILIPPINES**

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### **Abstract**

Bamboos are widely used by indigenous people in the tropical regions for different purposes. *Schizostachyum lumampao* is one of the bamboo species utilized by different ethnic groups in the Philippines. This study determined how the Lubuagan sub-tribe of Kalinga of the Cordillera Region Northern Philippines used *Schizostachyum lumampao* in their daily life. Selected key informants from the different communities of Lubuagan municipality were interviewed about the ethno-botanical uses of this species. These uses were verified through field observations and photo-documentations. *Schizostachyum lumampao* was found to be an integral part of the Lubuagan sub-tribe life. This bamboo species is a versatile source of materials for surgical tools, agricultural implements, shelter constructions, socio-cultural activities and indigenous musical instruments. These integral ethnobotanical uses of *S. lumampao* show the importance of bamboo plants to indigenous people's life that need to be conserved.

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**Keywords:** Ethno-botanical uses, indigenous people, Lubuagan sub-tribe

### **Introduction**

Liese (1987) claimed that bamboo is one of the economically important non-wood forest and agricultural products in the world. It is estimated that there are about 1200 species scattered in about 18 million hectares in different ecosystems in the continents of Asia, Africa and America (Ohrnberger, 1999). In most parts of tropical countries, rural poor depend completely on bamboo; almost one billion rural people live in bamboo houses. This is so because bamboo can be easily be grown and harvested (<http://www2.bioversityinternational.org/publications>).

Bamboo grows almost everywhere in tropical countries like the Philippines, particularly in places close to water such as on riverbanks and by streams. Because it is so easily found and so easily replaced, it is treated with an almost casual disregard and valued only lightly (Locsin; 2000). It is indeed a relatively cheap raw material. It is unfairly known as 'poor man's timber'. Of the 9 bamboo species of the genus *Schizostachyum* that thrive in Southeast Asia, *S. lumampao* is native in the Philippines (Rao et al.; 1989).

The favorable Cordillera climate is suitable for bamboo growth. Bamboos can be found at the low lying warm areas up to the coldest highest peak of Mount Pulag (Merill and Merrit, 1910). In fact, Tangan and Costales (1991) identified *Schizostachyum lumampao* as one of the common species in the region.

Bamboo has 1,500 documented traditional uses that include materials for complicated construction to most basic need that is food (<http://blog.agriculture.ph/bamboo>). As one of indigenous tribes living in the Cordillera Region of North Luzon Philippines, the Lubuagan sub tribe of Kalinga has their own unique indigenous socio-cultural practices, livelihood,

music and arts. Besides, the people of Lubuagan are known for their creativity in making of various indigenous implements.

This paper explores the ethno-botanical uses of *Schizostachyum lumm-pao* (byuyu) by Lubuagan sub-tribe. These ethno-botanical uses reported in this paper would serve as the bases for conserving this bamboo species for the next generation.

### Materials and methods

The study was conducted in the municipality of Lubuagan, Kalinga Province. Lubuagan is composed of nine barangays with a total land area of 234.20 km<sup>2</sup> (90.4 sq mi). These barangays composing the Lubuagan sub-tribe include Dangoy, Mabilong, Mabongtot, Poblacion, Tanglag, Lower Uma, Upper Uma, Antonio Canao and Uma del Norte.

A Global Positioning System (76CSX Garmin) receiver was used to determine the elevation and coordinates of the sites. The sites are located within the altitudinal range of 370 to 1246 meters above sea level (masl) with coordinates 17<sup>o</sup> 22 02.0 N, 121<sup>o</sup> 12 32.4 E / 17<sup>o</sup> 21 03.6 N, 121<sup>o</sup> 09 40.5 E (see Figure 1 ).

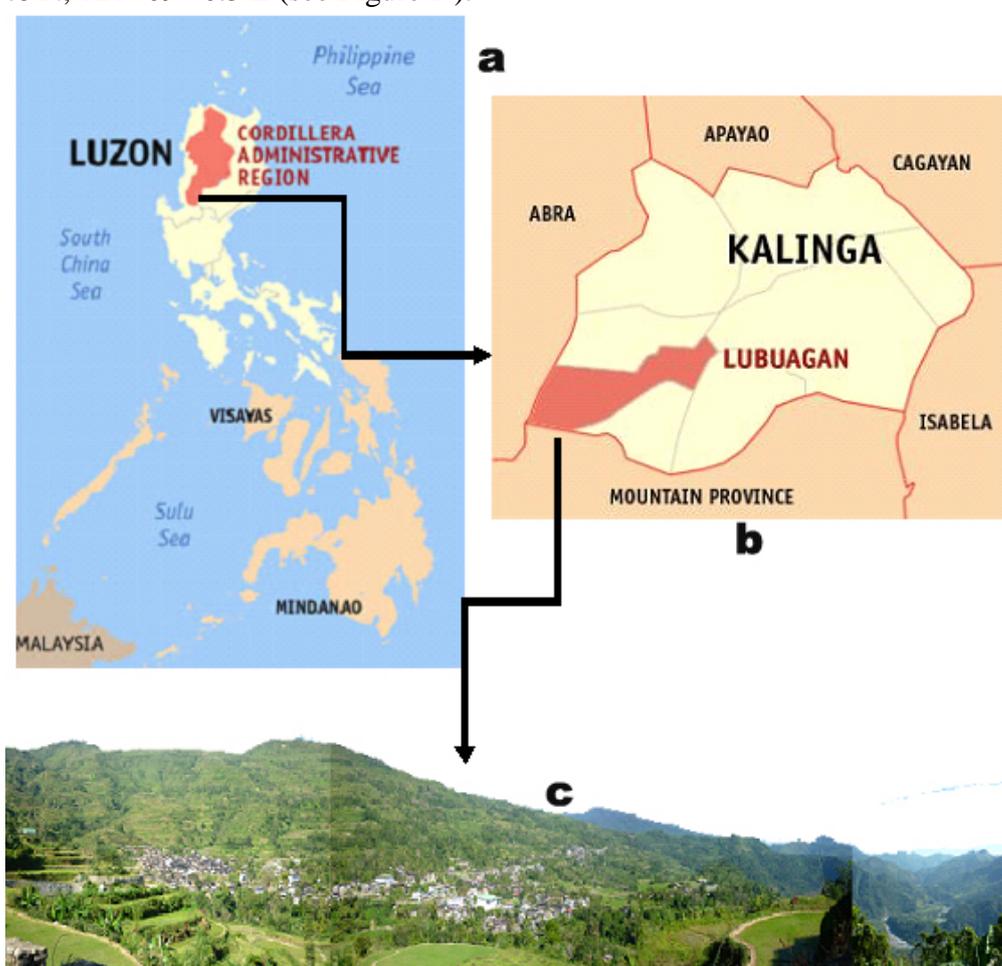


Figure 1. Locale of the study.

Map of the Philippines showing the Cordillera Administrative Region (a), map of Kalinga Province showing the municipality of Lubuagan (b), a photographic view of the Lubuagan town proper (c)

The descriptive method and photo-documentation were used in this study. Key informants were interviewed on the ethno-botanical uses of byuyu. These were community elders, bamboo growers, indigenous basket weavers, farmers, “imong” owners and indigenous healers. A digital camera (Panasonic; LUMIX 12 megapixels) was used to photo-document the uses of bamboo.

The ethno-botanical uses were classified into farming materials, musical instruments cooking/house implements, housing materials, cultural, weaving, and surgical implements.

### Results and discussions

Table 1 presents the ethno-botanical uses of *Schizostachyum lumampao* (byuyu) by the Lubuagan sub-tribe of Kalinga. It shows that there are 10 farming implements made from byuyu, 7 musical instruments, 5 cooking materials, 4 housing materials, 2 cultural practices, and 1 each for weaving and surgical implements.

Table 1. The ethno botanical uses of byuyu (*Schizostachyum lumampao*) by the Lubuagan sub-tribe as; (a) farming materials, (b) musical instruments, (c) cooking/house implements, (d) housing materials, (e) trapping and fishing implements, (f) cultural, (g) weaving, and (h) surgical tools

Names	Description	Uses
<b>(a) Farming Materials</b>		
1. Anggakit	Bamboo poles/stand installed along the rice paddies	For hanging of newly harvested rice during rainy season for easy drying.
2. Byobod	Thin and flexible bamboo strips	Used to bundle vegetables and other farm products
3. Byukyut chi maluk	A woven cage	To contain chicken during transport.
4. Gimata	bamboo pole	This is used by men to balance and carry rice on their shoulder
5. Kagaben	Strips suspended under or outside walls of a traditional house.	For chickens' resting place
6. Kagungkung	A suspended woven funnel-shaped bamboo.	Nest for chickens under or outside a traditional house
7. Sokche	A long bamboo pole	To pick big fruits like papaya, jackfruit, pomelo, etc.
8. Sukit	A long bamboo pole with split tip	For picking small fruits or to reach out for something
9. Tuchoy	A bamboo tube installed to a spring water source	It provides good water convergence and better access
10. Tutuytuy	A small bamboo tube	Storage for wild berries
<b>(b) Musical instruments</b>		
1. Kambyu-ut	A bamboo cane with two pliable splits at one end.	This is played as an accompanying music for salip or courtship dance during festive occasions.
2. Patang-og	A mouth flute made from a bamboo cane	It is played as accompanying music for villagers while on their way to a festivity or another village.
3. Saggaypu	A wind bamboo musical instrument in a set of 4-6 pieces.	It is played alternately with gongs during community occasions.
4. Siggisig	A flute made of bamboo cane	Traditionally played as ornamentation to back up bamboo ensemble for clear rhythm.
5. Tongali	A nose flute made of long and small bamboo tube.	This "love bamboo is traditionally played at night by village flutists to reminisce their romantic pasts.
6. Tong-nga-tong	A set of 4 to 6 of bamboo tubes in ascending lengths with opened upper end. This produces syncopated pentatonic tone when the closed base is stamped on the ground	It is played to announce and invite the community to join in the celebration of gabbok or the birth of the firstborn.

7. Ulimong	A flute made from one bamboo cane	Traditionally played at night to recall the pleasant experiences of the past. The tribe believes that this can be used to communicate with good spirits.
(c) House implements		
1. Acha-ed	A well dried bamboo tube split into two. A slot is made at the center of the other half then covered well with a soft kindler.	For starting fire by rubbing vigorously the slot against the side-edge of the other half until it burns by friction.
2. Lawok	A bamboo cup	For serving wine during festive occasions.
3. Peyaloy	A long bamboo table at waistline level.	Dining table during community celebrations.
4. Pilalit	Long tube made from fresh byuyu	To cook rice directly over a flame during a birth celebration
5. Tilibyayu	Fresh bamboo tube	For cooking meat by in the absence of a cooking pot.
(d)		
1. Bulilaw	A woven bamboo made of woven split bamboo	Wall of a commoner's house.
2. Byawi	A shed that can cover a wide space	To provide shade during community occasions.
3. Sigey	Bamboo farm hut	It is a second house of farmers in the farm for family use to work and rest
4. Teyob	Made of split poles fitted oppositely	For roofing
(e)		
Ilug/Sallut	Fresh bamboo pliable strips	For trapping wild chicken or birds
Pakatan	An attachment pole	Attachments pole for catching fish small bats and cicadas
(f)		
1. Sagang chi chekot	A bamboo stand mounted with glutinous rice cake.	Traditional symbol of thanksgiving after rice planting.
2. Pesuk	A bamboo bow and arrow	Symbolize the belief that a child has a very fragile and sensitive personality that can easily be disturbed or hurt by bad spirits
(g)		
1. Gegellayan	A bamboo pole	Used to set and hold a weaving set
(h)		
1. Ilap	A sharpen bamboo that has a razor like blade.	For cutting umbilical cord of a new born baby, castration of livestock and circumcision

Table 1a presents the uses of *Schizostachyum lumampao* as farming materials. It shows that byuyu canes are utilized as poles (gimata) in carrying rice seedlings during planting season and harvests (see Fig.2a & i). Byuyu is probably preferred for gimata due to its lightness, smoothness and convenient culm size for easy transport.

It is further shown that a drying stand or anggakit is made from byuyu poles (Fig. 2c) Anggakit stand is installed along the rice paddies during the rainy harvest season for easy drying of newly harvested palay. Native bamboo poles are used as sturdy posts while byuyu species are used as lateral hangers. The lengthy and straight poles of byuyu is a good trellis (Fig. 2d) for climbing plants and for picking fruits of tall plants (sokche/sukit) as shown in Figures 3f & g. Besides, pliable byuyu strips are also used to bind (takod) vegetable products (Fig. 2h) and woven into containing baskets (Fig. 2j). Likewise, these strips are woven into cages or kagungkong/kagaban for containing and transporting domestic animals (see Figure 3).



Figure 2. Farming uses of byuyu; gimata (a & i), bamboo poles for shooing aquatic animals in rice fields (b), anggakit (c), byaseg (e), sukut (f & g), takod (h), mini-basket (j)



Figure 3. Byuyu cages. kagungkong (a & c), kagaban (b), byuknot (d,e&f)

The Lubuagan sub-tribe is also known for their byuyu instruments as shown in Table 1b. Maceda (1998) reported that the Philippine ethnic groups make instruments from bamboo. These included aero phones or wind instruments; the chordophones or stringed instruments and the idiophones or percussion instruments. In the Cordillera region of North Luzon, Philippines, the Kalinga tribe had the most number of bamboo instruments. These are tongatong (Fig.4a) that produces a booming hollow sound bamboo when pounded on a log or a wooden floor, bamboo buzzers such as balingbing (Fig. 4b), bungkaka or batiwtiw and flutes (Fig.4d-i). Philippine Consortium on Agriculture and Resources Research and Development (1984) reported that bamboo musical instruments were also observed in Pangasinan in 1960.

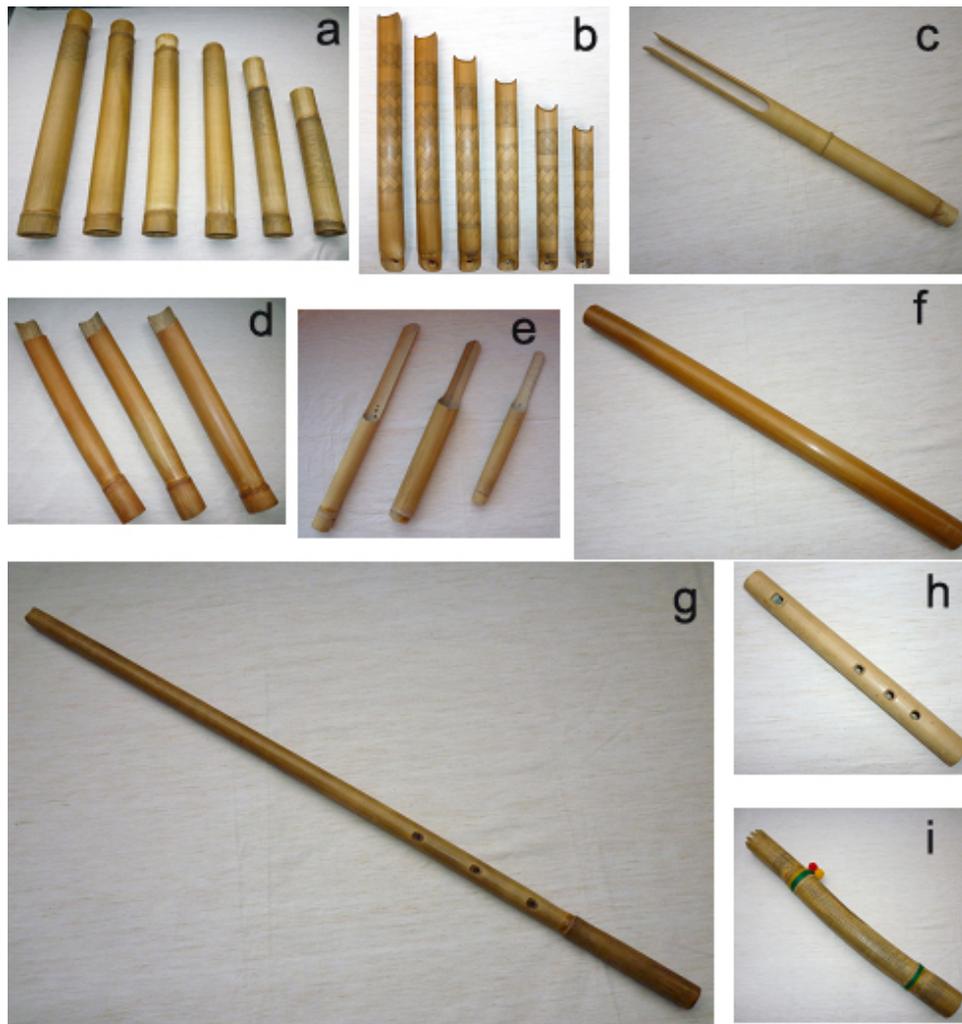


Figure 4. Musical instruments made from byuyu; tungatong (a) saggaypo (b), balingbing (c), kambu-ot (d) patang-ug (e), tubungan(f), tungali (g & h) sigisig (i)

Byuyu is used for cooking (Table 1c). Acha-ed (see Fig.5a) from dry byuyu is used for starting fire while fresh byuyu tubes (Figures 5b&c) are used for cooking rice and meats. Byuyu is the best container to cook probably due to its right culm wall thickness. Interestingly, byuyu strips are used to construct long tables (Fig.5d) for dining while smaller tubes are used as serving cups (Fig. 5e&f) of native wine during community affairs like peace pact celebrations. The lightness and tube diameter of about 3.0-5.5cm make a good cup for easy serving.



Figure 5. The uses of byuyu as cooking and serving implements; acha-ed (a), pilalit and tilibyayu (b & c), peyaloy (d), lawok (e & f)

Aside from cooking materials, dried byuyu poles are used as fuel for cooking, animal dressing and lye preparations (see Figure 7). These fuels easily burnt producing yellowish blue flame.



Figure 6. Use of byuyu as fuel, for burning and cleaning of butchered pig (a & b), cooking rice (c), preparation ash lye from native shells (d, e & f)

*Schizostachyum lumampao* is one of the indigenous materials for house construction by the Lubuagan sub-tribe (Table 1d). It shows that byuyu can provide the necessary materials to construct a farm hut sigey (Figure 7a). The poles can be split and arranged oppositely to form a roof or teyob (Figure 7b), as temporary support for tarps that provide a temporary shade (byawi) during community affair as seen in Figure 7c. A woven byuyu at can be used as wall, windows or doors (see Fig. 7d).

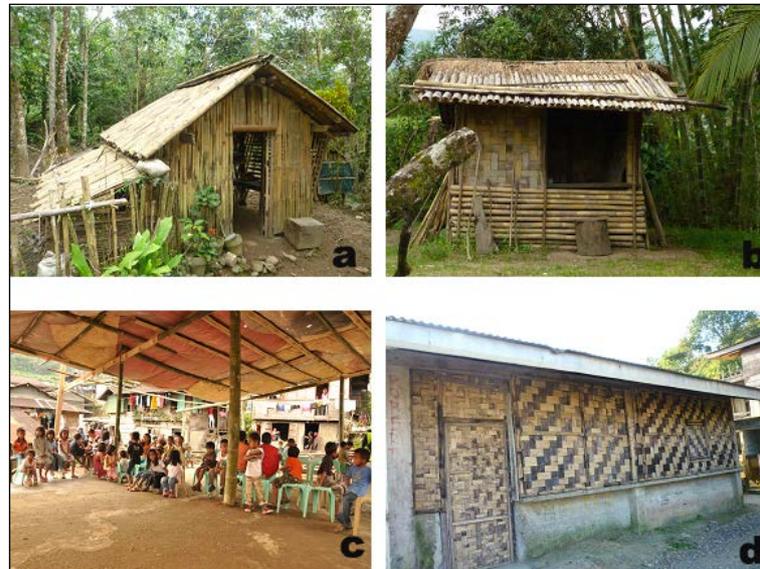


Figure 7. Byuyu as house construction materials; sigey (a), teyob (b), byawi (c) and bulilaw (d)

Locsin (2000) stated that aside from byuyu, other bamboo species such as *Bambusa blumeana* var. and *Dendrocalamus merrillianus* were also used as construction materials and farming instruments while *Bambusa cornuta* for households' uses.



Figure 8. The uses of byuyu for fishing and trapping, fish trap (a & b), handle of fish net (c), trapping of small mammals and birds (d & e), handle for bird mesh net (f)

The Lubuagan sub-tribe used byuyu for their hunting and fishing wildlife. The pliability of byuyu strips make it ideal for making traps for wild games and fishes (Table1e). The poles are also used as attachments for fish and bird nets as shown in Figure 8.

In terms of ceremonial ritual, byuyu split cane is used to contain sticky rice being offered as thanksgiving after rice planting (Table 1f). This split cane is placed directly in newly transplanted rice terrace as shown in Figure 9. Byuyu is used for its culm lightness and convenient size to fit-hold the rice cake.

It is also used as pesuk a bamboo bow and arrow which is used to symbolize the popular belief that a child has a very fragile and sensitive personality that can easily be disturbed or hurt by bad spirits. This is demonstrated in the shooting with pesuk (arrow) piercing the banana blossom hanged in the pakalaweg during the celebration. A bamboo due to its versatility can be used in many ways associated with the rural lifestyles in Malaysia as materials for house constructions, musical instruments, traps and numerous home utility items (Wong;1989)

Rao et al. (1989) reported that in Peninsular Malaysia, species of *Schizostachyum* are used for construction materials, wares, musical instruments, fishing rods, thatching, water containers, mats and baskets, handicrafts, props for banana plants, screens, container for cooking glutinous rice as well as edible shoots.



Figure 9. Sagang chi chekot

Lubuagan sub-tribe is known for their weaving skills in the region. Byuyu pole is used to hold a weaving set (see Fig. 10). The smoothness and lightness of the pole probably make this a weaver's choice among bamboo species.



Figure 10. Gegellayan, (weaving set)

Ilap (Fig.11) is razor knife made out of byuyu. This is used in cutting the umbilical cord of new born babies, circumcision, castrating animals, and the preparation of the animal entrails for cooking native delicacies. This species is preferred because when the culm is cut, it has sharp ends that make precise cutting.



Figure 11. Use of byuyu as cutting implements (ilap), for cutting of umbilical cord (a & b), for pig castration (c), for cleaning animal entrails (d & e)

### Conclusions

Results of this study show that *Schizostachyum lumampao* (byuyu) is an integral part of the socio-economic and cultural life of Lubuagan sub-tribe of Kalinga. This reveals the versatility of this species that needs conservation efforts for sustainable development of the area.

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## **CAN KIDS LEARN BY THEMSELVES USING TECHNOLOGY AND WHAT DO THEY LEARN?**

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### **Abstract**

This study presents the method and results of an experiment conducted to investigate whether kids (5-8 years) can use technology to learn in such unsupervised learning conditions. This study also assesses the skills and understanding that children develop through unsupervised technology exposure. The study, carried over 6 months, focused on two primary schools (School 'A' and School 'B') both found in Mauritius. Both quantitative and qualitative approaches were adopted to collect data for this investigation. The qualitative data focused on interviews with kids, examination of the students' work on PCs, observation in their ability to explore an interface, use a mouse, keyboard and the Internet. The quantitative data provide information which is easy to analyze statistically and fairly reliable. Descriptive statistics and charts have been used to analyze the quantitative data. It has been found that kids who had access to computers and Internet-based resources both at school and at home can self – educate themselves, but only to some extent because there will come such a moment when they will need a facilitator for guidance.

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**Keywords:** Technology, Self-learning, e-Learning, Computer-based Instruction

### **Introduction**

There is no doubt that Information and Communication Technology (ICT) skills are important assets for children to develop in today's world. As such, children are now being raised in a world of interactive media that is far different from that of their parents and grandparents. Nowadays, computer technology for children is a source of learning and entertainment. It has been observed that children are able to learn to use computers and the Internet on their own, irrespective of their social, cultural or economic backgrounds (Mitra and Rana, 2001). The press labeled these experiments, first conducted in 1999, as "Hole in the Wall" experiments because the experimental arrangement consisted of computers built into openings in brick walls in public spaces. The experiments were first conducted in Kalkaji, a suburb of New Delhi, India. A computer was connected to the Internet and embedded into a brick wall near a slum. It was reported that most of the slum children were able to use the computer to browse, play games, create documents and paint pictures within a few days. Since this finding encouraged the researchers, they replicated this approach in a number of remote and disadvantaged areas across India with almost identical results. These experiences gave credibility to the belief that given the facilities, groups of children in such settings could learn to use computers and access and benefit from Internet resources on their own. The experiments were described by Mitra and Rana as "minimally invasive", a term borrowed from surgery (Mitra and Rana 2001; Mitra 2003), and indicative of minimal human intervention. The well-constructed "Hole in the Wall" experiment by Mitra (2001) indeed

proves that children can teach themselves as well as their friends in the same surrounding. Even in slum areas where children are not well educated the use of technology like computer and Internet was made easy and without the intervention of a teacher to show them. However, there are certain limitations to learning alone or from peers even in an environment where technology and resources are available. This study investigated whether technology can help our Mauritian children (5 – 8 years) to learn through self-instruction and what knowledge and skills they develop through unsupervised ICT use.

The study aimed at answering the following research questions:

1. Does technology help children to learn better?
2. What knowledge and skills do children acquire through unsupervised ICT use?
3. To what extent can children use computers to learn things on their own?
4. Can children continue to use computers to acquire skills and knowledge without assistance?

### Research Methodology

A case study was carried out in this research as it provides an extensive coverage of the problem and it will provide justification as to why the findings and conclusion can be accepted or rejected. Both quantitative and qualitative approaches were adopted to collect data for this investigation. These approaches will help the researchers identify how children use a computer, to what extent they can use a computer to learn and what are the skills and knowledge they develop when they use computers to learn on their own. The context of this research is geared at underlying the relationship, in terms of cooperation, between teachers, students and parents within 2 southern primary schools in Mauritius. The qualitative data focused on interviews with children, examination of the students' work on PCs, observation in their ability to explore an interface, use a mouse, keyboard and the Internet. The quantitative data (for example: marks obtained in pre-tests and post-tests as well as results obtained from questionnaires) provide information which is easy to analyze statistically and fairly reliable. Descriptive statistics and charts have been used to analyze the quantitative data.

### Participants & Sampling

Two primary Government schools in Zone 3 were chosen, School 'A' and School 'B' both found in the south. Two schools were chosen instead of one because firstly, the validity and reliability of the respondents can be enhanced as their answers could be compared. The results from both schools could then be analyzed carefully hence making the results more valid and reliable.

School	Number of parents	Number of GP teachers	Number of ICT teachers	Number of children (Standard I –III)
School 'A'	15	10	1	60
School 'B'	15	10	1	60

**Table 1:** Number of participants involved in both schools

### Data collection tools

For the purpose of this study, as mentioned earlier, several data collection tools would be administered to gather data from the participants, Table 2.

<b>Data collection instrument</b>	<b>Purpose of the instrument</b>
Pre-test in classroom and /post-test in the ICT lab	To check whether computers help children to learn better as compared to traditional classroom methods
Interviews with students	To determine whether the students have access to technology at school/home and if so, to what extent are they familiar with using it and what do they use a computer for?
Observations with students by means of a checklist	To analyze what knowledge and skills do children acquire through unsupervised ICT use.
Observations with students + record time taken by means of a Gantt chart	To examine to what extent children can use computers to learn on their own
Questionnaires and Interviews with teachers and parents	To check if children can continue acquiring skills and knowledge without assistance

**Table 2:** Data collection instruments and their purposes

### **Pre-tests and post-tests with students**

Two equivalent tests were carried out, one to be administered as a pre-test in the classroom and the other one as a post-test (carried out after 2 days) in the ICT lab under the supervision of the researchers. The tests results were then compared and students' views about both types of assessment being carried out were video-recorded. A description of the tests is detailed in the Table 3.

<b>Class</b>	<b>Written class-test (supervised by the researchers in class)</b>	<b>Practical test (monitored by the researchers in ICT lab)</b>
<b>Standard I</b>	Drawing and coloring of shapes using colored pencils and rulers	Similar exercise by using Paint (researcher opens the program for children)
<b>Standard II</b>	Labeling of body parts using pencils and erasers	Similar exercise by using a drag and drop activity found on an interactive CD (researcher opens the activity for children)
<b>Standard III</b>	Activities on Food and Health	Similar exercise by using activities found on interactive CD (researcher opens the activity for children)

**Table 3:** Description of the activities involved in pre-tests and post-tests

### **Interviews and observations with students**

First and foremost, a pre-study investigation (in the form of an interview) on students' usage of computers was designed with a view to determining whether the students have access to technology at school/home and if so, to what extent they are familiar with using it and what do they use a computer for. Moreover students were being observed in order to investigate what knowledge and understanding do children acquire through unsupervised ICT use.

### **Investigating children's use of ICT**

Children of different ages are in at their different phases of development and appropriate research methods should be considered. One of the methods commonly used is drawing. It is easy for children to express themselves through drawing than through writing or speaking, as they may have difficulty discussing abstract concepts (Bruckman and Bandlow, 2002; Druin, 2002). When allowing children observe other children using technology, for example, Druin (2002) found that children seemed to take more effective

notes of their observations through drawings combined with small amounts of text, rather than text descriptions only. This is why simple free drawing tasks using Paint have been applied successfully to study children's knowledge and understanding of ICT. Students were observed over a period of 2 months (6 weeks) in the school ICT lab. The observation was carried out depending on the availability of the ICT lab.

### Questionnaire and Interviews with teachers and parents

An interview was carried out with 30 parents and 10 teachers from both schools. The main purpose of the interview was to depict information on whether children can continue acquiring skills and knowledge without assistance.

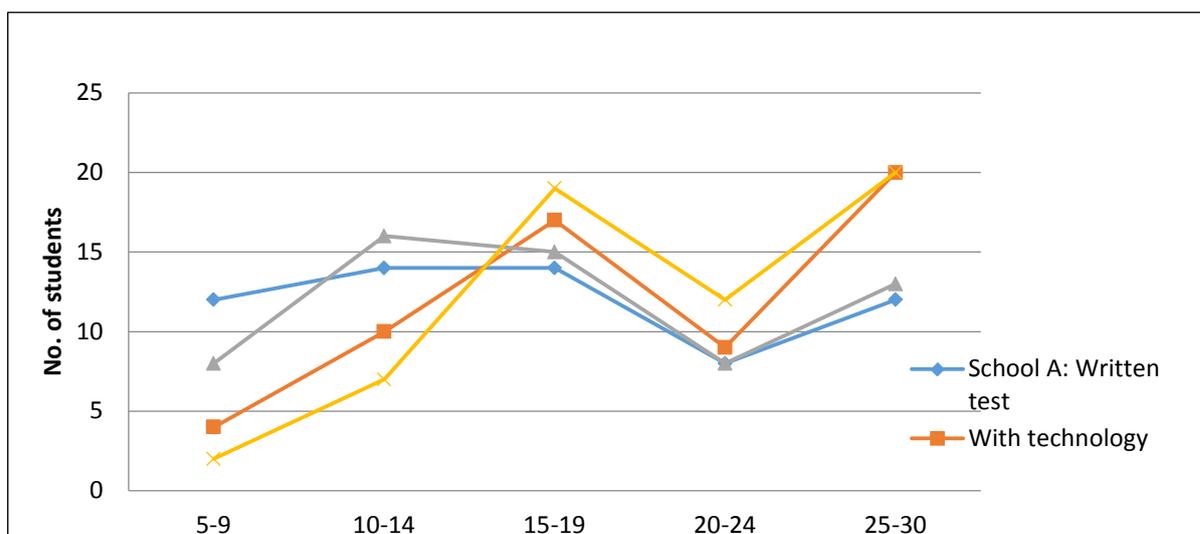
### Assumptions and Limitations of the study

Since ICT is taught as a subject at school from Standard I itself, this study presumes that the selected children already have a basic notion of the names of different hardware components (mouse, keyboard, and monitor). It is also assumed that children can manipulate a mouse and a keyboard and are already familiar with programs like Microsoft Word and Paint.

### Results from pre/post tests

The results are displayed by means of a line graph. The results obtained show that students have worked very well in both tests but there is a slight improvement in the performance of the students when they used technology to do the post test.

**Figure 1:** Graph showing the results obtained following the written tests in school A and B



Following the Pre-study investigation (in the form of an interview), it was found that all students from both schools have access to a computer and they can manipulate a PC. 68% students from school A and 80% students from school B have a PC at home. Further it was found that in school A, 40% would use a PC almost everyday, 43% would use a PC at least once a week and 17% would use it rarely. In school B, 50% would be using it everyday, 40% once or twice a week and 10% will be using the PC rarely.

The results in the bar chart show the tasks for which the students from both schools would normally use a PC for.

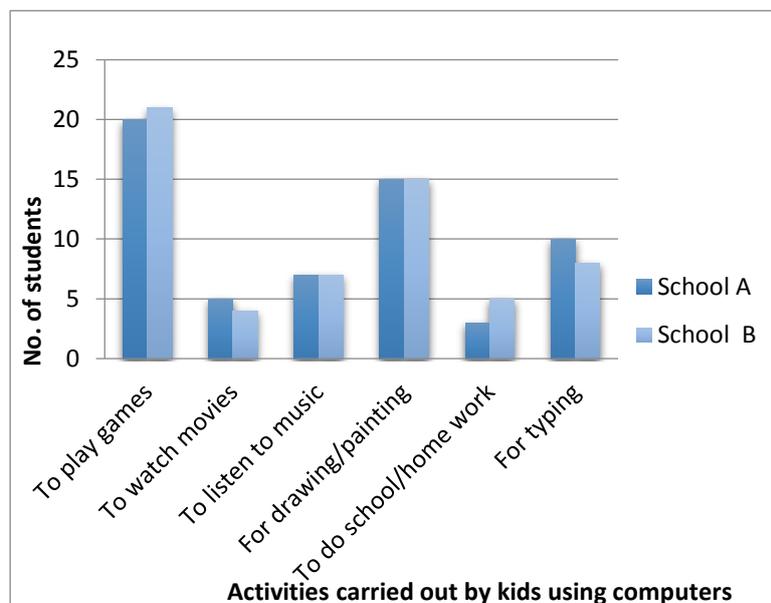


Figure 2: Bar chart showing how students from School A and B use a computer

The bar chart shows that children use computers mostly to play games and draw/paint. But they also use them to type, do school/homework, listen to music and watch movies. Since after playing games, students like to draw/paint, free drawing tasks using Paint have been given to children in order to study their knowledge and understanding of ICT use. This activity was carried out over a period of 3 weeks and the availability of the ICT lab.

	Description of the activity (1 hour)
<b>Weekly Schedules</b>	<b>Task: Free drawing using Paint</b>
<b>Week 1:</b> Standard I from both schools	Bring students to the ICT lab
<b>Week 2:</b> Standard II from both schools	Provide each student with a computer
<b>Week 3:</b> Standard III from both schools	Ask students to open Paint and to start drawing whatever they want
	Meanwhile, the researcher walked around and recorded observations by means of a checklist found in Appendix D

Table 4: Table showing description of the activity 'Free drawing using Paint'

### Observations during the practical session

During this activity, the researchers discovered that working out this activity in the ICT lab was a challenging and novel experience for the children. The findings were broken into two tables. The main reason of doing so was because children who already have computers at home were found to be more versatile with using computers as compared to those who don't have, Table 5.

Pupils who have access to computers BOTH at school and at home	Pupils who have access to computers at school ONLY
Students who have access to computers both at school and at home could follow the instructions easily. They seemed to be familiar with instructions like "open the program Paint. BUT it should be noted that around 35 students (58%) could not open the program 'Paint' by them. The researcher had to intervene.	Children who have access to computers at school only encountered lots of difficulties to follow the instructions. The computer vocabulary was largely unfamiliar to them. They were not acquainted with instructions like "open the program Paint" even though instructions were given by using the mother tongue. The instructor had to guide the children and provide help at different times.

Once the program was launched, the children started to draw and color by using the tools available. BUT some (63%) asked questions like: How to erase, how to insert text, where is the color toolbar.... etc. Here again, the researcher had to provide help.	During the working session, some children were found to be timid, unsure or insecure about their computer abilities. Since they did not use computers on a regular basis, the researcher had to provide help at each step.
Students enjoyed drawing things like: shapes, cars, houses, and seaside. Once their drawing was over, some asked researcher how to open a new page. So, the researcher helped the children once again.	Children liked to use the objects found in the toolbar to draw shapes. Similarly, here also children liked to draw houses and schools.

**Table 5:** Table showing observations made during the practical session of the 'Paint activity'

As mentioned above, students were observed over a period of 2 months (6 weeks) in the school ICT lab. During Weeks 1 -3, students were observed in terms of their ability to use Microsoft Word. Here also, the researchers devised a list of tasks so as not to make the children get distracted from the task. The tasks shown on Table 6 were as follows:

<b>Standard I</b>
Write their names
Insert shapes (circle, square, rectangle and triangle)
<b>Write simple sentences:</b> I am in Standard one. Researcher observed children by means of a checklist found in Appendix D

**Table 6:** Table showing activities carried out by Standard I children on Microsoft Word

<b>Standard II</b>
Write their names
Insert & color shapes
<b>Write short sentences</b> (i) Rita is a good girl. She is in Standard II. Researcher observed children by means of a checklist found in Appendix D

**Table 7:** Table showing activities carried out by Standard II children on Microsoft Word

<b>Standard III</b>
Insert & color shapes
Write the names of the shapes
<b>Write a short paragraph:</b> I am in Standard III. Researcher observed children by means of a checklist found in Appendix D

**Table 8:** Table showing activities carried out by Standard III children on Microsoft Word

It was observed that in this activity, children can teach themselves as well as their friends in the same surrounding. But most of them needed help from the researchers. For example, while typing sentences, 63% of students from school 'A' and 58% students from school 'B' asked the researchers how to leave a space after each word. Moreover, 60% children from school 'A' and 53% students from school 'B' did not know how to capitalize the letters. Additionally, 57% students from school 'A' and 51% students from school 'B' did not know how to move from one line to another.

Finally, during weeks 4-6, students were observed in terms of their ability to use the Internet. It should be noted that since only a few computers were equipped with Internet facilities, all 20 students from each class could not work at the same time. Special arrangements were made so that all students can get access to the Internet. The researchers devised a list of tasks so as not to make children get distracted from the task. The tasks were as follows:

<b>Standard I</b>
Since the children are too young, the researcher types the following URL in the address bar: <a href="http://www.cookie.com/">http://www.cookie.com/</a>
Researcher then asked children to click on any activities shown since all activities have been designed for 5-7 years old
Researcher observed children by means of a checklist

<b>Standard II</b>
Same as above

<b>Standard III</b>
Since Standard III children are more mature than Standard I & II children, They were asked them to type whatever they wished in the search bar.
Those who have not used the Internet before, the researcher typed the following URLs of some learning websites for them so as not to let them get distracted from the main task. <a href="http://www.cookie.com/">http://www.cookie.com/</a>
Here again, researcher observed children and provided help when needed

**Table 9:** Table showing activities carried out by Standard III children on the Internet

Following the above activities, it was found that most children like to play games on the Internet with a percentage of 75% for school A and 70% for school B. Through this observation, it has also been found that with a very limited technical knowledge of Internet use, the children involved in this study were able to perform various activities on the learning websites. Children learned mainly through experimentation as well as by observing others and sometimes by sharing knowledge with each other. Children who used Internet at home easily carried out more complicated tasks such as closing an application and re-opening another one.

### Findings from interviews with teachers and parents

Summary of questions during the interview with parents –School ‘A’ and School ‘B’

1. Do you have a computer at home?	YES - 75%	NO - 25%
2. What does your child do with a computer at home?	55 % - play games 35% - draw/paint 10 % - others (music, type, watch cartoons)	
3. Can children use computers to learn by <b>themselves</b> ?	2 % said Yes 98% said No	
4. Can children continue use computers to acquire skills and knowledge without assistance?	95% parents said No 5% parents said Yes	

**Table 10:** Table showing questions and answers from parents following the Interview

### Main questions during the interview with teachers –School ‘A’ and School ‘B’

1. Have you ever used technology in your class?	YES - 95%	NO - 5% (Why: Due to time constraint, loaded syllabus and lack of Internet facilities)
2. Can children use computers to learn by <b>themselves</b> ?	15 % said Yes 85% said No	
3. Can children continue use computers to acquire skills and knowledge without assistance?	3 % said Yes 97 % said No	

**Table 11:** Table showing questions and answers from teachers following the Interview**Discussion****Research question 1: “Does technology help children to learn better?”**

Two studies have shown that when ICT technologies have been used as an integrated part of the curriculum, students become highly engaged for longer periods of time, higher achievement in academic and less behavior problems (Cooper & Brna, 2002). It has been observed that there is a slight improvement in the performance of the students in terms of marks obtained when they used technology to do the post-test. Some of the benefits noted by the researchers when using computers with the children were that students were more excited when they received computer-based instructions.

- The amount of time required to do the activities on the computers were less compared to the time spent in the pre-test.
- With computers, students became more independent learners.
- Contrary to initial fears, computers do not isolate children. Rather, they serve as potential catalysts for social interaction. Children prefer to work with a friend rather than alone, and they make new friends around the computer.

**Research question 2: Knowledge and skills acquired through unsupervised ICT use by means of Drawing and painting using Paint**

For most children, the first contact with the computer is through some sort of game, and children play computer games very often. From the interview carried out, it has been found that children like to play games Pinball, Solitaire, Internet games (car games, Barbie games, angry birds' games, etc). To examine what knowledge and understanding do children acquire through unsupervised ICT use; free drawing tasks using Paint have been given to children in order to study their knowledge and understanding of ICT. The findings from this study on the use of computers by children on their own suggest that even though children had access to computers both at home and at school, they required helps. On the other hand, children who had little access to computers also required helps at each step. It was therefore not surprising that most of the participants demonstrated very little technical knowledge about computers. However, it should be noted that despite their lack of knowledge about computers and its uses, drawings using 'Paint' often suggest that they have an active interest in using computer. For example, many of the participants, with the help of the researchers, have been able to create some nice drawings.

**Research question 3: To what extent can children use computers to learn things on their own?**

When children used Microsoft Word, the researchers observed that children can teach themselves as well as their friends to certain extents. However, it is also true that the children would eventually get stuck and they would seek helps in order to carry out some particular tasks like (capitalization, line spacing, etc).

As mentioned earlier when using the Internet, even with a very limited technical knowledge, the children involved were able to perform various activities. More complicated tasks such as closing an application and re-opening another one was carried out by children who are exposed to Internet at home. Here also, children needed help. It was found that students from Standard V and VI only have access to Internet at the school. So, it was obvious that the children needed someone to guide them through this process. From observation, it was clear that the children can self-educate themselves, but only to certain degrees. The fact that children can teach themselves cannot be denied since learning is a natural process which a child adopts since birth. But eventually, from this observation, it has

been found that children do need a teacher to facilitate the learning process when using the Internet.

#### **Research question 4: Can children continue use computers to acquire skills and knowledge without assistance?**

Some parents (2%) who agreed that children can use computers to learn by themselves believed that since the children regularly have access to their PC at home, they can be left alone to learn by themselves. On the other hand, the other parents (even those who do not possess a computer at home) believed that children are too young to be left alone with a computer. They need someone to guide them. 5 % of parents interviewed, believed that if easy applications such as Paint, Microsoft word are concerned, then children can be left alone to learn by themselves. Parents were of the view that a kid does need a teacher or a parent to facilitate the learning process as he grows older, but with time and practice, the child will be ultimately responsible for teaching himself.

Teachers commented that humans are curious by nature; and it is this curiosity that often leads children to learn by their own. When using technology to learn, the learning approach is different as it encourages children to explore, learn and enjoy. They can develop their creativity and build certain autonomy by using the computer to learn by themselves. In the end, they will be happy that they have been able to come up with something constructive without the help of an adult. Their cognitive aspects would also develop through this approach. 3% teachers believe that given time and practice, children can learn things on their own. 97% of teachers interviewed believed that children, despite their abilities to learn on their own, would eventually need the presence of facilitators for their smooth learning cycle since they are too young.

#### **Conclusion**

From Dr. Sugata Mitra's experiment, it has been proven that children can teach themselves in one way or the other. They learnt by themselves and by working in groups through interactions and curiosity thus discovering things on their own. It is thought that children learn quicker on their own but within a classroom, under the teacher's supervision, the children tend to get into another sort of learning mode where they will be frequently asking questions like "What should I do now?" and they expect the teacher to answer. Through this study, we have seen that children can learn and develop skills such as using a mouse, keyboard, typing, drawing, coloring, playing as well as exploring an interface. This study also showed that children using technology to learn by themselves in an unsupervised environment is not always a success as they may have difficulty in learning on their own especially when they do not know how to use a program. As such, leaving children alone to learn with technology whether at home or at school may lead them to go astray and think in the wrong way. It is agreeable that curiosity is an important trait of a genius because it makes the mind active instead of passive; observant of new ideas. However, there will come such a moment when they will need a facilitator for guidance because it is the role of teachers to determine what the best actions are to help enhance the learning process for a particular.

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# GAUSSIAN DISTRIBUTION OF BREAKDOWN SHOTS IN NON-UNIFORM FIELDS

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## Abstract

The work is aimed at investigating the pattern of breakdown in an airgap for non-uniform field. In most technical literature it has been stated in gas breakdown that in the surrounding gas, photoelectrons are produced which initiates auxiliary avalanches directed towards the stem of the main avalanche, and that the greatest multiplication in these avalanches occur along the axis of the main where the space charge field supplements the external field.

Before the complete streamer formation (plasma) several breakdowns could occur before the breakdown of the main avalanche. This breakdown occurs in a definite manner due to presence of the applied field.

In order to investigate the pattern of breakdown four point-plane electrodes were used. For every test a kraft paper was placed on the plate electrode and each breakdown shot from the test punches a hole on the paper. After each complete experiment with punches on the paper, circles with intervals of 5mm were drawn until all the punches have been enclosed. From the analyses it was seen that for all point-plane electrodes the shot takes the Gaussian form of distribution within the ionization zone of electrode gap. This form of breakdown is mostly influenced by the resultant field between the external field and the space charge field at the head of the avalanche.

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**Keywords:** Space charge field, Critical length of avalanche, non-uniform field, Ionization zone, Streamer discharge, Filamentary avalanche.

## Introduction

In non-uniform fields, the field strength and hence the effective ionization coefficient  $\alpha$  vary across the gap. The electron multiplication is governed by the integral of  $\alpha$  over a path ( $\int \alpha d\lambda$ ). At low pressure the Townsend criterion for spark takes the form [1-3]

$$\gamma \left[ \exp \left( \int_0^d \alpha dx \right) - 1 \right] = 1 \quad (1)$$

Where  $d$  is the gap length

The expression is valid also for higher pressures if the field is only slightly non-uniform. In strongly divergent fields there will be at first a region of high values of  $E/P$  over which  $\alpha/P > 0$ . When the field falls below a given strength  $E_c$ , the integral  $\int \alpha dx$  ceases to exist. The Townsend mechanism then loses its validity when the criterion relies solely on the  $\gamma$  effect, especially when the field strength at the cathode is low. In reality breakdown (or inception of discharge) is still possible if one takes into account photo ionization processes [1, 3, 6]

To take into account the non-uniform distribution of  $\alpha$

$$\exp \int_0^{xc} \alpha dx = N_{cr} \tag{2}$$

Where  $N_{cr}$  is the critical electron concentration in an avalanche giving rise to initiation of a streamer,  $xc$  is the path of avalanche to reach the size and  $d$  the gap length. Hence eqn (2) will be

$$\int_0^{xc} \alpha dx = \ln N_{cr} \approx 18 - 20 \tag{3}$$

From the streamer theory of Meek and Raether [3], the expression for the space-charge field  $E_r$  at the head of the avalanche when it has crossed a distance  $x$  in non-uniform field is given as

$$E_r = \frac{5.27 \times 10^{-7} \alpha_x \exp\left(\int_0^x \alpha dx\right)}{(x/p)^{1/2}} \text{ V/cm} \tag{4}$$

The field distribution in a non-uniform field gap is shown in fig 1.

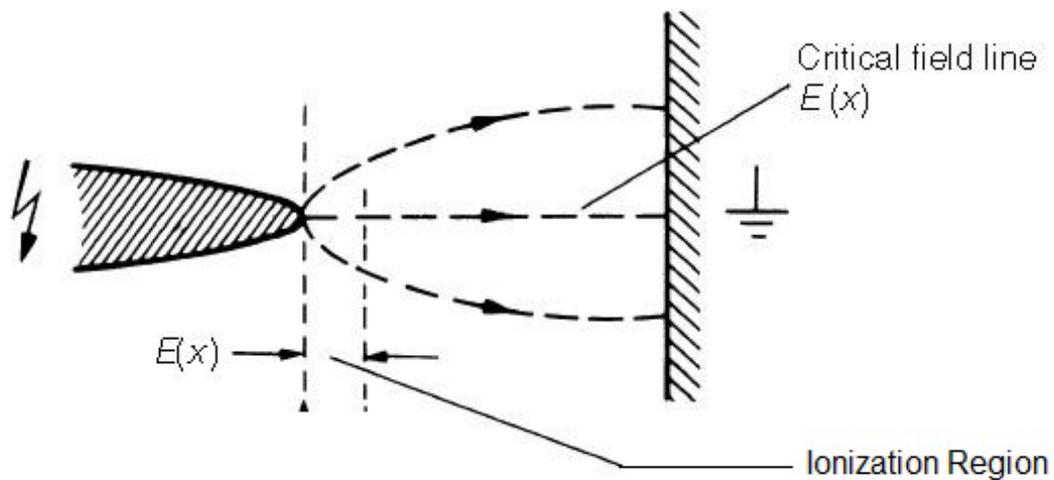


Fig 1: Field distribution in a non-uniform field

When positive voltage pulse is applied to a point electrode, the first detectable ionization is of a filamentary branch nature. This discharge is called a streamer and is analogous to the case of uniform field gaps at higher  $pd$  values. As the pulse voltage level is increases [4, 5], the streamers grow both in length and their number of branches as shown in fig 2.

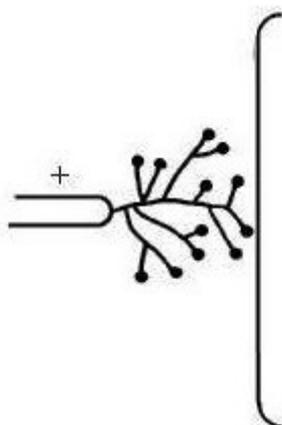


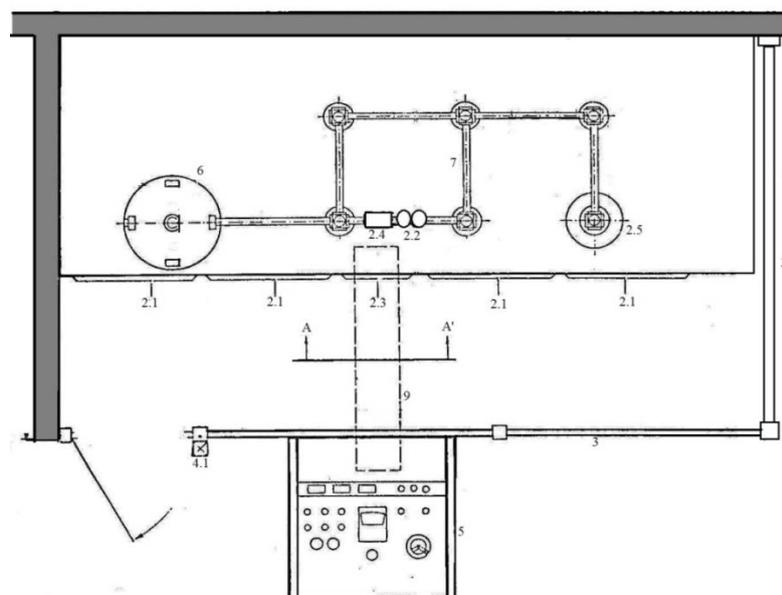
Fig 2: Streamer growth in an airgap

One of the interesting characteristics is their large number which never crosses each other. The velocity of the streamer decreases rapidly as they penetrate the low field region. If the gap length is small (less than 2cm), and the voltage is gradually raised no appreciable ionization is detected up to breakdown. As the gap is increased the field distribution becomes more inhomogeneous, and on increasing the voltage at first a transient slightly branched filamentary discharge appears. These discharges have been shown to be identical with those observed under impulse voltages and are also called streamers. Under steady state the streamer develops with varying frequencies, giving rise to currents that are proportional to their physical length. These streamers are sometimes called onset streamer or burst pulses [1, 6].

On increasing the voltage still further, new and more vigorous streamers appear which ultimately leads to complete breakdown of the gap. In the present investigation due to the formation of filamentary avalanches, breakdown occurred not only within the critical avalanche length (area) but was spread within the area call the ionization zone.

### Methodology

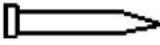
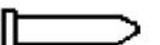
The equipment used to investigate was a single stage high voltage (HV) equipment with AC, DC, and Impulse voltage stages. An electrode stand was used to adjust the gap distance as needed. The layout of the HV equipment is shown in figure 3.



1. Wall or protective screen
2. Bench
- 2.1 Drawer for post insulators, capacitors, resistors and small parts
- 2.2 Spark gap
- 2.3 Tap-off panel
- 2.4 Spark gap adjustment chamber
- 2.5 Electrode stand
3. Protective screen
4. Protective screen door
- 4.1 Green and red warning lights
5. Control desk
6. Test transformer – 100 kV AC and 150 impulse.
7. Experimental set-up
8. Floor
9. Cable shaft:  $W \times D = 200 \times 150$  mm

**Fig. 3:** Layout of High Voltage Equipment

Four electrodes were used and were designated as needle, harp blunt and cone electrodes, as shown in fig 4.

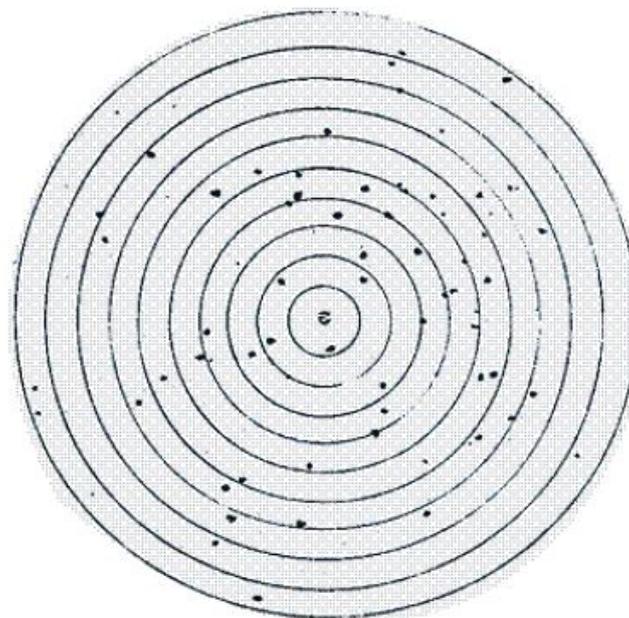
S.No.	Types of electrode configuration	Electrode and tip dimension
1		Needle $r = 0.25$ mm
2		Sharp $r = 0.75$ mm
3		Blunt $r = 0.9$ mm
4		coner = 1.3 mm

**Fig 4:** electrode configuration and dimension

With the high voltage equipment and the electrode stand, each of the electrodes was fixed and the gap distance was set using the adjustable rod on the electrode stand. A thin sheet of paper was place on the plate electrode. Having marked the centre of the electrode on the paper the breakdown probability test was carried out. In each experiment, the paper was taken and the centre to the furthest punch (hole) was measured. A circle was drawn, making sure that all punches were enclosed in the circle.

From the four different electrode arrangements, the distances, radius and the mean voltage ( $V_{50\%}$ ) was taken as shown in table 1.

In each of the papers circles with interval of 5mm or 6mm were drawn at each interval the number of shots were counted. The frequency of occurrence of the shots at such interval was tabulated against the distance. This is shown in fig 5.



**Fig 5:** Shot distribution

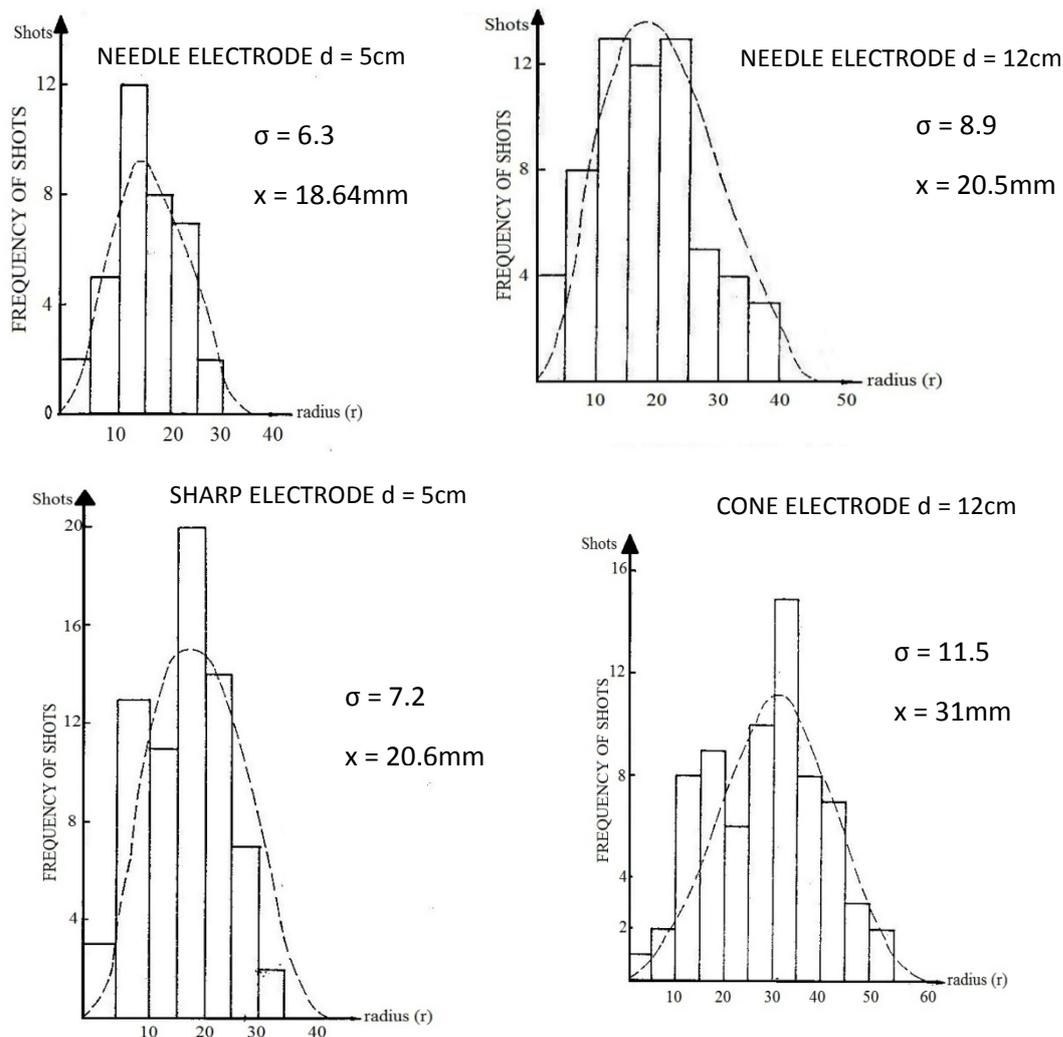
### Results and calculations

The selected gap distances are shown in table 1.

**Table 1:** Electrode Distance and Frequency of Shots for air gaps

Electrode Distance and Frequency of Shots for 5cm gap								Electrode Distance and Frequency of Shots for 12cm gap			
Needle Electrode		Sharp Electrode		Blunt Electrode		Cone Electrode		Needle Electrode		Cone Electrode	
Spread	Shots Freq.	Spread	Shots Freq.	Spread	Shots Freq.	Spread	Shots Freq.	Spread	Shots Freq.	Spread	Shots Freq.
6	2	5	11	6.5	3	5	2	5	4	5	1
11	5	10	20	11.5	13	10	3	10	8	10	2
16	12	15	26	16.5	11	15	9	15	13	15	8
21	8	20	17	21.5	20	20	11	20	12	20	9
26	7	25	12	26.5	14	25	14	25	13	25	6
31	2	30	7	31.5	7	30	9	30	5	30	10
—	—	—	—	36.5	2	35	5	35	4	35	15
—	—	—	—	—	—	40	4	40	3	40	8
—	—	—	—	—	—	—	—	—	—	45	7
—	—	—	—	—	—	—	—	—	—	50	3
—	—	—	—	—	—	—	—	—	—	55	2
<b>Total</b>	<b>36</b>	<b>Total</b>	<b>93</b>	<b>Total</b>	<b>70</b>	<b>Total</b>	<b>57</b>	<b>Total</b>	<b>62</b>	<b>Total</b>	<b>71</b>

From the different frequency tables histogram were drawn as shown in fig 6



**Fig. 6:** Histogram and Frequency distribution of breakdown shots

Due to the pattern of breakdown statistical methods was used to find the mean and standard deviation. From the given formular the values were worked out.

$$\bar{x} = x + \frac{\Sigma fd}{\Sigma f} \quad (5)$$

The standard deviation is

$$\delta = \sqrt{\frac{\Sigma fd^2}{N} - \left(\frac{\Sigma fd}{N}\right)^2} \quad (6)$$

Where a is assumed mean

From the analysis of the results, the spread, mean and standard deviation and gap distances are shown in fig. 6.

### Discusion

The point-plane gap is particularly suitable for obtaining a high localized stress and for localization of dense space charge. When positive voltage pulse is applied to the point electrode, the first detectable ionization is of a filamentary branch nature which is called a streamer and is analogous to the case of uniform field gap at higher (pd) pressure. As the voltage level is increased the streamers growth both in length and their number of branches [7-9].

Due to the exponential character of the ionization in the avalanche the density of ions will be highest near the anode. The positive ion charge will produce field distortion in both radial and axial direction and it will be greatest at the head of the avalanche. In the surrounding gas photoelectrons are produced which initiate auxiliary avalanches directed toward the stem of the main avalanche if the space charge field developed by the original avalanche is comparable to the external field.

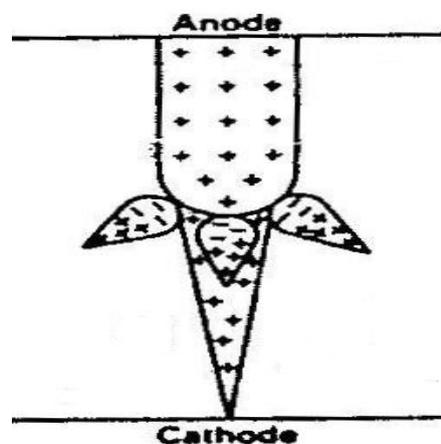


Fig. 7: Cathode directed avalanche

The greatest multiplication in these auxiliary avalanches occurs along the axis of the main avalanche where the space field supplements the external field [10, 11].

Due to the field direction these avalanches are directed towards cathode. From the experiment, these cathode directed multiplication of avalanches sometimes spark over before the breakdown. But due to the attachment within the stem of the main avalanche, they are fewer within the critical length, rather the breakdown charge distribution gives a Gaussian pattern which was evident of all electrodes. With the four electrodes the Gaussian pattern was maintained.

## Conclusion

When the avalanche has grown beyond the critical size, its head has opened indicating ionization round the original avalanche head and the cathode directed streamer starts. From the experiment, a hissing corona sound is heard with subsequent breakdown. Since it was impulse voltage used, before the formation of plasma any of filamentary avalanche developed enough is able to cause breakdown. That was why spark or breakdown could follow a subsequent one sometimes with louder sound.

In the various gap length used and with different electrode configuration the shot distributions follows the Gaussian distribution pattern. It is normal to (medium and long) of non-uniform configuration. It does not apply to parallel plate electrodes or weakly non-uniform fields (sphere gaps).

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# AN AUTONOMOUS SIMULATION BASED SYSTEM FOR ROBOTIC SERVICES IN PARTIALLY KNOWN ENVIRONMENTS

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## Abstract

This paper is focused on presenting the architecture and the implementation of a semi autonomous simulation based system which is able to navigate into a partially known environment. Most of robotic agent does not support mobility according the requirements of applications. Our implementation provides a semi autonomous system which is used by an operator performing several services with better quality and low costs. The design is a module based architecture which supports the robot navigation using simulation offline software and on line at the moment when the agency perceps obstacles. The robot changes states of its mobility in real time building a new strategy to achieve the normal path received from a simulator that execute and communicate the path calculated by a simple navigational algorithm in the virtual static environment.

Using a communication protocol between robotic unit and simulator software, it is possible to correct data and to improve the system behavior through a wireless communication. The physical system is tested in a laboratory environment. It is situated in a environment which is the same designed in the simulator. The robot updates its coordinates in the virtual environment and the simulation runs exactly according the navigation algorithms until the sensor module transmits to simulation software new data of obstacle presence. We evaluate the performance of the system and the results confirm an improved behavior of robotic agent in extreme situations of dynamic environment.

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**Keywords:** Autonomous system, robotic agent, module based architecture, communication protocol

## Introduction

Autonomous applications are those in which the user is interested in the results of self processing large amounts of data in several distributed locations in order to achieve some goals. These applications are extremely useful in areas such as intrusion detection systems, self service system or unknown environment map analysis.

Robotic agent systems appear to be the most feasible solution for their implementation. In these systems, autonomous software entities (robots) may move across an environment of execution platforms. The application is supported by an architecture which seems to be based on two modalities of agency work.

In this paper we are focused on a semi autonomous system in a partially known environment which is able to bring services of transportation using robotic agents in every point addresses generated from a central management system. The robots move autonomously in an physical environment area controlled by an operator but the robot path has been fixed in a virtual partially known environment. A wireless communication system supports the connection between the central system and robotic entities. There are two channel transmissions in two different frequencies. The system passes from one modality

(simulation off line) in another one (simulation online) when the robots percept the presence of unknown obstacles.



**Figure.1.** View of the simulation.

The work aims to contribute on bringing new solutions to solve the problem of the navigation in partially unknown environments in order to avoid collisions with obstacles. Another element is the designing process tents to be easier, programming intelligent behaviors in virtual environments. The robotic entity is equipped by a set of sensors to sense obstacles. We have tested several behaviors of the system in different environment and the performance of the system was very good. In figure 1 you can see a robotic prototype used to be programmed inside the system.

### **Research Objectives**

In this research we propose an modulated architecture agent based approach to develop such complex applications. The approach aims for extending the functionalities of systems that are able to manage dynamism and changes autonomously.

The general idea of self-management is to endow computing systems with the ability to manage themselves according to high-level objectives specified by humans. Researchers divide self-management into four functional areas [3]:

- Self-configuration: automatically configure components to adapt themselves to different environments;
- Self-healing: automatically discover, diagnose, and correct faults;
- Self-optimization: automatically monitor and adapt resources to ensure optimal functioning regarding the defined requirements; and
- Self-protection: identify and protect against attacks.

The environment will occupy an important role. An agent based system which pretends to be self managed must take the appropriate actions based on a sensed situation in the environment. This requires functionality for monitoring, decision making, and action execution. This requires coordination of behavior of agents used in different applications.

### **Multiagent Systems and Software Architecture**

A multiagent system provides the software to solve a problem by structuring the system into a number of interacting autonomous entities embedded in an environment in

order to achieve the functional and quality requirements of the system. In particular, a multiagent system structures the system as a number of interacting elements in order to achieve the requirements of the system. This is exactly what software architecture is about. [6] defines software architecture as: Software elements (or in general architectural elements) provide the functionality of the system, while the required quality attributes (performance, usability, modifiability, etc.) are primarily achieved through the structures of the software architecture.

Typical architectural elements of a multiagent system software architecture are agents, environment, resources, services, etc. The relationships between the elements are very diverse. In short, multiagent systems are a rich family of architectural approaches with specific characteristics, useful for a diversity of challenging application domains. [7] There are applications that provide different levels of complexity and various forms of dynamism and change. The architecture for many of them is a set of agents, for reuse, they can serve for developing software architectures transporting them as ready entities with specific attributes such as: each agent has incomplete information or capabilities for solving the problem and, thus has a limited viewpoint and computation is asynchronous.

A multiagent systems consists of a (distributed) environment populated with a set of agents that cooperate to solve a complex problem in a decentralized way. [8] Behavior-based action selection is driven by stimuli perceived in the environment as well as internal stimuli. Situated agents employ internal state for decision making relates to:

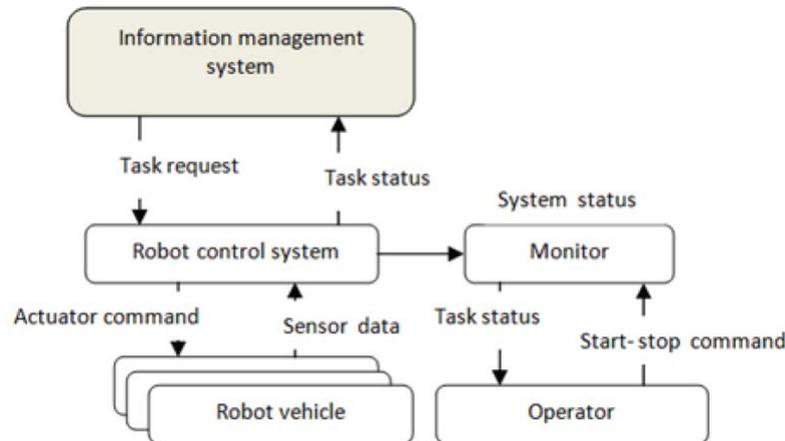
- planning off line (static information of the system);
- planning on line ( dynamic information related to the changes of the environment); or issues internal to the agent.
- environment encapsulates resources and enables agents to access the resources.[9]

### **The Application**

We give an overview of the functionalities of the system discussing the main quality requirements. The robot has to transports loads from one place to another. The tasks are generated by the information agent which is part of a central information systems, typically for a business management program.

The task is composed out of some processes like receiving order from service agent acquiring the first service point address, moving to first service point, receiving the second service point address, moving to the second service point. In order to execute this task, the system has to perform :

- Route assignment: paths are generated by the information systems and have to be assigned to robot vehicle that can execute them.
- Routing: the robot must route efficiently through the environment layout of the warehouse when executing transports.
- Gathering traffic information: although the layout of the system is static, the best route for the robot in general is dynamic, and depends on the actual traffic condition. Using visual sensors, the robot routes efficiently without collision with other objects. [10]



**Figure. 2.** The diagram of the robotic system for semi-automatic services.

This model integrates the environment and agent integrating mechanisms of adaption for agents. We have divided the model in two parts: environment and situated agent. The environment model consists of a set of modules with flows between the modules. The modules represent the core functionalities of the environment. The model consists of two main modules:

- the deployment context (referred to the given hardware and software and external resources with which the multiagent system interacts (sensors and actuators, a printer, a network, a database, a web service, etc.).and
- the application environment.(refereed to the part of the environment that has to be designed for an application)

The agent model consists of four modules with flows between the modules. The modules represent the core functionalities of a situated agent. Knowledge module provides the functionality to access and update the agent's current knowledge. Sensing module receives perception requests from the Decision Making and Communication modules to update the agent's knowledge about the environment. Decision making and communication use the agent's current knowledge to make appropriate decisions. The communication module writes the location in the agent's current knowledge which in turn will be used by the decision making module to move the agent efficiently towards the destination. Decision Making provides the functionality to an agent for selecting and invoking influences in the environment. Decision making consists of two basic functions: Influence selection and actuator execution. To select appropriate influences, an agent uses a behavior based action selection mechanism extended with roles and situated commitments. Execution provides the functionality to invoke selected influences in the environment.

### **The wireless communication**

Figure 3 is a view of market place environment of robotic vehicles. We consider them independent entities that communicate with a central management system which generates transportation tasks through a sales information agent. The control of task distribution is centralized but the vehicle path is calculated autonomously. We consider the presence of collision point but this not object of this work. The central system sends instructions according the simulation software which pretends to know the environment in its first statement.

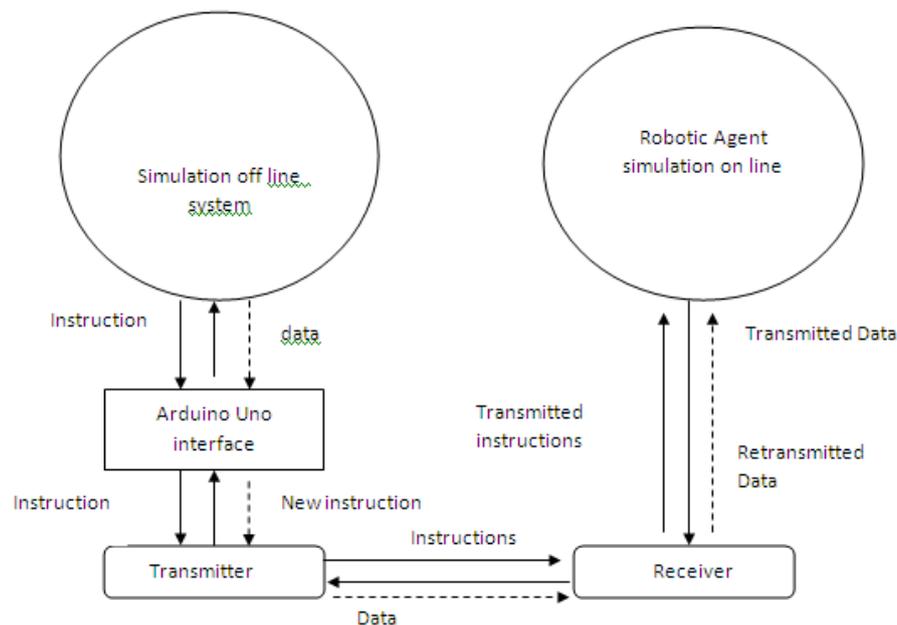


Fig. 3. Receiver and transmitter modules of the wireless communication

Here is been presented some technical features of the Wireless device which is composed by two modules:

- Receivers RX-B1 (433 MHz and 315 MHz) and
- Transmitters TX-C1 (433 MHz and 315 MHz)

Each message is transmitted as:

- 36 bit training preamble consisting of 0-1 bit pairs
- 12 bit start symbol 0xb38
- 1 byte of message length byte count (4 to 30), count includes byte count and FCS bytes
- 2 bytes FCS, sent low byte-hi byte

Everything after the start symbol is encoded 4 to 6 bits, Therefore a byte in the message is encoded as 2x6 bit symbols, sent hi nibble, low nibble. Each symbol is sent LSBit first. The Arduino Diecimila clock rate is 16MHz => 62.5ns/cycle. For an RF bit rate of 2000 bps, need 500 microsec bit period. The ramp requires 8 samples per bit period, so need 62.5microsec per sample => interrupt tick is 62.5microsec. The maximum message length consists of  $(6 + 1 + VW\_MAX\_MESSAGE\_LEN) * 6 = 222$  bits = 0.11 secs (at 2000 bps). Testing with TX-C1, RX-B1, 5 byte message, 17cm antenna, no ground plane, 1m above ground, free space. At 10000 bps the transmitter does not operate correctly (ISR running too frequently at 80000/sec?). At 1000bps, Range over 150m. As suggested by RFM documentation, near the limits of range, reception is strongly influenced by the presence of a human body in the signal line, and by module orientation. Throughout the range there are nulls and strong points due to multipath reflection. Similar performance figures were found for DR3100. 9000bps worked.

Arduino and TX-C1 transmitter draws 27mA at 9V. Arduino and RX-B1 receiver draws 31mA at 9V.

Here we present two protocols which let the system to send commands to robots and to receive data from its. There are two simple protocols which are used to link the simulation software with the physical entity. These messages are transmitted in different frequencies to avoid signal interferences and message errors

**Receiving data protocol**

```

int GetMessage()
{
    int command=-1;
    uint8_t buf[VW_MAX_MESSAGE_LEN];
    uint8_t buflen = VW_MAX_MESSAGE_LEN;
    if (vw_get_message(buf, &buflen))
    {
        int i;
        char inStr[25];
        char inChar=-1;
        for (i = 0; i < buflen; i++)
        {
            inChar = buf[i];
            inStr[i] = inChar;
        }
        inStr[i]='\0';
    }
    return command;
}

```

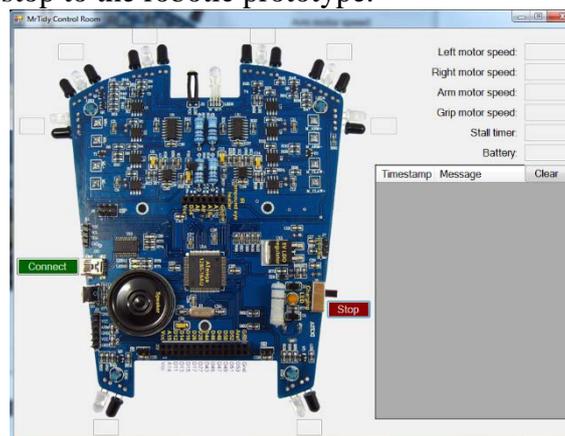
**Sending commands protocol**

```

void SendMessage(String msgToSend)
{
    char msgtmp[25];
    msgToSend.toCharArray(msgtmp, 25);
    vw_send((uint8_t *)msgtmp, strlen(msgtmp));
    vw_wait_tx();
}

```

The operator can use a robot interface to view the messages which are being transmitted in both sides of the communication. The interface is used to give basic manual command as connect or stop to the robotic prototype.



**Fig. 4.** The view of the robot interface

**The simulation**

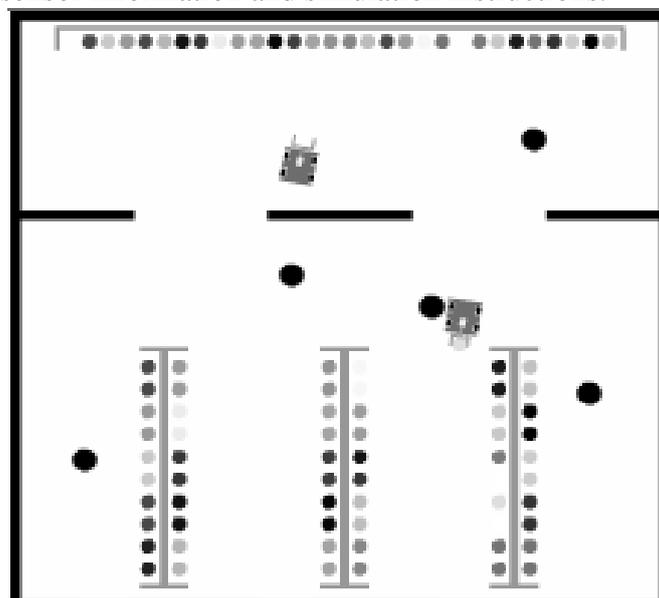
We represent here an application that represent an agent which will operate in a two dimensional environments, without obstacles; and the obstacles are generated randomly; i.e. in random sizes and distance between them, and their black shapes are circular. Over this we can put another obstacle during the simulation time. A great number of obstacles gives a

complex virtual world but this required more calculation power managing the dynamic information. At each step, agent should performs two phases:

- interaction with simulation software if agents do not sense an obstacle,
- interaction with environment if agents sense one,
- orientation choosing the next step.

The final objective is to find the complete the task executing instructions came from a system of management. For this purpose, we combine the two behaviors to achieve the goal. The system is designed to control constantly the changes of the environment avoiding the failures.

Our system is designed to have a set of sensors. What does it mean? The agent can percept the obstacle and can observe the distance from the obstacles. Hanging around the motion map, the agent can discover invisible areas behind the obstacles to find the target which is not in the visible area. Here he finds the motivation to change position for a new state with purpose to reach his objective. He starts his movement following a predicated plan in base of the visual sensor information and simulation instructions.



**Fig. 5** The environment of simulation with obstacles.

This is an important moment for showing the new state after the action execution. These actions are divided in two categories :

- normal actions that change the environment
- sensing actions that accumulate information over the environment to make decisions.

In a intelligent system, during the execution of work pogram, the agent decides itself about the state of conditions : true or false.

## Conclusions

During the simulation, we can observe the agent environment relations and their dependencies:

- We have designed a software system that is capable to integrate successfully the execution ability of complex tasks using reflexive capacities needed to manage uncertain situations in dynamic environment.
- We observe temptations for more reactive behaviors in expected situations.
- The speed of mission is another of agent exigencies. However the environment changes with certain speed and the agent has not time enough to make a perfect decision and to choose accurately the next action.

- Time in disposition do not compromises the agent performance in the dynamic environment.
- The simulation software that we have designed, provides a simple way to study the complex interactions between different types of environment and agents.
- We were interested to study the stability on making decisions of the system. Our attention was focused on how much security offers an agent based system in difficult situations.
- Many different types of robotic agent behaviors have been introduced. We could observe the agent efforts to reach the goal and the results were interesting about agent intelligence.
- Combining simulation off line with simulation on line, the agent can perform better behaviors in a partially known environment giving a new solution in software engineering.
- In further research it would be interesting to introduce new types of environment making them more complex. We aim to extend agent based systems on modeling hierarchical structures of control system

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## DESIGN AND DEVELOPMENT OF NOISE SUPPRESSION SYSTEM FOR DOMESTIC GENERATORS

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### Abstract

Increase in demand for standby power sources and disruption in power supply has increased the use of generators manifold for domestic and industrial consumers leading to objections on their use concerning noise pollution. The work presented here aims to focus on how generator set noise is propagated, controlled and reduced to a limit as defined by domestic laws. The presented work is in fact a feasibility of a simple and effective design of an acoustic enclosure for portable generators aims at reducing the radiated noise. This effort is a multi-disciplinary work that comprises acoustics, heat transfer and material science. Heat generation and requirement of cooling air leads to a heat transfer model with internal forced convection. The design is a balance of noise control and thermal management. Noise generating areas have been identified and conventional passive noise control techniques have been used to control and reduce the noise. Acoustic barriers and insulation are used to control the noise propagation at its transmission path. In the conclusion comparison and results of noise are plotted using sound measuring techniques and devices as well as the thermal profiles of cylinder head are compared with and without canopy.

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**Keywords:** Sound Mapping, Acoustic enclosure, Heat transfer, Noise Suppression

### Introduction

Growing gap between power production and consumption around the globe has compelled the consumers to look for standby energy sources. Among available options, generators are considered to be cost effective, user friendly and reliable power generation source [1,2]. However systems in use at the domestic, commercial and industrial level are polluting the environment due to high noise levels [3,4,5]. The noise laws and regulations of different countries do not allow the use of generators in their domestic and commercial areas, hence forcing consumers to adopt less efficient and costly backup power sources [6]. Typical noise levels of different sources and their surrounding environment is depicted in Figure 5. Intensity of sound is measured in decibel (dB). Typical generator set noise lies between 80-105 dB at 21 ft which falls in very loud to uncomfortably loud category with respect to sensitivity of human ears and hence, making electrical generators a source of noise pollution to environment. Laws and regulations typically, in United States for example, allow noise in domestic residential areas up to a maximum of 67 dB while for industrial areas the allowable limit is up to 72 dB. Much of the earlier research for generator noise control is focused on the selection of materials that can be used for design of an isolated enclosure to suppress the noise [7-11]. Although effective noise suppression methods for large scale generators is quite common, however, the same are not available for the medium to small scale generators, mainly due to cost considerations. The basic aim of this research work is to design and develop a

suitable solution for the noise suppression and thermal management of small sized generator sets for domestic use for a typical family size of 5 to 10 people. For this study, therefore, a generator set of 4.5 kVA is selected whose sound levels are measured with a suitably accurate dB meter. For effective noise control different methods have been proposed for reduction of noise produced by machinery and other equipment[12-14]. This paper presents a study on selection of appropriate noise suppressent materials suitable for the generator canopy as well as effective heat transfer methodology to ensure stable generator operations. Extensive measurements of noise levels as well as generator cylinder head temperatures, before and after the installation of designed canopy around the generator, has been carried out to show the effectiveness of the proposed design for reduction in noise pollution.

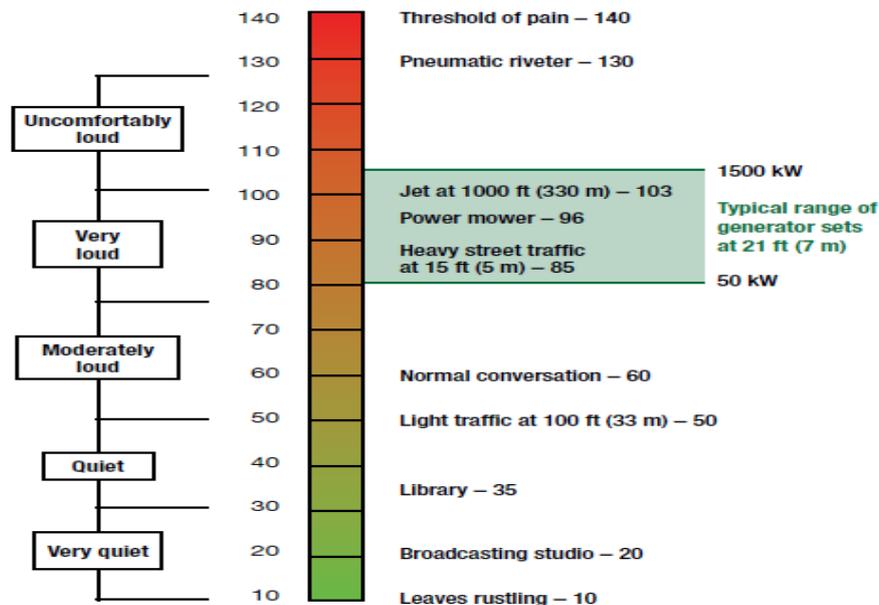
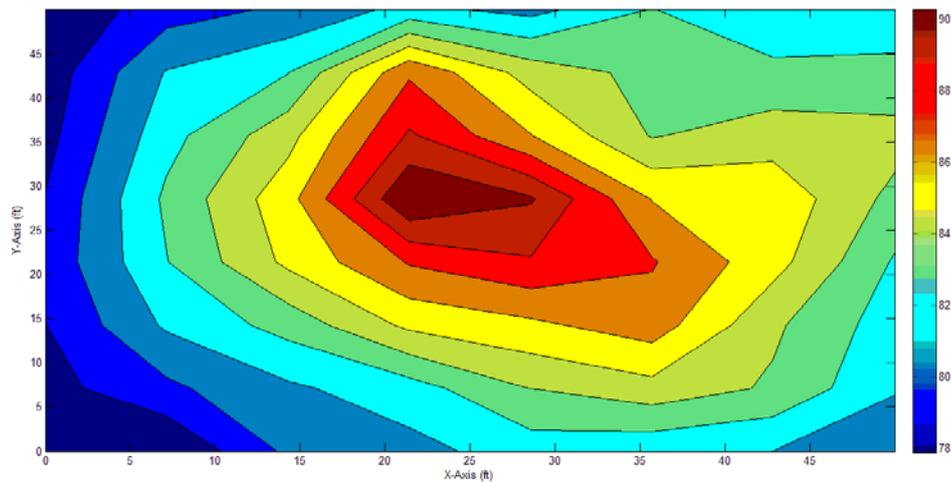


Figure 5. Various sources of sound with their typical noise levels, measured in (dB) [6].

### Sound/Noise Mapping

In this study, for the consistency in noise measurement technique, a methodology has been defined so that straight forward comparison can be made for the noise levels of the generator in both outdoor and indoor environments. For this purpose, a simple experiment is performed for which a test space of 50 ft x 50 ft in open air is selected. Sound source i.e. the generator is placed in the center of test space and the sound levels are then measured using dB meter, in a 8 x 8 space matrix format. The numerically measured noise values in (dB) and their corresponding 2D plot is shown in Figure 6 as a spectrogram of noise produced by the generator.

		SOUND LEVEL (dB)							
WIDTH (ft)	50.000	78.2	77.9	80.6	81.2	82.2	81.9	81.6	80.9
	42.857	78.7	80.1	81.4	82.3	84.1	84.9	83.9	81.7
	35.714	79.1	81.8	83.3	85.6	86.3	87.2	84.3	82.2
	28.571	79.5	82.8	85.6	87.9	88.9	87.9	85.8	82.7
	21.428	79.2	83.1	86.1	91.5	90.4	86.5	86.2	83.7
	14.285	78.7	82.4	84.9	89.2	86.6	84	84.7	84.6
	7.143	78.4	81.7	82.8	87.6	84.8	83.7	83.2	83
	0.000	78.1	79.8	80.6	82	81.2	82.9	81.7	82.5
	0	7.1428	14.285	21.428	28.571	35.714	42.857	50	
		LENGTH (ft)							



**Figure 6. A typical 8x8 space matrix for noise measurements along with Spectrogram, for generator without enclosure in open environment**

### Material Selection and Noise Control

Noise control is always been a key environmental concern in all industrial and domestic areas. Noise produced from machinery and other equipment can be controlled by using either active or passive methods, depending upon cost of the solution. The Contour plot of noise levels produced by the generator, as shown in figure 2, indicates that noise from the generator is almost symmetric in all dimensions, with small variations due to the non symmetric shape of the generator. Therefore, for the purpose of finding cost effective solution for the domestic users, it is imperative to have noise control done at its source and along its transmission path. Thus, in this study passive noise control techniques have been explored. For this reason, the generator is proposed to be enclosed in a suitable enclosure made of suitable noise suppression materials. This shall significantly reduce the noise on one hand and on the other hand, the heat accumulated inside the enclosure may raise the temperature of the generator beyond its safe operating limits. Thus the challenge in this design is to find a balance between reduced noise levels as well as sufficient heat transfer from the enclosure for the domestic generator to noiselessly operate for a long duration.

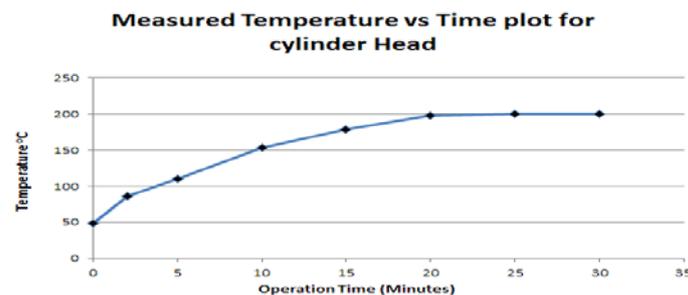
In general, noise control at its transmission path design is accomplished through installation of acoustic barriers and use of insulation material. In proposed scheme an enclosure to place the generator set for reduction in noise emission to environment has been perceived. At first different rigid materials are considered for the canopy design to achieve the desired results. Factors considered for selection of material for canopy fabrication include transmission loss, thickness, weight, cost, material properties and ease of fabrication. As scope of the work is focused to noise suppression, so transmission loss and thickness parameters are preferred. Values for thickness and transmission loss parameters of different materials considered are tabulated in Table 1. Steel is selected from considered materials for its minimum thickness and maximum transmission loss. Further survey revealed that different standard working gauges of steel are readily available in market. As there are fabrication issues with the Standard Working Gauge (SWG) 14 which is listed high during parameter comparison therefore, SWG 16 gauge steel with thickness of 1.63 mm and transmission loss of 27 dB is selected for fabrication of canopy. It is a known fact that most materials absorb sound. There is a wide variety of insulation materials available in the market, with an equally wide variance in form, performance, sustainability and cost-effectiveness. The absorption coefficient is a common parameter used for measuring the sound absorption of a material, defined as ratio of energy absorbed by a material to the energy incident upon its surface. Rockwool is selected with a maximum sound absorption coefficient of 0.65.

**Table 1. Materials Thickness and Sound Transmission**

Material	Thickness (mm)	Surface Density (kg/m <sup>2</sup> )	Transmission Loss (dB)
Dense Concrete	100	244	40
Light Concrete	100	161	36
Brick	150	288	40
<b>Steel</b>	<b>0.64 – 1.97</b>	<b>4.9 – 15.20</b>	<b>18 – 30</b>
Aluminium	1.59 – 6.35	4.4 – 17.1	23 – 27
Wood	25	18	21
Ply Wood	25	16.1	23

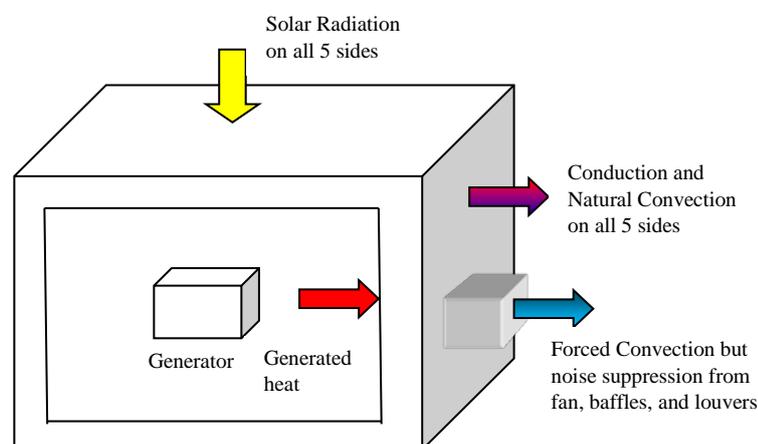
**Heat Transfer Model**

Understanding and computations of heat transfer are important in this work as it will affect the generator operation when isolated inside an acoustic enclosure. Initial heat transfer design considerations are done with the operating temperatures of engine, exhaust and surrounding environment. A resistance thermocouple is used to measure the generator cylinder head temperature. From figure 3, it is seen that maximum generator cylinder head temperature of 200 °C is reached after a 20 minutes of operation and then does not rise even after complete operation time of 30 minutes. Since the maximum allowable temperature defined by OEM i.e., 270°C for the selected generator, therefore it is important that adequate heat transfer measures must be taken to ensure that even in the enclosed canopy, the generator cylinder heat temperature do not rise closer to this limit. Ambient temperature at the time of the test is measured as 30 °C.



**Figure 7. Cylinder head temperature history when generator is in open location without canopy**

A model for heat transfer calculations is shown in figure 4. The generator and its canopy is modelled as a six sided rectangular box, as shown in the figure 4, across which the heat is transferred out to its surroundings from 5 of its sides (the lower side of the box touching the ground is assumed to be insulated).



**Figure 4. Heat Transfer model of generator inside the canopy**

Applying energy balance, it is realized that for a steady generator operation, all the heat energy given away by the generator during its operation plus the solar radiation coming into the canopy must be conducted out of the canopy and through natural convection from all 5 sides to the surroundings and through forced convection from the cooling fan. Mathematically,

$$\dot{Q}_{in} - \dot{Q}_{out} + \dot{Q}_{gen} = \frac{dq}{dt} \quad (1)$$

In this equation 1, the right hand side is essentially zero for steady state operation. For the solar radiation coming into the canopy,  $\dot{Q}_{in} = \epsilon\sigma A(T_s^4 - T_\infty^4)$  (2)

where,  $T_s$  is the surface temperature of the canopy,  $T_\infty$  is the ambient temperature,  $A$  is the 5 face areas of the canopy,  $\epsilon$  is the emissivity of the surface, and  $\sigma$  is the stephen Boltzman constant.  $\dot{Q}_{gen}$  in equation 1 is estimated from the known surface temperature profile of the cylinder head.  $\dot{Q}_{out}$  in equation 1 comprises of heat conducted out through the walls of the canopy and naturally convected to the surroundings. This is estimated from the equation 3 :

$$\dot{Q}_{natconv} = \frac{(T_{Cyl} - T_\infty)}{R_{Total}} \quad (3)$$

where,  $T_{cyl}$  is the generator cylinder head temperature in its steady operation and  $R_{Total}$  is the thermal resistance in the path of the heat energy from the generator to the outside environment and is given by equation 4 below:

$$R_{Total} = R_{conv, 1} + R_{wall, 1} + R_{wall, 2} + R_{conv, 2} \quad (4)$$

where,  $R_{conv,1}$  is the convection resistance from the generator body to the inside wall of the canopy.  $R_{wall,1}$  is the thermal resistance of the noise suppressent material,  $R_{wall,2}$  is the thermal resistance of the body of the canopy,  $R_{conv,2}$  is the natural convection resistance to the atmosphere. From the material properties and geometrical shapes, all these resistances can be well estimated. However, the contribution of this mode of heat transfer is much lower and is not sufficient of keep the generator cylinder head temperature within safe and stable operation. To improve heat transfer, the help of forced convection through a suitable sized fan is felt necessary. Therefore the other component of  $\dot{Q}_{out}$  is the forced convection through the duct with fan which can be estimated by solving equation 1 and using equations 2, 3, and 4. Thus, the fan must be of suitable size as not to open up the channel for noise to go out but of sufficient size to convect the accumulated heat out as  $\dot{Q}_{out}$  in equation 1. This design objective can be achieved by carefully installing louvers and silencing baffels in the convection path of the fan which supresses the noise but allows effective cooling. The total heat load that the fan must transfer out through forced convection,  $\dot{Q}_{fan}$ , is calculated to be 1135 W for the 4.5 KVA generator used in this study. Now to transfer this energy either a powerful fan with small opening can be employed but which may generate its own noise and also may not be available commercially. Thus, using market survey for the available fans with least noise and fulfilling the thermal energy transfer requirements of 1135 W, the fan with radius 0.0635 m is selected and from its given rpm, the velocity of the fan is calculated to be 3.91 m/s. To verify the suitability of fan for  $\Delta T$  of 35 °C above ambient, the heat convected out by the fan is about 1152 W which is just sufficient for our design requirements. The margin of about 17 W in excess of required heat transfer is justified, especially because the thermal design for this study is highly linearized for the estimates of fan heat load calculations. However, the practical test on generator cylinder head temperature, as given in figure 7, verified the estimated heat transfer calculations.

### Results and discussion

After installation of generator inside the canopy, sound mapping is again done at the same space as per defined methodology in the earlier part of paper. The sound mapping results, as shown in figure 5, reveals a significant sound reduction after installation of the generator inside the designed canopy.

		SOUND LEVEL (dB)							
<b>WIDTH (ft)</b>	<b>50</b>	61.3	63.8	64.3	63.8	63.4	63.1	63.2	62.2
	<b>42.857</b>	63.9	64.8	67.1	69.1	66.2	65.8	65.5	62.7
	<b>35.714</b>	64.9	65.9	67.6	72.7	69.7	68.1	67.5	63.3
	<b>28.428</b>	64.7	66.8	71.1	72.6	76.2	71.7	69.6	66.5
	<b>21.428</b>	64.6	67.6	76.3	68.4	74.3	72.7	69.2	66.8
	<b>14.285</b>	63.4	66.2	67.1	65.7	68.3	69.2	67.6	65.9
	<b>7.1428</b>	62.1	64.6	65.4	64.7	64.3	65.4	64.7	64.5
	<b>0</b>	60.4	62.1	63.2	62.8	62.5	62.4	62.4	62.1
		<b>0</b>	<b>7.142</b>	<b>14.285</b>	<b>21.428</b>	<b>28.571</b>	<b>35.714</b>	<b>42.857</b>	<b>50</b>
		LENGTH (ft)							

Figure 5. Sound level measurements of Generator inside the designed canopy in open environment.

A qualitative comparison of sound levels of the Generator with and without canopy can be visually appreciated by plotting their sound maps together, as shown in figure 6. The significant reduction in the noise levels, before (upper plot) and after the canopy (lower plot), in figure 6, are clearly visible.

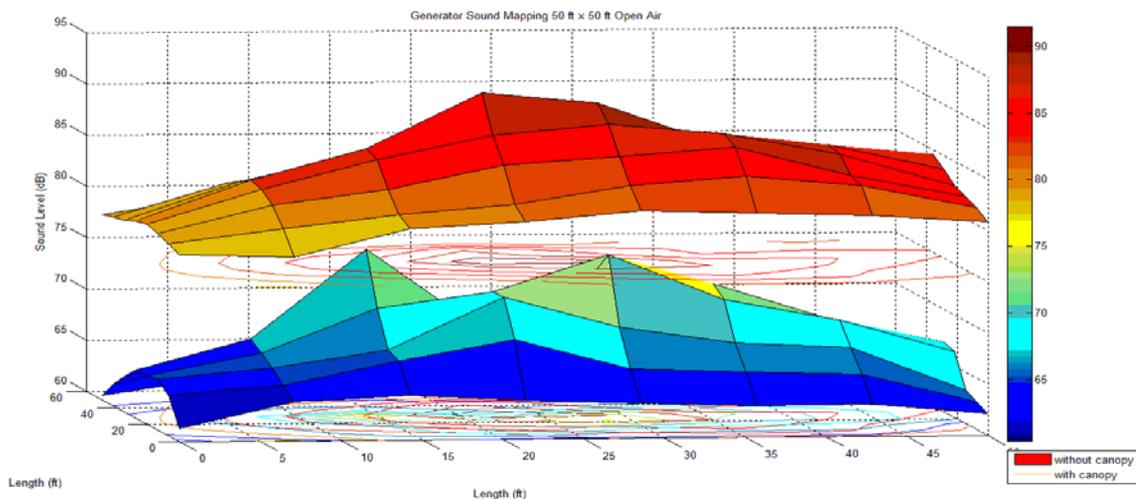


Figure 6. Noise distribution plots for the Generator with canopy (lower) and without canopy (upper)

A quantitative comparison of the sound mapping results can be done in various ways, however, suffice is to show that the maximum and minimum noise levels are both significantly reduced after the installation of Generator inside the canopy. Table 2 shows that about 15 dB reduction in the maximum noise level and more than 17 dB reduction in the minimum noise level has been achieved with the use of designed canopy for the operation of the domestic generator.

Table 2. Comparison of Sound Level for Open Environment (dB)

Sound Level	Without Canopy (dB)	With Canopy (dB)	Reduction (dB)
Maximum	91.5	76.3	15.2
Minimum	77.9	60.4	17.5

The reduction in noise (of about 15 dB) achieved in this project is very significant if the absolute values of noise are compared with the acceptable noise levels depicted in figure 1. It is realized that the domestic generator noise category has been reduced due to the designed canopy from 'Very Loud' to 'Moderately Loud'. This reduction in noise category thus gains importance in localities where legal noise limits may not allow operation of domestic generators with 'Very Loud' categories and only allow for lower noise category generators.

To ensure that the temperature of the Generator inside the canopy does not go beyond safe limits, figure 7 shows that the steady state cylinder head temperature which is achieved at maximum temperature of 220 °C. Expectedly, this temperature is little more than the generator head temperature without the canopy. Thus, the comparison of the two temperature histories of cylinder head indicates the suitability of heat transfer model for fan selection and effective heat transfer.

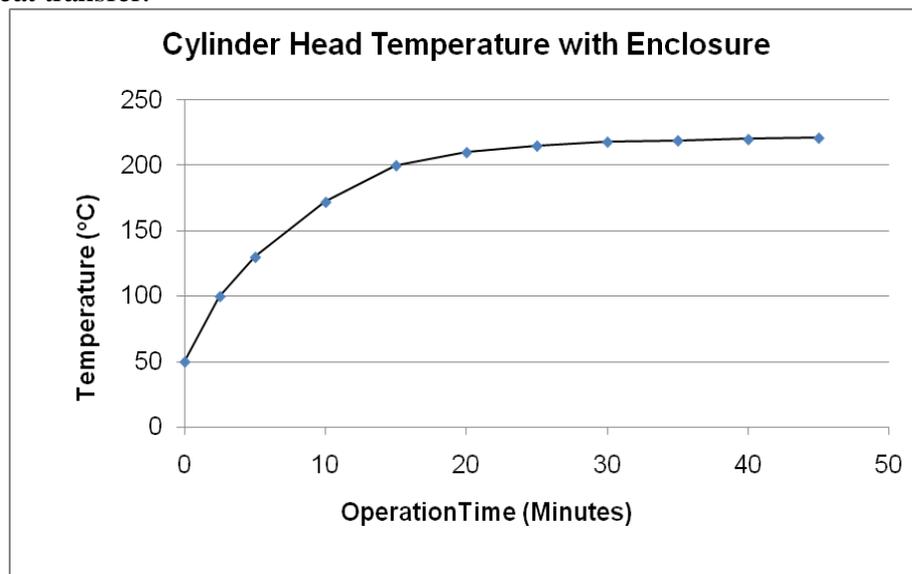


Figure 7. Cylinder Head Temperature history when generator is inside the Canopy

## Conclusion

In this study, an effective noise control methodology has been applied in the design of sound proof canopy for the use of domestic Generators. Heat transfer calculations play equally important role in this design where enhanced cooling requirement in the enclosed spaces for the generator is inversely proportional to the noise control methodologies. Therefore, an appropriate balance between the two opposing requirements is an essential step in such designs. The successful implementation of the design in this study has demonstrated the effectiveness of sound proof canopy for the domestic Generator by lowering its noise category from 'Very Loud' to 'Moderately Loud'.

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# CONTEXT AWARE MOBILE COMPUTING AS A CHALLENGE FOR DEVELOPERS AND SOFTWARE ENGINEERS:A REVIEW

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## Abstract

The trend of mobile computing has entered the society like rapidly flowing water. Almost every person wherever he is present, is getting benefits from it while working, studying, traveling or even for enjoyment. Due to this great demand of mobile computing there are some challenges such as context-awareness for the developers and the software engineers who are greatly concerned with the satisfaction and ease of their customers. The context aware mobile computing has gained an increasing recognition and is one of the emerging technologies for the mobile devices of next generation. This is a review paper in which we have generally discussed some of the issues of mobile computing with respect to software engineering and specifically we have reviewed some issues and problems of context aware mobile computing for developers as well as software engineers.

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**Keywords:** Mobile computing, Context aware, Software engineering

## Introduction

Mobile computing is gaining wide acceptance because of the fast improvement in wireless communication technologies. This has led to an increase in the requirement for mobile information access (Mandi Gobindgarh & Abhishek Kumar Gupta 2008). Mobile computing means that the users can access information and collaborate with others by using portable (mobile) computing devices. These devices may include tabs, Laptops, PDA's, smart phones and other handheld devices. Mobile computing environment is distributive, where we have mobile hardwares (mobile devices) as clients having mobile softwares in them and information systems (e.g; satellites, internet etc) as servers. Mobile computing devices use wireless technologies such as Wi-Fi, LAN, MAN and GPRS etc (K. Asha & Vallikkanna 2008).

One challenge in mobile distributive computing is to make use of changing environment with a new group of applications that are conscious of context in which they run. The context aware system adapt itself according to the collection of people around, accessible devices and changes to these things over time. So a context aware system provide suitable service or content to users by making use of contextual information without too much user interaction (Sangkeun Lee, Sungchan Park, & Sang-goo Lee 2009). Different authors have identified different issues related to mobile computing such as creating user interfaces accessible to differently-abled users, Handling the complication of providing applications across many mobile platforms, designing context-aware applications and specifying requirements ambiguity (Josh Dehlinger & Jeremy Dixon 2011). Some authors have focused on context awareness issues like Architecture Style of context aware systems, its performance, Historical Context Data & User Behavior, Privacy Protection were identified. Some imaginary scenarios were also proposed which should be considered as a future of context aware mobile computing (Sangkeun Lee, Sungchan Park, & Sang-goo Lee

2009 ). In the area of mobile computing, the goal of applying context is to make the device capable to offer better services to people by providing the context information that is available (Li Han, Salomaa Jyri, Jian Ma & Kuifei Yu, 2008 ). Issues related to main components of context aware systems such as Context Acquisition, Context Representation etc were discussed by different authors (Nazir Malik, Umar Mahmud & Younas Javed 2007). According to some authors context-awareness framework can be appealing as in mobile environments context changes gradually over time and space (Yaser Mowafi & Dongsong Zhang 2007).

In this paper we have generally discussed some of the issues of mobile computing with respect to software engineering and specifically we have reviewed some issues and problems of context aware mobile computing for developers and software engineers. The remainder of this paper is organized in literature review, analysis, results and discussions and finally conclusion and the future work.

### Literature Review

The growth of computing platform has outpaced the software engineering work adapted to mobile application development (Josh Dehlinger & Jeremy Dixon 2011). Mobile device user interfaces (UI) provide a new paradigm for new human-computer interaction sequences that have not been previously explored in research and there were no established UI guidelines present and different mobile platforms (Android, Windows 7, etc.), differing hardware manufacturers for platforms (e.g., Android versions on HTC, Google, Samsung) and cellular phone and tablet platforms (e.g., Apple's iPhone and iPad) have necessitated developers to make a chain of the same application modified for each type of device. These features discussed above found in mobile devices are leading towards four main challenges to mobile application software engineering such as creating user interfaces accessible to different users, handling the complication of providing applications across many mobile platforms, designing context-aware applications and specifying requirements ambiguity.

Agent oriented software engineering can be used for mobile application software engineering which can improve the design of context-aware applications but different authors find that many service scenarios assume too ideal situation (e.g. an agent knows everything about every user). RELAX is a medium of expressing environmental and behavioral ambiguity for the behavior of dynamically adaptive systems (Josh Dehlinger & Jeremy Dixon 2011 ). In RELAX requirements are partitioned to those that are invariant (i.e., requirements that must always be satisfied) and variant (i.e., requirements that may be partially satisfied). For each variant requirement, the RELAX process documents what environmental changes can affect the requirement and how the requirement can be partially satisfied. This approach extends the traditional shall requirement to document the uncertainty and how the application can adapt in the face of uncertainty to still deliver some functionality. When combined with an agile approach, it would provide better requirements structure and improve analysis and satisfaction of non-functional requirements in mobile applications when the environment/context changes. History of context awareness has described technical issues of context aware systems. Review was performed by different authors in which they find that many service scenarios assume too ideal situation (e.g. an agent knows everything about every user). By keeping these things in mind seven realistic service based scenarios were proposed (Sangkeun Lee, Sungchan Park, & Sang-goo Lee 2009 ).

#### A. Historical background of context aware systems

Context aware systems history is from 1994 to 2008.

- Evolution of Context: Context definition was location only first time then it refined to location, time, identity and environment. In 1998 emotional status also become the part of

context elements. In 2000 context was further refined to be called an information that can be used to describe the situation of entities that are considered appropriate to the communication between a user and an application, which includes the user and the application themselves.

- Context Aware Systems And Applications: These applications can be general and specific. Context aware system represents context data, gather and manage context data and do service matching. It includes:

- Location aware systems and domain specific applications: In 90's first location based service system was developed and that was the time when there was limited types of context data supported by context aware systems such as tour-guide, shopping assistant etc.

- Context aware frameworks: In 2001, Context Toolkit was developed that can be used as reusable software components for accessing and interpreting context data. Then in 2002 hydrogen framework was developed. Both these frameworks had peer to peer architecture.

OWL (Web Ontology Language) was also designed for the Semantic Web, but many context-aware systems used OWL as the context-model. It had performance problems. CoBrA was agent based context aware system which has centralized context broker which maintains and manages the shared context data. Using it users can define privacy policy for their identity protection. Another architecture called context fabric also provide privacy protection facility to users while getting context information. SOCAM (Service-Oriented Context-Aware Middleware) was similar to CoBrA, because it also aims to build a middleware for context-aware services and uses OWL to model its context. SOCAM had upper ontology and domain-specific ontologies. CocA was another framework that uses ontology approach and database approach to manage context data. These two approaches ,loading only relevant data according to heuristics and good performance made it acceptable to many context aware systems. Different research issues such as architecture style, performance, historical context data & user behavior, and privacy protection of context aware systems were identified. Architectural styles were peer to peer and centralized server architecture (Sangkeun Lee, Sungchan Park, & Sang-goo Lee 2009 ). Context can be divided into social, physical and internal context (Li Han, Salomaa Jyri, Jian Ma & Kuifei Yu, 2008 ).

- Physical context is the real world around user; it includes the physical things like building, computer etc.

- Internal context describes the abstract things related to people like thought, action, feeling, task, interest etc.

- Social context describes the social surrounding of users i.e. social relationship. It includes people related to user. Every kind of context information can belong to either past, current or future context.

Context information can be proposed by user as when registering for a website. Context information can be provided by mobile handheld device like mobile phones, or by sensor devices which are installed on specific location. In the area of context, location is most important information which belongs to physical context. The most widely used location-sensing system GPS (Global Positioning System). GPS does not work well indoors because signal strength is often too low to penetrate in buildings. RADAR system can localize a laptop in building within 2-3 meter location using finger prints from four 802.11 access points. There are many other indoor location systems which use ultrasonic and infrared technology, but extra hardware infrastructure installation is required for them (Li Han, Salomaa Jyri, Jian Ma & Kuifei Yu, 2008 ).

#### B. Service scenarios of Context aware Systems

Author also proposed seven context aware service scenarios. so that these aspects should be focused while making practical context aware systems (Sangkeun Lee, Sungchan Park, & Sang-goo Lee 2009 ).

- Collaboration among devices: PDA rings and asked the user whether to prepare ice coffee or not. On saying yes the coffee pot in room starts to make iced coffee. The U-home terminal notified the user that the iced coffee is ready. It is concluded that there is a functional collaboration between multiple devices. A context-aware system should consider device substitution for services (If user has cell phone instead of a PDA, participating devices could be changed for the same service).
- System should use information from external sources: U-home management terminal rings and gives weather forecasting information from the website that it will rain today. So it is concluded that the system should be able to use information from the external sources e.g; web sites, web services, etc.
- Recommendation based on User's Schedule: User puts reminder about event on the calendar application on PDA. System should remind the user and give him suggestions for travelling e.g; about trains, buses so that he can reach at the event place safely and timely.
- System should catch the changing information: Context information such as location of bus keeps changing rapidly so context-aware systems should be able to catch up the rapidity of changing information.
- Automatic Environment Setting and feedback: System should maintain e.g; suitable temperature for sleeping and plays a calm music. The system should ask different questions from user like "Did you sleep well? Yes / No" and use these answers as a feedback for later services.
- Cooperation among devices: For example at the conference room the brightness of room should be adjusted by the system automatically for the presentation and Listeners can automatically see the slides through their PDA or other portable devices automatically. The system should support devices to make an ad-hoc network without a centralized server to achieve availability of the system.
- Using legacy database information: Context aware system should use legacy system's database as context-data and give this information to the user by physically sensing his presence on the system. e.g; User sits on the system to apply for graduation. The system recognizes him and show him the application deadline by getting information from the university database and suggest him to visit department office.

The existing context-awareness applications can be of three types (Li Han, Salomaa Jyri, Jian Ma & Kuifei Yu, 2008 ).

- Intelligent space that presents an ideal vision of future life where the device would be disappearing but service would be ubiquitous.
- Providing information based on context represents intelligence of service that will change the way of using Internet from people looking for information to information looking for people .e.g. Tourist guide is one of the example.
- Mobile context sharing application that make the communication between people easy.

Many services of internet can get better through context aware mobile computing by improving intelligent features e.g. Q&A service. In current websites of Q&A as Ask Yahoo!, people look for questions which they can answer(Nazir Malik, Umar Mahmud & Younas Javed 2007). Depending on the knowledge people can answer only a part of questions. Much time and energy can be saved if questions can look for people who can answer the question instead of people looking for questions. Following are some differences that this concept has from the work done previously (Li Han, Salomaa Jyri, Jian Ma & Kuifei Yu, 2008 ):

- Context of all the questions will be fully considered
- To know the user well all the related context information of every user including question and answer will be analyzed and stored.

- People closely related to the question will be actively looked by the service thinking that they can answer the question according to their history.

So the context-aware Q&A will provide the answers quickly to the people who ask question and also increase the efficiency of people answering the question by making use of context information. There are five main components of context aware systems such as Context Acquisition, Context Representation, Context Storage, Context Interpretation and Context Adaptation (Nazir Malik, Umar Mahmud & Younas Javed 2007). Context acquisition deals with sensing the contextual data through sensors built into the mobile devices and present in the environment and gathering the contextual data by the acquisition modules of the context-aware systems. The acquired raw data is then represented in a standard format for sharing the data. The issues in context representation are :

- Representation Schemes should use standard schemes and if are they not used then there must be some context transformation mechanisms to translate contextual data between the standard formats.
- Identities of the context-aware systems involved in inter-communication require to be authenticated earlier than starting exchange of data.
- Exchange of data should be secure from the malicious objects requiring confidentiality. Communication can be established using public or private cryptosystems.

The context data is then stored into the context aware device which allows the system to keep a history of context that is used to identify preferences of the entities (users, smart phone network companies). Issues of Context data storage are that:

- It requires a plenty of memory and fast retrieval mechanisms to achieve memory related efficiency.
- The old context data must be removed but its effect should be maintained (Little information must be present). Preferences should be maintained in quantitative format.
- History must be there to predict the context data in the absence of sensor data.
- Contextual data should be stored in encrypted form at storage areas to keep away from exposure to unauthorized entities. Encrypted data is shared among the participants in areas of high risk.

Context data is then interpreted and implications are reasoned which provides instructions for adaptation process and applications. The interpreted contexts provides information about 'What', 'Who', 'Where' and 'When' contexts e.g; to identify the best service available it must be according to the preference of the user, to identify the best route, the context of the intermediate environments on the route should be interpreted. Research issues in interpretation process are :

- The interpretation should consider the user mood and preferences (predicted through history) before adaptation.
- The context-aware systems should interpret the context on the basis of their scope e.g; a context-aware laboratory should gather contexts of all people working on different experiments.
- Interpreted context should be reasoned to deduce implications e.g; if the context of a scholar engaged in research activities is busy for the past two hours then it may deduce that the scholar desires a break. Reasoning is the basis for the discovery and adaption of services.

Context adaptation uses decision making techniques to help the users in his daily tasks. It discovers the Service for the user on the basis of load and cost as element of their context preference. The selected service is then delivered to the user through the mobile devices. The delivery process selects an interface that is well-matched with the participating devices. The contextual data is used to adapt the service behavior and the device behavior. Context adaptation can be event-based or event-less. Event-based adaptation is carried out

when an external event occurs. Eventless adaptation is carried out in the absence of external event when internal reasoning recommends adaptation of services. More focus has been made on extracting and acquiring context from the surrounding environment and less effort has been made on finding out how to develop context-awareness within mobile computing globe. One of the approaches to build a conceptual framework for context-awareness in mobile computing is the user-centered approach. The misinterpretation or ambiguity in the set of collected context data that is captured by context-aware systems has been brought in notice by many researchers. An alternative approach addresses those concerns as following (Yaser Mowafi & Dongsong Zhang 2007):

- The integration need implicitly means that which context-aware systems will proactively provide the users with awareness behaviors and explicitly means the direct input through end users'. We argue that traditional dependency on the sensor-based context acquirement is reduced with such integration .
- Context-awareness should be interpreted from the user's perspective to enable a context-aware system to capture some of the contextual information that is already abstracted by the user themselves instead of completely relying on the system to gather the user's actual context.

Integration of user context with physical context is the need that is emphasized by the relevancy of context to user's interaction with the mobile devices. User centered context-awareness approach would reduce the erroneous inference of users' relevant context. It is composed of user context profile, context information manager, dialog manager and context-awareness service manager.

### **Analysis**

Research methodology we have adopted includes the review of some research work done by different researchers in mobile computing and context awareness. The review of related work reveals that the context aware UI design is difficult and mobile application developers must foresee the targeted device e.g; Apple devices are restricted to two sizes based on the size of the iPhone and the iPad while Windows 7, Android, and Blackberry offer screens of varying sizes and screen resolutions. Developers should consider Shneiderman's guidelines that can be easily translated to mobile devices such as enabling regular users to use shortcuts, designing dialogs to yield closure, offering informative feedback and supporting internal locus of control. Developers should use software product line engineering approach for mobile applications to save development time and cost. This approach may be appropriate to mobile application software engineering in that it would give confidence to developers to proactively focus on what the common requirements, design, resources, etc. to the development of a mobile application across different OS platforms (e.g., iOS, Android, etc.) or hardware platforms (e.g., HTC, Samsung, Google, etc. for the Android OS). Researchers should look to how SPLE can be specifically modified for mobile application software engineering to avoid duplicating early software engineering work and assets (K. Asha & Vallikkanna 2008).

Developers should consider context-awareness as a first-priority feature in mobile application software engineering to design better context-aware applications. Agent oriented software engineering can be used for mobile application software engineering which can improve the design of context-aware applications but different authors find that many service scenarios assume too ideal situation. (e.g. an agent knows everything about every user) (Josh Dehlinger & Jeremy Dixon 2011 ). The dynamic, contextual nature of mobile application content (e.g., location-based applications) allows for cases in which the application's behavior may not be able to completely convince the specified functional and non-functional requirements so in this case it is better to provide old content (i.e., content based on a

previous location) instead of displaying an error message (e.g; due to low battery, GPS sensor disabled, etc.) or no response from the application. As mobile applications become more context-aware, self-adaptive requirements should be integrated into agile development so that developers more thoroughly consider the behavior of an application when its full requirements cannot be fulfilled dynamically and how it may self-adapt to partly satisfy the requirements. All the context information cannot be obtained easily, particularly the internal context information such as context information of people emotion. Context information that is obtained is not always fully utilized. As for mobile application, the knowledge in the mind of people is important but it is impossible to let that be expressed explicitly. Previous and current context information can be used to gather such context information (Li Han, Salomaa Jyri, Jian Ma & Kuifei Yu, 2008 ).

User Authentication and standard context aware representation is an important issue. In addition to this Context aware information must be provided to the user according to his preference and must be according to the scope, not outside the scope. Context aware architectural style must be according to the requirement of the system such as Peer to peer and central server. Different devices support heterogeneous data that was also the main issue of context aware systems (Mandi Gobindgarh & Abhishek Kumar Gupta 2008). Software engineers and developers must address Performance issues which arise If there are many users to approach for the same context data. The increased number of sensors also effect the system performance so these issues must be kept in mind while designing the context aware system (Josh Dehlinger & Jeremy Dixon 2011 ). By analyzing user behavior log, the system should automatically suggest a new service to service provider. System should be able to protect user's private information from the illegal accesses (e.g. "my mailing address and current location should not be accessible to other users"). In context-aware mobile computing one of the important problems is to balance the relationship between acquiring context and protecting privacy (Yaser Mowafi & Dongsong Zhang 2007).

### **Results and Discussions**

From the above analysis done by reviewing some of research work done by different researchers in mobile computing and context awareness we have highlighted some of the issues faced in the area of mobile computing and context awareness. The section also presents some guidelines for software engineers and developers in the area of context aware mobile computing. The results are presented in table 1.1 as given below.

Table 1.1 Challenges in context aware mobile computing and guidelines for developer and software engineers

<b>Issues /Challenges in context aware mobile computing</b>	<b>Guidelines for developers and software engineers</b>
Inferring context information.	Context information can be inferred from complete location information so researchers must do research on location information mining
Difficult to sense internal context.	Use methods that allow users submit internal context such as nicknames used by users.
Time and accessibility.	Information should be delivered to the most accessible device of user's context and timely delivery of data is also the important aspects which the context aware system should have.
Improvement and efficiency in service.	Internet services can get better through context aware mobile computing by improving intelligent features
Lack of automatic means of inferring information.	Computers should be improved to gather context and deduce it, the increases in richness of communication in human-compute interaction results in a more powerful and more useful computational environment.
Complexity in context acquisition due to gradual change of context over time and space in mobile environments.	Developing a context-aware system based on the framework can decrease the complexity related to the traditional context acquisition approach that is mainly based on the sensor-based structure, by influencing users' natural dialogue with value-added services of mobile computing that are currently available on most mobile devices e.g. GPS or messaging services. For the successful design, development, evaluation and deployment of context-aware artifacts such simplification is very important.
Insecurity of users regarding context aware applications.	User's privacy, authentication, his required data preference and scope of the required data should be kept on the top priority while developing and designing the context aware software.
Reusability and development process of context aware software.	Context aware software's must be developed through mature SDLC having reusability as its core and reusability must be done carefully and it must save development time and effort.

### Conclusion and Future Work

Mobile computing is gaining wide acceptance because of the fast improvement in wireless communication technologies. The aim of context-aware computing is to make the mobile devices smarter by enabling them to recognize and understand the surrounding environment and also react intelligently. But still the design, development and deployment of

the artifacts of context-aware mobile computing are in its initial stages as the existing research in this area has not gone beyond restricted research laboratories or are in proof-of-concept stage. Due to the great demand of mobile computing there are some challenges such as issues related to context-awareness for the developers and the software engineers who are greatly concerned with the satisfaction and ease of their customer. This is a review paper in which we have generally discussed some of the issues of mobile computing with respect to software engineering and specifically we have reviewed some issues and problems of context aware mobile computing and suggested some guidelines for developers as well as software engineers.

Future context aware computing environment could consider realistic scenarios such as collaboration among devices and it may give recommendation to user based on user's schedule, provides information to user by using legacy database information and automatically sets the environment according to user requirement and use his feedback to improve its services. The issues in context representation and context data storage should be considered and research should be done on the interpretation process of context aware systems.

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# IMPACT OF EMPIRICAL PATH LOSS MODELS ON SPATIAL TV WHITE SPACE UTILIZATION

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## Abstract

Regulatory bodies have called for alternative spectrum management models and techniques that would allow efficient utilization of the TV white space since the proposed cognitive radio technique may not be realized in the nearest future. For effective utilization of the spatial TV white space, and coexistence between the primary and secondary users, a reliable prediction technique is required to accurately estimate the service contours of the primary users. In this article, we present the effects of empirical path loss propagation models in predicting the TV service contour using optimized model which is based on measurements of path loss in the study area and other conventional models such as the ITU-R, COST 231, HATA, Egli and CCIR models. Results of simulations show that measured path loss models' prediction deviates significantly from the other models that provide large protection zone around the primary cell and, thus reduce the spatial utilization of the spectrum. It was also found that the -114 dBm FCC rule for empty white space is highly conservative and significantly affects the availability of the white space.

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**Keywords:** TV white space, path loss models, service contour, protection contour, cognitive radio

## Introduction

Spatial TV white space represents geographical locations where there is no TV signal and the broadcasting frequency can be used for secondary purposes without causing any interference to the performance of the TV broadcasting in the remaining areas and other incumbent services anywhere [1]. Technically, this represents locations where the signal level is less than -116 dBm for digital TV (DTV) and -94 dBm for analogue TV [2].

Although, FCC defined -114 dBm as the criteria of the empty spaces for TV white space. Developed countries like USA have conducted analytical studies of the white space and its management and, also, determined what kind of services could reuse the white spaces. The idea of deploying cognitive radio networks to utilize the available white spaces in developing countries like Nigeria may not be realized in the nearest future, and hence, the call for alternative methods and techniques for exploiting the underutilized spectrum. In view of these, recently, researchers adopted the conventional propagation models to predict the TV coverage and keep-out distances and consequently the white spaces for safe and peaceful coexistence between the primary and secondary networks. The service area (TV coverage) of a primary user will however depends on the transmit power, height, operating frequency and propagation characteristic of the area. Several models have been employed by researchers to predict these service contours. The general trend is that, field strength vary with distance, this

is true in some cases but most of the wireless devices operate in a complex environment and this makes accurate modelling of the actual environment difficult. It is expected that prediction errors will be high when these models are deployed in a different environment for which the model was not intended since the models are not restricted to the environment to which they were built for. This makes the models not too accurate when applied for another environment. It has been proven that, the most widely used empirical models developed are not compatible with the tropical regions in Nigeria. For example [3][4] provide error bounds for nine widely used empirical models based on measurement conducted in Kwara State, Nigeria. The work concluded that no single model provides a good fit consistently, however the Davidson model gives better performance amongst the models used. The work presented in [5] provides an optimized Davidson model in which minimal errors were achieved. In this work, the effect of empirical path loss propagation models in predicting the TV service contour is presented. In the work, an optimized model which is based on local measurement conducted in Kwara State, Nigeria and the Hata, COST231, ITU-R 5293, ECC, Egli and CCIR models were used to predict the service contour (coverage distance) of primary users.

**System Model and Simulation**

Consider a licensed primary transmitter (TV Broadcast system) mounted on a tower with height,  $h_{T(m)}$ , transmitting with power,  $P_T$  (kW), on UHF band as shown in Fig 1. The secondary user can reuse the same frequency near the cell border of the primary user if it meets the required condition specified by FCC for empty white space. The TV service contour is the TV service area which is within the grade B contour, i.e. where received signal strength for channels 14 through 69 exceeds 64 dBu and 41 dBu for analog and digital TV systems respectively. The service area is illustrated in colour blue. These contours are calculated in accordance with specific procedure described in Section 73.622 and 73.625 of the FCC Rules and Regulations [6].

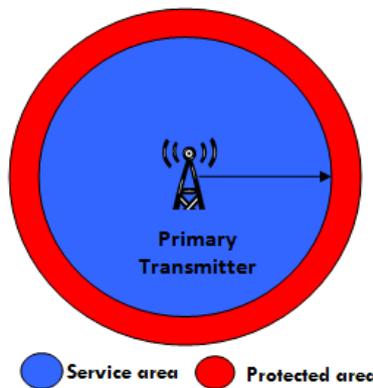


Fig. 1. TV service and protection contour

In order to have safe coexistence between the primary and secondary users, the incumbent TV services must be protected from excessive interference from the secondary transmitter. For such protection to be guaranteed, the secondary users must be located outside the contour of the TV transmitter for a minimum distance (keep-out-distance) as described by FCC [7] (see Table 1). Fig 1 shows the protection radius in RED. Therefore, it is necessary to know the service contour of the primary user for effective utilization of the white space.

TABLE 1 FCC RULES ON REQUIRED SEPARATION DISTANCES [8]

Antenna Height of Unlicensed Device	Required Separation [km] From Digital or Analog TV Protected Contour	
	Co-channel	Adjacent channel
Less than 3 meters	6.0	0.1
3 - Less than 10 meters	8.0	0.1

10 - 30 meters	14.4	0.74
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**Results and Discussion**

In the first scenario, we consider a lower power 150 m height primary transmitter operating on channel 21 (470 MHz). Fig 2 shows the coverage level for the model described in Fig 1. FSPL, COST 231, Hata, ITU-R, ECC, CCIR and optimize model (measured) were used in the simulation.

Considering the ITU regulation of 41 dBu for service contour for digital TV systems, the minimum received signal strength was found to be -87.46 dBm. This value is obtained using equation (1). Now, if this threshold is put into considerations, we can see that the estimated coverage radius for the DTV transmitter is 95 km, 60 km, 38 km, 33 km, 31 km, 18 km and 26 km for Egli, ECC, ITU-R, Hata, COST 231, CCIR and measured respectively. Meaning, other models except for CCIR model over estimate the service contour.

$$P(\text{dBm}) = E(\text{dBu}) - 130.8 + 20 * \log_{10}(615 / f_{mid}) \quad (1)$$

where,  $f_{mid}$  is the channel mid frequency in MHz.

TABLE 2 SIMULATION PARAMETERS

Parameter	Values
Center frequency of DTV Transmitter	CH 21 (470 MHz), CH 31 (550 MHz), CH 41 (630 MHz), 51 (710 MHz) 60 (782 MHz)
Transmit power of DTV Transmitter	1, 2.5, 5, 10, 100 kW
D/U ratio at noise-limited contour	15.5 dB
Field strength at grade B contour	41 dBu
Path Loss model	COST 231, HATA, ECC, Egli, CCIR, ITU-R and Measured model
Height DTV receiver	10 m
Path loss exponent (n)	2.8
Height of DTV transmitter (m)	100, 150, 200, 300, 400, 500 m

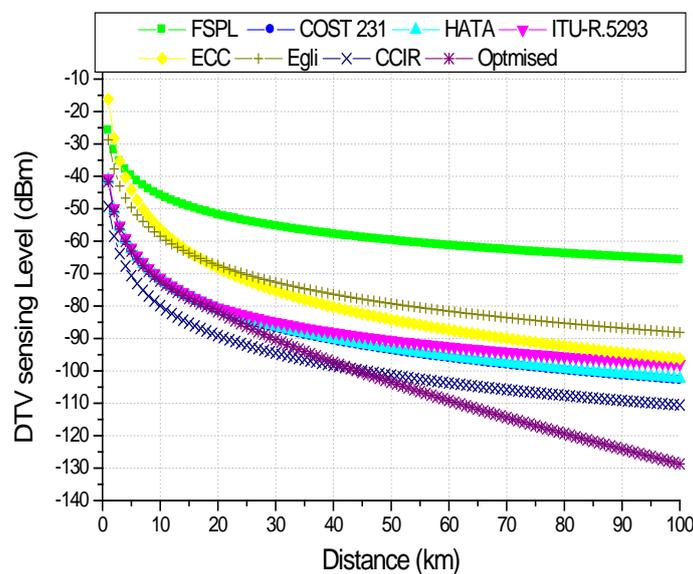


Fig 2. Received signal strength with distance for optimized and other models for 1kW 150m 470 MHz antenna

The models provide a large protection zone around the primary cell and hence reduce the spatial utilization of the spectrum. In the other hand, CCIR model under-estimates the service contour and consequently, lower the protection zone. This in turn maximizes the spatial white space but transmission of secondary users will degrade the QoS of the primary

system. Knowing that the optimized model has impact on the DTV service coverage, we further investigate how frequency could possibly affects the availability of the white space. In this scenario, operating frequencies were randomly selected from the UHF band; Table 2 shows the simulation parameters used. Fig 2 provides plot of DTV service contour with distance for channels 21 (CH 21), CH 31, CH 41, CH 51 and CH 61.

TABLE 3DTV SERVICE COVERAGE FOR OPTIMIZED AND OTHER MODELS FOR 1kW 150m TRANSMITTER FOR 41 dBu COVERAGE LEVEL LOW POWER TRANSMITTER

Path Loss Model		HATA	COST 231	ITU-R 5293	Egli	ECC	CCIR	OPT
DTV service Coverage (km)	CH 21	32	33	38	61	95	18	27
	CH 31	31	31	37	61	97	18	26
	CH 41	30	29	36	61	98	17	26
	CH 51	28	27	35	60	98	15	25
	CH 60	26	125	34	60	98	14	25

TABLE 4 DTV SENSING LEVEL FOR OPTIMIZED AND OTHER MODELS FOR 100 kW 150m TRANSMITTER FOR 41 dBu SENSING LEVEL FULL POWER TRANSMITTER

Path Loss Model		HATA	COST 231	ITU-R 5293	Egli	ECC	CCIR	OPT
DTV service Coverage (km)	CH 21	141	147	265	192	-	80	57
	CH 31	137	137	269	192	-	77	57
	CH 41	133	129	274	192	-	75	56
	CH 51	130	122	282	192	-	74	55
	CH 60	127	117	191	192	-	72	55

Tables 3, 4, 5, 6 and 7 show the DTV coverage distance for the optimized model and the conventional models. Table III provides coverage distance for lower power transmitter for channels 21-60 using seven empirical path loss models. In this work, 41 dBu service criterion was used. For CH 21, the minimum signal strength using the criterion is -87.46 dBm. The optimized model predict the coverage radius as 27 km. Hata, COST 231, ITU-R, Egli and ECC models over-estimate the radius by 5 km, 6 km, 11 km, 34 km and 68 km respectively. In the other hand, CCIR model under-estimates the coverage distance by about 9 km. For Ch 41 the threshold value is -90 dBm this decreases the coverage radius for all the models. Hata model gives results that are closer to the measured model. But for the fact that prediction error for Hata becomes more, when the transmission exceeds 20 km, the height may not be the limiting factor since is still within the validity range.

TABLE 5DTV COVERAGE LEVEL FOR OPTIMIZED AND OTHER MODELS FOR 2.5 kW AND FIXED TRANSMITTER HEIGHT OF 150m AT 41 dBu SENSING LEVEL LOW POWER TRANSMITTER

Path Loss Model		HATA	COST 231	ITU-R 5293	Egli	ECC	CCIR	OPT
DTV service area (km)	CH 21	43	45	55	77	130	24	32
	CH 31	41	42	54	77	132	24	31
	CH 41	40	39	53	77	134	23	31
	CH 51	39	37	53	77	130	20	30
	CH 60	38	36	51	76	128	18	28

Similar results were obtained for full power transmitter except for ECC model which produces the worst case with no result in all the channels as shown in Table IV. This distances covered by the transmitters are the protected distance of the incumbent users or licensed owner and no TVWS devices must transmit or operate within this territory. When 15.5 dB D/U (desired –to–undesired) ratio rule is applied, the coverage distance increase from 32 km to 57 km for CH 21as shown in Tables V and VI. This implies that, the protection margin will increase and subsequently decrease the availability of the white space. However the coverage distance increases furthermore when FCC rule of -114 dBm for empty white

space is used. The protection margin increase by about 48 km as shown in Table 7. This shows that the FCC rule would surely under-estimate the available white spaces for secondary use.

TABLE 7DTV SENSING LEVEL FOR OPTIMIZED AND OTHER MODELS FOR 2.5KW 150m FIXED TRANSMITTER HEIGHT AT -144 dBm SENSING LEVEL

Path Loss Model		HATA	COST 231	ITU-R 5293	Egli	ECC	CCIR	OPT
DTV service area (km)	CH 21	311	324	-	351	-	176	78
	CH 31	272	273	-	324	-	154	74
	CH 41	242	235	-	303	-	137	71
	CH 51	230	215	-	285	-	122	68
	CH 60	210	195	-	263	-	105	65

## Conclusion

In this article we have shown that a reliable prediction technique is required to accurately estimate the service contours for effective utilization of spatial TV white space. It was found through simulation that, when considering -114 dBm FCC regulation of empty TV white space, the service contour increases from 69 km for low power transmitter (1kw) to 112 km for high power transmitter (100 kW). It was also found that there where divergence in coverage prediction between the measured model and the conventional models. Therefore transmit power and heights of the TV transmitter would in the same way affects the service contour, which will ultimately affect the availability of the white space.

## Acknowledgement

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## MICROMEAS PERFORMANCE BASED IN ARGON- ISOBUTANE AND ARGON-DEMETHYL-ETHER

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### Abstract

MICROMEAS (MICROMesh GAs Structure) detector which is among the major families of position detectors in High Energy Physics, introduced in the late sixties, detects and localizes energy deposit by charged particles over large areas, is widely used in particle physics. This detector is in a sealed in which mixture gas circulates. This mixture usually based, on a noble gas and a few proportions a "quencher". In this paper, we use  $^{55}\text{Fe}$  source that produces X-ray photons of 5.9 keV and a mixture gas on Argon (Ar) with quencher as isobutane ( $\text{iC}_4\text{H}_{10}$ ) and dimethyl-Ether. We will present the results of the MATLAB simulations of MICROMEAS performance taking into account all the processes from the primary ionization, the distribution of charges in the electrodes and the electron avalanche amplification (first Townsend coefficient and amplification gain). All the simulated results obtained indicate that the performances of the detector depend on many parameters. The simulation results are nearly consistent with the data that are published in other references, and provide important information in the MICROMEAS design, making and operating. Our simulation predicts that further improvements are still possible for give a best spatial and temporal resolution for a MICROMEAS detector.

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**Keywords:** MICROMAEGAS, Gas mixture, X-ray Source, Primary Ionization, Avalanche phenomenon, MATLAB Program.

### Introduction

A lot of effort has been invested in the development of the Micro strip Gas Chamber (MSGC) [1] in order to be used as tracker for the LHC project. This technique allows good localization accuracy and double track resolution. However, it is necessary to operate it with a relatively low gas gain because of the presence of the insulator near the amplification region and because of the fragility of the structure. MICROMEAS [2] is a high gain gaseous detector, which can stand up alone without a need of an additional preamplification. It combines high accuracy, high rate capability, excellent timing properties and robustness. These results were confirmed by a similar structure having wider amplification gap and thicker metallic grid [3].

In this paper, we will present the simulation results of the parameters characterizing the Micromegas detector as; Townsend coefficient and amplification gain at atmospheric pressure and normal temperature, for gas mixtures: (Ar- $\text{iC}_4\text{H}_{10}$ ) and (Ar/DME). These results are compared with measurement results in the literature [4], [5]. The agreement between measurements and calculations has been proved satisfactory. When the simulation program

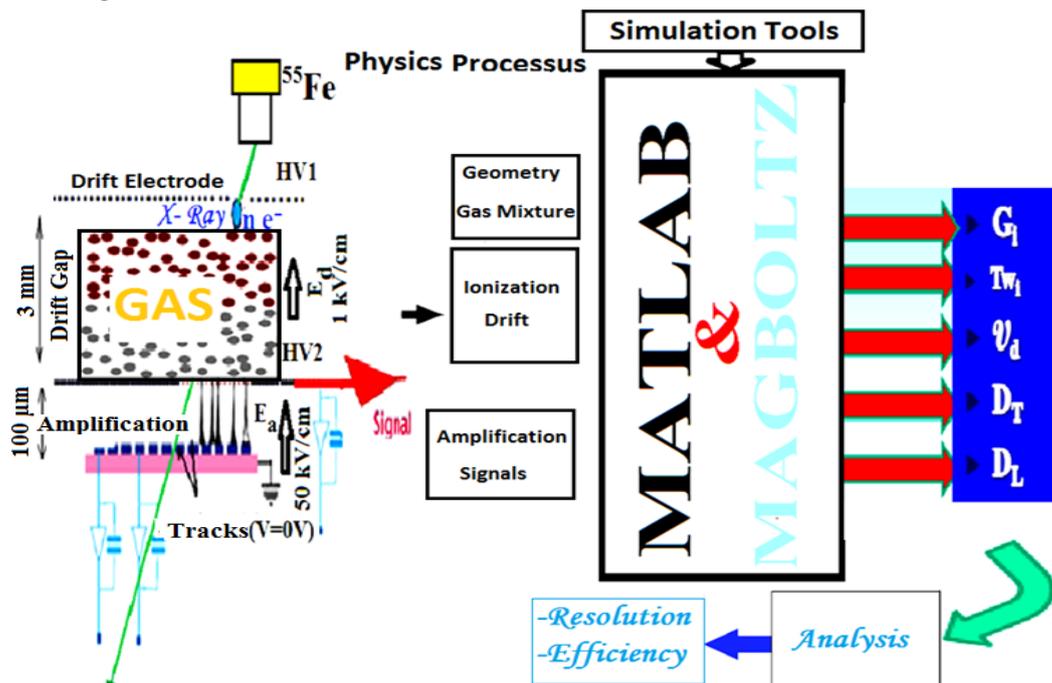
was validated was used to study the influence of various parameters (geometry, gas ...) on the detector's performance. This simulation has been used to optimize detector's performance and understand the detector's response.

**Description, Principle and simulation model**

In more recent design (1985), MICROMEGAS (Micromesh Gaseous Structure) suggests that new higher performance techniques previously developed. It operates on the principle of multi-wire proportional chamber (MWPC), but with better spatial resolution ( $\leq 50$  microns) and a more rapid formation of the signal.

MICROMEGAS is a gaseous detector strongly asymmetric parallel faces. The basic principle is to decouple the drift region of the amplification gap, either by a grid wires, but by a very fine metal grid (3microns thick). The trick lies in the use this micromesh pierced by a multitude of holes (in less than or equal to  $50\mu\text{m}$ ). MICROMEGAS principle is illustrated in figure 1. It consists of a drift gap (3 mm) and a thin amplification gap (100  $\mu\text{m}$ ). The properties of the electric field in two gaps have been studied by MC simulation with Garfield [6].The voltage of drift electrode and mesh is HV2 and HV1, respectively, and MICROMEGAS is operated in gas mixture of Argon-isobutane ( $\text{Ar}/\text{C}_4\text{H}_{10}$ ) and Argon-Dimethyl-Ether ( $\text{Ar}/\text{DME}$ ), at a temperature of 300 K and a pressure of 1 atm. The electric field in the amplification region is very high ( $\geq 40$  kV/cm), and the one in the conversion region is quite low. Therefore, the ratio between the electric field in the amplification gap and that in the drift gap can be tuned to large values.

The MICROMEGAS is based on the planar electrodes. The drift electrode is made from  $5 \times 5 \text{ cm}^2$  500LPI (lines per inch) steel mesh pasted on an epoxy frame, and the same mesh is used as the amplification electrode. The drift gap is also called conversion gap because the ionization of the gas by incoming radiation occurs mainly in it. The field in the amplification gap catches the free electrons from the drift gap to forcefully accelerate them through the small amplification gap. They, then, acquire enough energy to ionize surrounding gas. The newly ionized electrons gain as well as sufficient energy to ionize the gas again and again, thus forming an avalanche and leading to a measurable electric signal on the anode and on the mesh. Figure 1 and Table 1 show the operating principle and some parameters characterizing MICROMEGAS detector.



**Figure 1:** Description, Principle and Simulation Tools used for MICROMEGAS Detector

Input Parametrs	Output Parameters	Geometric Parameters
Drift Field $E_d$	Drift velocity	Amplification Gap(d)
Magnetic Field B	Longitudinal Diffusion	Drift Gap(h)
Amplification Field $E_a$	Transverse Diffusion	Track pitch( $p_p$ )
Gas mixture	Amplification Gain	Width of a track(w)
Temperature & Pressure(NTP)	First Towsend Coefficient	Grid pitch( $p_g$ )
Cross Section of gas	Spatial Resolution	
Amplification Coefficient of gas	Temporal Resolution	
Electron mobility	Efficiency	
X -Ray source	Signal	

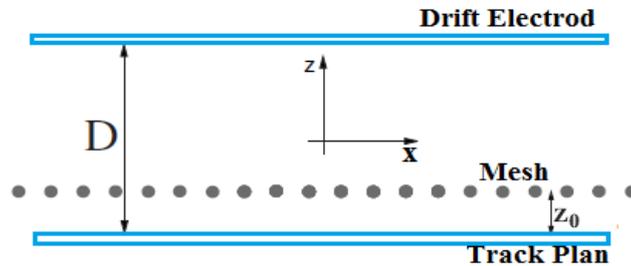
**Table 1:** input and output parameters of MICROMEGAS Detector

**Potential and electric field distribution**

The knowledge of the shape of the electric field lines close to the micromesh is a key issue for an optimal operation of the detector and especially for an efficient transfer of electrons to the amplification gap. The electric field is homogeneous in both the conversion and the amplification gap. It exhibits a funnel like shape around the openings of the micro grid: field lines are highly compressed towards the middle of the openings, into a small pathway equal to a few microns in diameter. The compression factor is directly proportional to the ratio of the electric fields between the two gaps.

**Basic equation**

The mathematic term of potential is often calculated analytically using conformal transformations or Schwartz- Christoffel transformation [7]. Our work is based on the use of Green functions [8]. The configuration that we want to study is presented in figure below.



**Figure 2:** Configuration for analytic calculation potential

After all calculus, considering alls processes, we established the following form of Potential:

$$\phi(x, z) = \frac{V}{\pi} \left[ \arctan \left( \cot \left( \frac{z\pi}{2D} \right) \tanh \left( \pi \frac{x + w/2}{2D} \right) \right) - \arctan \left( \cot \left( \frac{z\pi}{2D} \right) \tanh \left( \pi \frac{x - w/2}{2D} \right) \right) \right] \quad (1)$$

The weithing field is deduced from equation (1) using a scalaire form below

$$\begin{cases} \vec{E} = -\vec{\nabla}\phi \\ \vec{\nabla} = \left( \frac{\partial}{\partial x} \right) \\ \quad \left( \frac{\partial}{\partial z} \right) \end{cases} \quad (2)$$

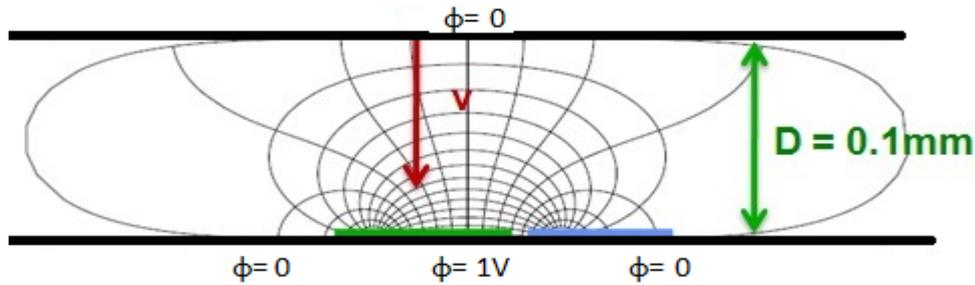


Figure 3: Weighting Potential by applying 1 volt on a track(V=1 V) and 0 volt on other

$$E_x = V \frac{1}{2D} \left[ \frac{\sin\left(\frac{z\pi}{D}\right)}{\cosh\left(\pi \frac{x - w/2}{D}\right) - \cos\left(\frac{z\pi}{D}\right)} - \frac{\sin\left(\frac{z\pi}{D}\right)}{\cosh\left(\pi \frac{x + w/2}{D}\right) - \cos\left(\frac{z\pi}{D}\right)} \right] \quad (3)$$

$$E_z = -V \frac{1}{2D} \left[ \frac{\sinh\left(\pi \frac{x - w/2}{D}\right)}{\cosh\left(\pi \frac{x - w/2}{D}\right) - \cos\left(\frac{z\pi}{D}\right)} - \frac{\sinh\left(\pi \frac{x + w/2}{D}\right)}{\cosh\left(\pi \frac{x + w/2}{D}\right) - \cos\left(\frac{z\pi}{D}\right)} \right] \quad (4)$$

The field lines are determined by the equation:  $\vec{E}(M)\Delta d\vec{M} = \vec{0}$ , figure 4 shows the profile of lines for this equation.

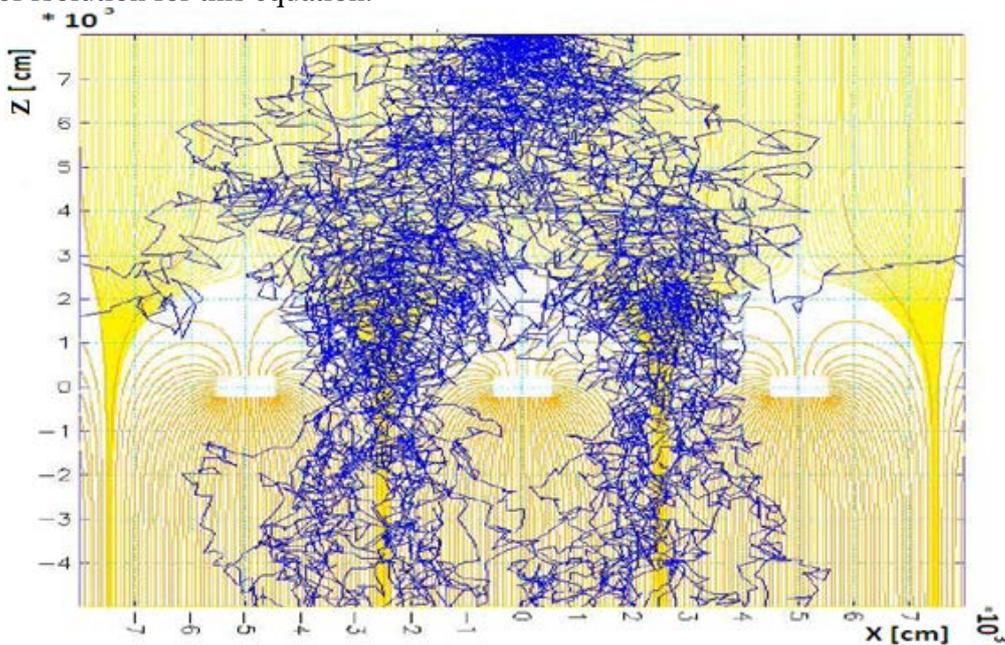


Figure 4: electric field lines in the vicinity of a micro-grid (500 LPI) with MAXWELL 2D-SV and simulated trajectory of electrons with GARFIELD 7.10

### Study of electron avalanche amplification

When electrons are subjected to an electric field more than ten kilovolts per centimeter, they acquire enough energy to ionize the atoms to gas; new electrons are created and will in turn be accelerated. A process chain snaps and gives rise to an avalanche. It is necessary to add the noble gas mixture forming the basis of a certain proportion of poly atomic gases known as quencher.

The effects of this gas acting on the electron transport, it will also play a role in the development of the avalanche. It also will absorb electromagnetic radiation produced during the avalanche. Numerous levels of excitations, rotations and vibrations will enable it to absorb photons and thus limit the development of the avalanche. This stabilizes the operation of the detector and limits the development of avalanche process leading to a divergent and a hamstring problem. On the other hand, the energy radiated during the collection of ions on the cathode which could cause a new signal will be absorbed by these molecules.

The avalanche phenomenon is characterized by the inverse mean free path for ionization is usually noted  $\alpha$  or  $(T_w)$ . This coefficient is called the first Townsend coefficient (amplification factor). It represents a number of electron-ion pairs produced per unit length of drift. In general  $\alpha$  increase with the electric field if this field exceeds a certain threshold. An approximation of the first Townsend coefficient as a function of field strength  $E$  is given by several equations proposed to describe this ratio since 1941[9, 10]. ZASTAWNY [11] suggests, to this simple model:

$$\frac{\alpha}{p} = A \exp\left(-B \frac{p}{E}\right) \quad (5)$$

Where  $p$  is the atmospheric pressure, the coefficients  $A$  and  $B$  depend on the gas mixture used; these parameters must be adjusted for each gas mixture, considering the cross section of gases used [12] and [13]. Note that these coefficients as a function of electric field and pressure. The gain of a detector can be noted for a length of amplification  $d$  as

$$G = \exp\left(\int_0^d \alpha(x) dx\right) \quad (6)$$

In this case of approximation of electric field uniform amplification in the amplification region,  $\alpha$  is constant and simply written as

$$G = \exp(\alpha \cdot d) \quad (7)$$

### Simulation of the First Townsend Coefficients

Using equation (5), and table 2 shown below, we can estimate the first amplification coefficient for different proportions of each gas mixture; the same program remains what we need to change are the values of the coefficients  $A$  and  $B$  [12, 14]. These parameters are adjusted by experience [15].

Mixture	Percentage	A (cm <sup>-1</sup> )	B (kv.cm <sup>-1</sup> )
Ar- isobutan	6	4700	62.70
	10	4600	69.20
	20	5700	93.90
	30	7200	119.80
Ar-DME	5	2900	39.60
	10	3100	44.40
	15	3500	52.90
	20	3300	53.60
	30	4200	69.10

Table 2: Townsend coefficient for different mixtures of an amplification gap 100  $\mu$ m

### Argon-isobutane gas mixture

The amplification coefficient of calculations results  $Tw_i$  (first Townsend coefficient, ( $i = 1$  to 4)) for different proportions of Argon-isobutane are shown in figure 5.

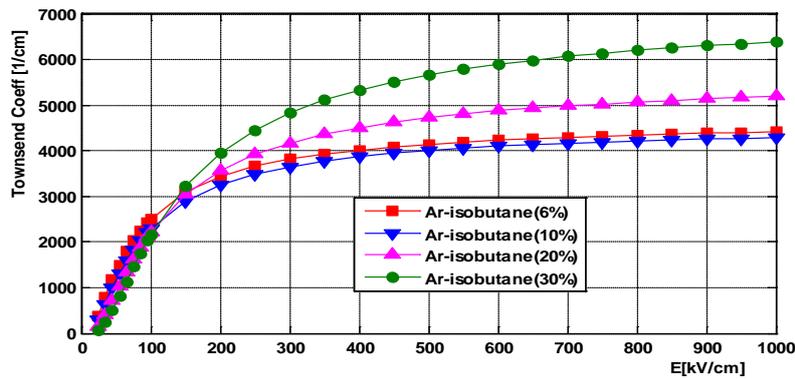


Figure 5: First Townsend coefficient for Argon-Isobutane as a function of Electric field

From figure 5, it seems that a proportion of Argon-Isobutane given, the Townsend coefficient increases with increasing electric field and reaches a saturation value range as the field which is more important.

### Argon-dimethyl-Ether Gas mixture

The results of simulation made by gas mixture of Argon-Dimethyl-Ether are shown in figure 6

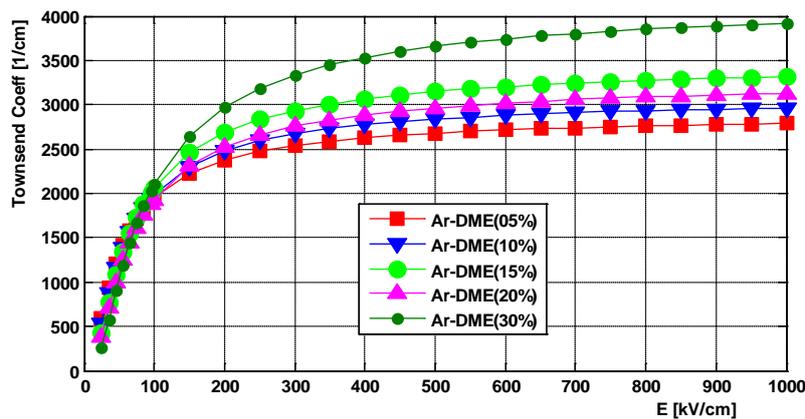


Figure 6: First Townsend coefficient for different proportions of Argon-Dimethyl-Ether

The figure 6 shows that the first Townsend coefficient  $Tw_i$  ( $i = 1$  to 5) increases with the growth of the electric field and that this coefficient increases with the increase of proportion of Argon-dimethyl-Ether.

### Simulation of the Gain

There is a multitude of possible gas mixture. It is possible to use different gas mixtures as a base. We used argon, and different quenchers; we used the DME (Dimethyl-Ether), Isobutane. From these gases, we can compose binary mixtures and varying proportions. Many gas mixtures have been tested, usually binary mixtures by varying the proportion of quencher. For these models, we use a  $^{55}\text{Fe}$  source which emits X-ray photons of 5.9 keV. The detector been studied a broad amplification gap of 100  $\mu\text{m}$ .

### Argon-Isobutane mixture

From equations (5) and (7), we get the gain as a function of field E.

$$G = \exp\left(A \cdot d \exp\left(-\frac{B}{E}\right)\right) \tag{8}$$

For this, we consider the distance of the amplification gap of  $d=100 \mu\text{m}$ , the field E varies between 30 and 100 kV/cm, A and B are defined in table 2, these parameters depend on gas mixtures. With the equation (8), and table 2, we can optimize the amplification gain for different gas mixtures; it remains the same program that we must change the values of the coefficients  $A_i$  and  $B_i$ . Figures 7 and 8 shown the estimated gain (a) that is on the left, against that is on the right which is the experimental gain (b) [12, 14].

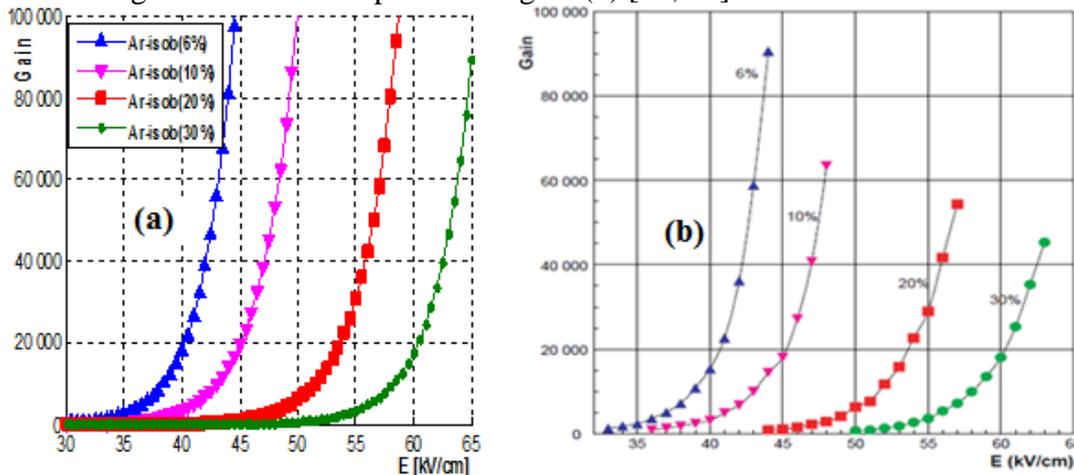


Figure 7: Comparison between the gain simulated (at) and experimental (b) in the presence of Ar-isobutane mixture for different proportions

In figure 7, we see that increasing proportion of quencher lowers the gain. We also note that to obtain the same gain, the higher proportion of quencher is more important and the field amplification is important. The maximum gain decreased with the proportion of isobutane in the mixture, breakdowns occurs at lower gains when the proportion increasing of isobutane. Here, we see the effect of the quencher, which tends to limit the development of the avalanche.

### Argon-Dimethyl-Ether mixture (Ar/DME)

We will apply the same procedure to simulate the gain of Argon-dimethyl-Ether mixture. The figure 8 represents the results obtained.

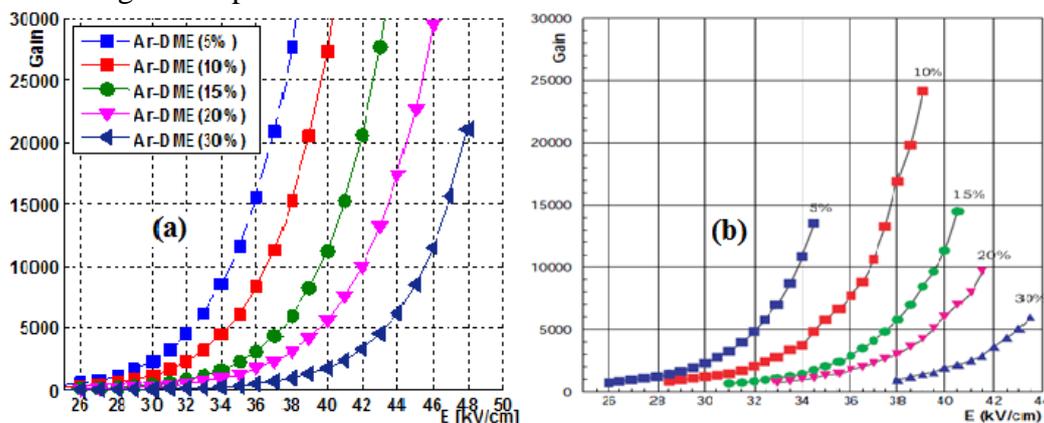


Figure 8: Comparison between the gain simulated (a) and experimental (b) in the presence of Argon-Dimethyl-Ether for different proportions

We see from this figure, the gain decreases by increasing proportions of the quencher, this gain is more akin to the measured gain. The DME is a quencher to reduce further dissemination.

It seems that these results are consistent qualitatively and quantitatively, except for some errors, and table 3 below summarizes some remarkable results:

*Table 7: Report between simulated ( $G_S$ ) and measured ( $G_M$ ) gain*

E [kV/cm]	Simulated Gain ( $G_S$ )	Measured Gain ( $G_M$ )	% Quencher	Report $G_M/G_S$ (r)	%eff
32	4510	5000	05(DME)	1.100	10
38	15310	17000	10(DME)	1.110	11
40	5658	6000	20 (DME)	1.060	06
42	3310	3500	30 (DME)	1.057	5.7
45	20000	18461	10(isob)	0.920	08
55	30900	28000	20(isob)	0.900	10
55	3480	3200	30 (isob)	0.920	08
58	9190	10000	30 (isob)	1.090	09

The correction factor (eff) that is specified in equation (9) made a good justification for the quality of the program developed using MATLAB software, which gives results comparable to experimentally measured results. This correction factor varies between 5.7% and 11.

$$G_M = \text{eff} * G_S \quad (9)$$

If there is a specific way on the curves representing the calculated and measured gains, we will see that they are similar qualitatively and quantitatively. This is justified by observing and making some outstanding values in view whenever the earnings ratio remains in all cases  $r \approx 1$  on the hand, and on the other hand, that the gain is reduced by increasing the proportion of DME which causes the decrease of diffusion coefficients. Therefore, the replacement of isobutane by the DME reduces further the dissemination.

## Conclusion

The charge induced by the electrons is much larger for MICROMEGAS that in the case of a multi-wire proportional chamber (MWPC). This property is related to the shape of the electric field. Indeed, in (MWPC), the electric field varies as  $(1 / r)$ . The majority of electron-ion pairs are produced close to the wires, less electrons travel a short distance before being collected by the anode and the charge induced by the electrons is a very small fraction of the total charge. In the case of MICROMEGAS, the avalanche starts much closer to the cathode due to the uniform electric field in the amplification gap. This property allows MICROMEGAS to obtain faster and more intense signals.

In this part, the simulated results of the MICROMEGAS detector developed are presented. The results indicate that our system with a micro-mesh (500 LPI) can reach rather good operational states. In the summary, the simulation results are nearly consistent with the data that are published in other references.

Our simulation predicts that further improvements are still possible. We expect the use of a 500 LPI would give a best spatial and temporal resolution for MICROMEGAS detector.

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# L'IMPACT DU SOUTIEN SOCIAL SUR LE SUJET MALADE DU CANCER ET SUR SON PARCOURS DE MALADIE ETUDE QUALITATIVE

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## Abstract

Although proved as an important ingredient to physical and mental health, social support is a critical and yet underutilized resource when undergoing cancer care. My first objective is to provide deeper comprehension of the perceived social support and its relationship with patients' representations of cancer. Therefore, my study goes towards a greater acceptance of care and better wellbeing of cancer patients.

The present article represents part of an extended research, dealing with relations between social support, social norm and patients' representations. Unconscious aspects of cancer management, hidden behind defence mechanisms of patients confronted to cancer disclosure, can block or hinder their demand for support.

First results on a major theme of my research are hereby revealed: the influence of the social support on patient's life, relationships, opinions and health behaviour. This main theme gives expression to collective voices across participants.

This qualitative study is characterised by respect of subjective meaning and perception of cancer and social support by the patient, even if this meaning is opposite to common representations. Whatever be the form of social support (emotional, appraisal, informational or instrumental support) patients need it, even if they are reluctant to ask for help. That's why most of the time social support it is not explicitly expressed.

Patients need to know that "somebody is there for them", want to be considered as an "entire person" and to be free in choosing social support upon their own criteria and at the right time for them. Offering social support seems to be as important for some patients as receiving it.

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Keywords: Physical and mental health, social support, health care

Le présent article se propose d'analyser des résultats partiels obtenus dans le cadre d'une étude qualitative plus ample, en cours de déroulement, portant sur le soutien social et ses rapports avec les représentations et la norme sociale chez le malade du cancer. L'objectif prioritaire de ma recherche vise, sur le plan clinique, l'amélioration du bien-être des malades de cancer (en proie à des processus psychiques inconscients qui peuvent s'avérer nuisibles pour leur santé).

J'ai choisi la partie de ma recherche qui porte sur l'impact du soutien social sur le sujet dans sa globalité, ainsi que sur sa vie de malade et ce à partir du discours d'un micro-échantillon de cinq patients cités à titre d'exemple. Le thème du soutien (à travers des paroles de patients) est un thème pivot de ma recherche principale.

Malgré la polysémie du terme et les difficultés des chercheurs de trouver un consensus concernant les définitions et catégorisations du SOUTIEN SOCIAL, celui-ci peut

être conceptualisé comme étant *l'ensemble des actions ou des comportements qui fournissent effectivement de l'aide à la personne* (Barrera, 1986)<sup>300</sup>. En fonction de son émetteur et de son destinataire, le SOUTIEN REÇU fait référence à l'utilisation actuelle des ressources du soutien social (Tardy, 1985). On le présente aussi comme étant une description comportementale du soutien. Les comportements et relations de soutien peuvent comprendre l'écoute, l'expression des inquiétudes, les marques d'affection et de confiance, l'opinion des autres, le prêt d'argent, l'aide pour réaliser une tâche, etc. Alors que le SOUTIEN PERÇU, ou l'appréciation subjective du soutien, est associé à « l'évaluation cognitive » – et émotionnelle – « d'une personne à propos du soutien qu'elle estime recevoir d'autrui » (Barrera, 1981; Streeter et Franklin, 1992, p. 81 – in Ruiller C.)<sup>301</sup>. J'estime que l'approche cognitive du soutien perçu n'est de loin pas suffisante, car la réalité dans ce domaine a montré à quel point les cognitions sont dépassées par les émotions du sujet.

Le thème du soutien social perçu et donné par les patients, en tant que thème prioritaire de ma recherche, constitue une grille thématique comportant d'autres thèmes (portant sur les représentations des patients sur eux-mêmes, sur la maladie, sur les diverses sources de soutien possibles, sur les différents rôles joués par les malades, sur le temps perçu, etc.).

### Un Aperçu sur ma recherche

Les comportements, attitudes et paroles de malades (issus de services français d'oncologie), observés et recueillis sur une durée de plusieurs années, ont relevé : une réticence importante (voir refus) des patients vis-à-vis des prises en charges psychologiques et sociales ; le caractère systématiquement tardif de l'appel à l'aide sociale ou au soutien par les patients ; leur difficulté à accepter l'aide et le soutien proposés par le système médico-psycho-social ; une tendance à se conformer à « ce que l'on attend d'eux », plutôt que d'écouter leurs propres attentes et besoins.

En quête du ressort profond des phénomènes observés et dans une démarche de compréhension des éléments qui font obstacle à la demande et à l'acceptation de l'aide psychothérapeutique et sociale par les patients, mon attention s'est portée sur les représentations de ceux derniers. Il s'agit là de *représentations* sur tout ce qui relève de la maladie (la perception de la maladie, les changements provoqués par le cancer dans leur vie, leur vécu de la maladie), mais également des représentations sur les *sources de soutien* possibles (proches ; soignants ; structures de soins ; prises en charge diverses ; système d'information, etc.). Ma recherche principale analyse en profondeur la perception du soutien apporté par tiers ainsi que l'impact de la norme sociale sur les convictions et le comportement de santé du malade.

A partir de l'enquête préliminaire, j'ai compris que les *représentations sur la santé*, quel qu'en soit l'objet (eux-mêmes, le cancer, le système des soins et ses professionnels, leurs proches) influent sur la perception des patients sur le *soutien* qui leur est offert (appelé par ailleurs « soutien réel, ou donné »). D'où les deux hypothèses de ma recherche principale qui portent :

- d'une part sur la relation en boucle existante entre la *norme sociale*, les *représentations* et le *soutien social perçu*. Les rapports entre ces trois variables revêtent un caractère complexe : à la fois hiérarchisé (parce-que les représentations des patients - y

<sup>300</sup> BARRERA M., (1981). "Social Support in the Adjustment of Pregnant Adolescents: Assessment Issues", dans B.H. Gottlieb (dir.), *Social Networks and Social Support*, Beverly Hills, CA: Sage, p. 69-96, in Caroline ROUILLET...

<sup>301</sup> STREETER C.L., et FRANKLIN C. (1992), "Defining and Measuring Social Support: Guidelines for Social Work Practitioners", *Research in Social Work Practice*, vol. 2, no 1, p. 81-98, in Ruiller C.

compris sur le soutien social - ont leurs racines dans la norme sociale) et cyclique (parce-que chacun de ces concepts influence l'autre, en feed-back) ;

- et d'autre part sur les conflits internes se produisent entre la norme sociale d'autonomie et les mécanismes de défense mis en place par le malade (comme le phénomène de régression).

La norme sociale influence les représentations du malade sur l'univers du cancer, sur son propre vécu de la maladie ou sur les soignants, conduisant à une représentation du soutien social propre à chaque individu, mais comportant également des éléments communs. Le modèle social prônant l'autonomie, l'autosuffisance, la performance et l'efficacité, voire l'indépendance émotionnelle, avec des attributions de causalité interne, accentue le poids de l'acteur en tant que facteur causal (tout en sachant que l'internalité est socialement valorisée par les sociétés modernes et les sujets suivent cette désirabilité sociale). Influencées par la norme sociale, les représentations sur le soutien social influenceront à leur tour la perception du soutien offert par des tiers, en modelant les convictions, comportements et attitudes des patients sur la santé. Qui convictions, comportements et attitudes influenceront à leur tour par un effet de feed-back (et par le biais des agents de changement) la norme sociale.

### **Norme sociale ↔ Représentations ↔ Perception du soutien social**

raison de l'influence que la norme sociale d'autonomie et d'autosuffisance peut avoir sur l'individu, *la prise de conscience* concernant les difficultés causées par le cancer se met en place tardivement, difficilement ou pas du tout. Elle peut, de ce fait, agir parfois comme un frein plutôt qu'un stimulus, empêchant le sujet de réaliser les difficultés posées par sa maladie et retardant ainsi sa demande d'aide.

Après l'exposé des logiques qui sous-tendent ma recherche qualitative dans son ensemble, je présenterai quelques éléments concernant la méthodologie de recueil et de traitement des données utilisée.

### **Elements de methodologie**

Ma recherche qualitative revêt à la fois un aspect clinique et social. Dans la collecte de données, ma recherche utilise la *méthode de l'enquête de terrain*, conduite auprès d'un échantillon de 40 personnes, H et F, dont 60 % F et 40 % d'âge compris entre 20-86 ans, issus de deux services hospitaliers d'oncologie (hôpital de jour et hospitalisation) de la même clinique privée de l'Est de la France. Les techniques utilisées dans la collecte des données sont : (1) *l'entretien semi-directif enregistré* (chaque entretiens durant entre 1-2 heures) ; (2) l'observation participante et (3) les sources documentaires (y compris les statistiques existantes en la matière). Le micro-échantillon de 5 patients, présenté ici à titre d'exemple comporte : 4 femmes et 1 homme, tous soignés à l'hôpital de jour de la même clinique.

Après une phase de *pré-enquête* (constituée notamment d'observation participante), j'ai établi une *grille d'entretien* qui a été utilisée comme support dans l'ensemble des entretiens avec les patients (et même dans les entretiens avec les proches et les professionnels – ne faisant pas l'objet de la présente thèse). La grille d'entretien a conservé une certaine souplesse, s'adaptant à la condition psychologique et physique des patients ainsi qu'aux contraintes temporelles, spatiales et organisationnelles.

Compte tenu de l'espace-temps limité de l'étude ainsi que du caractère particulièrement fastidieux de la retranscription des entretiens, j'ai du utiliser pour la recherche principale juste une partie des entretiens enregistrés (40). En ce qui concerne le présent article, il comporte à titre d'exemple, le discours de cinq patients avec les inférences et interprétation y afférentes.

### **Étapes parcourues dans mon analyse thématique de contenu**

Même si l'approche qualitative ne dispose pas des mêmes outils statistiques que l'approche quantitative, la rigueur scientifique est de mise à tout niveau de la lecture et de l'interprétation des informations récoltées. D'une certaine manière, les représentations des patients sont passées à travers des « filtres » de lecture, parallèlement avec un important travail de déconstruction des représentations de l'enquêteur. Cette opération s'est effectuée principalement grâce à ce qu'il est convenu d'appeler l'« analyse de contenu ». Ceci nécessite la construction d'une *grille de cotation* et d'une *grille d'analyse de données*.

L'analyse du contenu des données qualitatives, à caractère empirique, dépend du type de discours que l'on souhaite étudier ainsi que de l'interprétation à la lumière des hypothèses de recherche posées. Malgré les nombreux modèles d'analyse de contenu (dont j'ai privilégié celui de Laurence Bardin), on s'aperçoit qu'il n'y a pas de recette toute faite (comme dans les analyses quantitatives). Ayant traité à la vie la plus intime et à l'expression du sujet, l'approchant de plus près dans son humanité et sa souffrance, j'ai dû composer avec son rythme spécifique et adapter mes méthodes et techniques. Un savant mélange de rigueur et de souplesse.

Compte tenu de la spécificité de ma recherche, j'ai été emmenée à construire moi-même l'ensemble de mes outils d'analyse des données, à savoir :

1. La constitution de bases de données théoriques sur chacune des variables dépendantes étudiées (état de lieu de la recherche précédente en la matière)
2. La création des fiches comportant le profil des patients
3. La création de fiches typologiques/ de classement du soutien social, de la norme sociale et des représentations
4. La création d'un plan d'analyse des données
5. La création d'une grille thématique d'analyse
6. La codification des informations recueillies
7. Premières inférences et interprétations à partir de ma grille d'analyse thématique

Dans le processus de structuration et d'analyse du corpus de données, je me suis servie de mots/idées clé ; de majuscules (en rapport avec les mots clé) ; de schémas, tableaux et diagrammes ; de grilles de couleurs auxquelles sont attribuées différentes connotations, autant d'instruments méthodologiques qui s'améliorent et s'affinent au fur et à mesure de la progression de ma recherche et qui s'appliquent à des discours extrêmement diversifiés, traités manuellement.

Mon analyse de contenu s'est organisée autour de trois phases chronologiques : (1) la pré analyse (qui a supposé une lecture flottante des données à analyser ainsi que *l'organisation de l'information* recueillie sur le terrain) ; (2) l'exploitation du matériel (qui a consisté à *repérer les passages pertinents* issus des observations et des entrevues ; à *sélectionner et à définir des codes* ou les unités de classification des données recueillies ; *codifier les instruments de collecte*, en numérotant toutes les questions afin de rendre plus précis et pratique l'exploitation des instruments) et (3) le traitement des résultats (une *analyse et interprétation des résultats* dans laquelle les données brutes seront traitées de manière à être *significatives et valides*).

Dans ma *grille d'analyse thématique*, le thème analysé ici, à savoir : « Le soutien social perçu et donné par les patients, quelque soient ses formes de manifestation, a un impact sur la personne dans sa globalité ainsi que et sur son parcours de maladie », occupe une place centrale. Après avoir construit la grille thématique, j'ai établi une *grille spécifique* pour chacun des thèmes, autour des *catégories* suivantes, qui évoluent et dont l'intitulé a un caractère *générique* :

1. L'acteur (le patient)
2. Le mot clé qui désigne le thème (ex : soutien social ; le temps ; les représentations, etc.)
3. Les « objets » (personnes, objets, *éléments de la société, structures, éléments de la nature, services, équipements*)
4. Les « actions » / comportements
5. Les « opinions »
6. Les « émotions »
7. L'expression

Ces catégories varient en rapport avec la spécificité de chaque thème. Dans l'établissement de ma *grille thématique*, j'ai utilisé les *techniques* suivantes :

- Elaboration d'un fichier informatique par thème, regroupant les textes originaux issus du discours des patients et portant sur le thème en question ;
- Apposition de commentaires- affinés dans des mots-clés - au niveau de chaque paragraphe du discours des patients
- Rapprochement des fichiers comportant le texte original avec mes commentaires des fiches de traitement élaborées par mes soins et comportant :
  - o Fiche portrait du patient
  - o Typologies du soutien et de la norme sociale

Les thèmes relevés représentent un face-à-face entre l'univers des patients à travers leurs propres paroles et l'univers de la recherche en la matière.

*Ma grille thématique* permet d'établir la liste des contenus, faits, idées, opinions présents dans le texte, mais elle rend également compte des connaissances de l'analyste sur ce qu'il s'attend à trouver dans le texte et les théories qui peuvent s'y appliquer. Ma grille thématique est autant le reflet de ce qu'on lit dans le texte que de ce que je pensais y trouver. Je n'ai pas procédé uniquement à partir du texte (en essayant de synthétiser et d'organiser ses contenus) mais aussi à partir des références externes au texte.

Mots clé : soutien perçu ; soutien donné ; patient ; liens, opinions ; expression

Abréviations utilisées dans le texte : RS (représentations sociales) ; NS (norme sociale) ; SS (soutien social) ; AS (assistante sociale)

ACTEUR (1)	FORMES SS (2)	SOURCES SS (3)	PERSONNES / OBJETS (4)	EFFETS SS (5)	EMOTIONS/ LIEN (6)	ACTIONS/ COMPORTEMENTS (7)	OPINIONS / VALEURS (8)	EXPRESSION (9)
<b>Mr. I.J.</b> 65 ans	<u>SS PERCU</u> : Emotionnel (gestes ; paroles); Informationnel ; Tangible (protection);  <u>SS DONNE</u> Tangible (aide son épouse aux tâches ménagères)	<u>PERCUES</u>  Epouse ; Infirmière - membre de la famille ; la Foi ; le Médecin ; Ses petits-enfants ; le Travail ; la Lecture ; sa Fille ;  <u>RECUES</u> <u>mais NON-</u> <u>PERCUES</u> Professionnels et Dispositif Soins de support (Psy, AS, etc.)	- Connaissances profanes sur la maladie  - Soins/traitements  - Structure hospitalière identifiée à la maladie	Bénéfiques	Anxiété ;  Refuge dans la Foi ;  Refus d'en savoir plus sur soi  Liens familiaux forts  Communication avec le groupe de pairs (non- identifiée par le patient comme une source de SS)	Veut travailler, jardiner, bricoler  Vit au rythme de la maladie et des soins	Valeurs spirituelles et besoin de « vérité »  Cherche les ressources en soi uniquement  Valeurs du : travail, de la force intérieure	- Besoin de soutien implicite - Est de manière explicite dans le déni - Affirme la « chose et son contraire » - Parole directe - Satisfait de la qualité du SS et de sa disponibilité

ACTEUR (1)	FORMES SS (2)	SOURCES SS (3)	PERSONNES / OBJETS (4)	EFFETS SS (5)	EMOTIONS/ LIEN (6)	ACTIONS/ COMPORTEMENTS (7)	OPINIONS / VALEURS (8)	EXPRESSION (9)
<b>Mme W.R.</b> 25 ans	<u>SS PERCU</u> : Emotionnel (gestes ; paroles); Informationnel ; Tangible (protection); Soutien « complet » offert par les soignants	<u>PERCUES</u>  Epoux Parents Beaux- parents Infirmières Soignants Soins de support Supérieur	- La maladie  - La fatigue et la perte de capacités  - Connaissance profane de la maladie  - Soins/traitements  - Structures	Bénéfiques  Mais ne souhaite pas être sur- protégée	Anxiété  Incertitude provoquée par l'évolution de sa maladie  Sensibilité à « fleur de peau » (pleure)  Se sent	- Veut faire du sport  - Veut mener une vie « à cent à l'heure »  - Prépare son départ en vacances par des soins intensifs  - Est à la recherche d'activités adaptées à ses	Souhaiterait la solidarité et la compréhension des collègues  Critique l'absence d'humanisme du médecin  Demande à être traitée par les	- Besoin de soutien explicite  - Satisfaite du soutien professionnel/informationnel pourvu par le dispositif des Soins de support  - Insatisfaite de la prestation du médecin sur le plan humain

		hiérarchique  <u>NON-PERCUES</u>  le Médecin	hospitalières,  - Le médecin  - Apprécie les soins de support  - Son lieu de travail  - Sa maison		« marginalisée » par ses amis à cause de leurs RS sur le cancer  Se sent incomprise par ses collègues  Se sent comprise par sa supérieure hiérarchique  Se sent surprotégée par sa belle-famille	capacités actuelles  - Vit au rythme de la maladie et des soins  - A une activité professionnelle	professionnels (notamment le médecin), comme une « <b>personne à part entière</b> »	
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ACTEUR (1)	FORMES SS (2)	SOURCES SS (3)	PERSONNES / OBJETS (4)	EFFETS SS (5)	EMOTIONS/ LIEN (6)	ACTIONS/ COMPORTEMENTS (7)	OPINIONS / VALEURS (8)	EXPRESSION (9)
Mme S.S. 53 ans	<u>SS PERCU</u> : Emotionnel (« être là pour moi ») ; Informationnel mis en avant Évaluatif ; Tangible ;  <u>SS DONNE</u> Soutien émotionnel et évaluatif offert à des personnes âgées	<u>PERCUES</u>  Sa fille (Psy) Ses amis Son époux Soins de support Lecture Voyages  <u>AUTO-SOUTIEN</u>  Voyages imaginaires  <u>SOURCES NON-PERCUES</u>  Le groupe de pairs	- 2 <sup>ème</sup> cancer  - Fatigue et douleurs chroniques  - Maladie, traitements  - Connaissance profane de la maladie	Bénéfiques	Choc de la récurrence plus important que celui du 1 <sup>er</sup> cancer  Approche positive / Équilibre intérieur  Lien fusionnel avec sa fille  Lien avec ses Amis  Rejette les approches de la maladie perçues comme « négatives »	Met en place de stratégies individuelles d'adaptation et d'ajustement à la maladie et à la douleur (voyages imaginaires, lecture)  A recours au dispositif des soins de support (avec ses professionnels)	Attitude « positive » face à la maladie  Valeurs : familiales, amitié, solidarité,  La maladie ne changera pas son identité	- Franc parler  - Besoin de soutien explicite  - Satisfaite du soutien professionnel/informationnel pourvu par les Soins de support  - A besoin de communiquer avec les autres

ACTEUR (1)	FORMES SS (2)	SOURCES SS (3)	PERSONNES / OBJETS (4)	EFFETS SS (5)	EMOTIONS/ LIEN (6)	ACTIONS/ COMPOTEMENTS (7)	OPINIONS / VALEURS (8)	EXPRESSION (9)
<p><b>Mme B.F.</b> 54 ans</p>	<p><u>SS PERCU</u> : Emotionnel (se dit « très touchée par le geste de l'entourage »); Informationnel ; Evaluatif ; Tangible ;</p> <p>Le SS INFORMATONNEL est mis en avant</p> <p><u>SS DONNE</u> Soutien émotionnel et tangible offert aux membres de sa famille</p> <p><u>SS REEL/RECU mais NON-PERCU</u></p> <p>Reconnait l'existence des soins de support mais n'y a pas recours (motivation : le temps)</p>	<p><u>PERCUES</u> Conjoint Famille éloignée Fille Collègues Groupe de pairs</p> <p><u>SOURCES NON-PERCUES</u> Membres de sa famille éloignée (beau-frère)</p>	<p>Diagnostic livré par le médecin « à petites doses »</p> <p>La maladie</p> <p>Structures hospitalières</p> <p>Satisfaite de la prestation médicale</p> <p>Maison</p> <p>Diverses situations familiales</p> <p>TEMPS biologique</p>	<p>Bénéfiques</p>	<p>Mémoire douloureuse des symptômes et découverte de son cancer</p> <p>Choc du diagnostic atténué par l'annonce progressive</p> <p>Beaucoup de ruptures en un temps très court</p> <p>Incertitude provoquée par l'évolution de sa maladie</p> <p>TEMPS psychologique</p> <p>Mémoire lancinante des cancers qu'elle a soignés dans sa famille</p> <p>Cancer « pressenti » Anxiété Incertitude Bilan de vie Espoir</p>	<p>Vit au rythme de sa maladie</p> <p>Travaux ménagers</p> <p>Travail professionnel</p> <p>Déplacements à l'hôpital</p> <p>Traitements lourds</p>	<p>Comportements précédents conformes à la norme sociale (travail, valeurs de propreté, d'ordre, de rigueur, du devoir accompli).</p> <p>Conserve des jugements normatifs mais remet en question ses comportements normatifs antérieurs</p> <p>L'argent : entre valeur et moyen</p> <p>Critique la non-compréhension/non-participation de sa belle famille à la prise en charge des beaux-parents malades</p> <p>Le stress et le rythme de vie sont la cause probable de son cancer</p> <p>Genèse du cancer attribuée au stress</p>	<p>- Besoin de soutien implicite et explicite à la fois</p> <p>- « Touchée » par le soutien apporté car ne s'y attendait pas</p> <p>- La chose et son contraire (contradiction au sujet des changements provoqués par la maladie dans la vie du patient)</p>

ACTEUR (1)	FORMES SS (2)	SOURCES SS (3)	PERSONNES / OBJETS (4)	EFFETS SS (5)	EMOTIONS/ LIEN (6)	ACTIONS/ COMPORTEMENTS (7)	OPINIONS / VALEURS (8)	EXPRESSION (9)
<p><b>Mme M.E.</b></p> <p>71 ans</p>	<p><u>SS PERCU</u> : Informationnel ; Tangible ; Emotionnel</p> <p>Le SS INFORMATIONNEL est mis en avant systématiquement [pudeur, NS ou les deux ?]</p> <p><u>SS NON-PERCU</u></p> <p>Reconnait l'existence des soins de support mais n'y a pas recours</p>	<p>Dieu Conjoint Enfants Amis « certaines » infirmières Attachées de recherche Soins de support</p> <p>Met en avant l'importance de la personne pourvoyeuse de soutien</p> <p>Ne perçoit pas le groupe de pairs comme une source pour soi-même, mais pour les autres</p>	<p>Diagnostic non-communicé et non-expliqué par le médecin</p> <p>Le médecin est perçu comme « n'osant pas » annoncer le diagnostic</p> <p>Connaissance profane de la maladie par la patiente</p> <p>Structures hospitalières</p> <p>Peu de TEMPS accordé par le médecin</p> <p>Le médecin devrait « suivre des cours de psychologie »</p> <p>La patiente se décrit en dehors du groupe de pairs</p> <p>Certaines frictions entre les parents et leur fille</p> <p>Notion de TEMPS</p>	<p>Bénéfiques</p>	<p>Evite de montrer ses émotions / de se livrer</p> <p>TEMPS de vie</p> <p>Incertitude provoquée par l'absence d'annonce</p>	<p>Vit au rythme de sa maladie</p> <p>Travaux ménagers</p> <p>Déplacements à l'hôpital</p>	<p>Evite de donner ses opinions</p> <p>Valeur spirituelles</p> <p>Valeurs familiales</p> <p>Valeur de vérité (aurait souhaité qu'on lui dise la « vérité » sur sa maladie)</p> <p>Se montrer « fort »</p> <p>Minimise la maladie [stratégies défensives ou norme sociale ?]</p> <p>A l'impression d'être un « cobaye »</p> <p>Demande à être traitée par les professionnels (notamment le médecin), comme une « <b>personne entière... qui a un esprit</b> »</p>	<p>Langage souvent creux, évitant</p> <p>Déclarations impersonnelles</p> <p>Discours factice</p> <p>[Possible biais ?]</p>

## **Inferences et interprétations autour du thème du soutien**

### **Concernant la catégorie ACTEUR (A1)**

L'acteur, dans l'analyse thématique ci-dessus, est le patient, celui qui parle, le sujet. Le profil de chacun des cinq patients figurera également dans le tableau complet des analyses thématiques sur les 10 thèmes recensés. Il s'agit là de cinq personnes – 4 femmes et 1 homme – d'âge variable (de 25 à 71 ans), personnes en activité professionnelle ou retraitées, toutes relevant de l'hôpital de jour et ayant été interviewés (à des dates différentes) pendant leur séance de chimiothérapie.

### **Concernant les FORMES de soutien social (FS 2)**

Le concept de soutien est présent dans le discours de tous les patients cités, de manière plus ou moins explicite, sous toutes les formes possibles (émotionnel, informationnel, instrumental, évaluatif, perçu, reçu ou donné ; fonctionnel ou structurel), ainsi que les relations et les comportements de soutien. A diverses intensité et occurrence, mais omniprésent.

La forme de soutien la plus évoquée, est le soutien INFORMATIONNEL. Malgré sa fréquence d'apparition dans le discours des patients, je pense qu'il recouvre une double facette : celle qui porte réellement sur l'information nécessaire demandée par le patient et l'autre qui représente une sorte de « porte d'entrée » dans le domaine du soutien et dans l'univers individuel du malade.

En effet, par pudeur, par fierté, en vertu de traits de personnalité, des éléments contextuels ou des mécanismes qui agissent inconsciemment sur le sujet (de type norme sociale), le soutien émotionnel ou le soutien évaluatif ne sont pas toujours exprimés de manière explicite par les patients. Ils restent parfois « cachés », voilés derrière une demande explicite de soutien « informationnel » (dans notre cas, 40 % des patients interrogés sont en demande implicite de soutien émotionnel, alors qu'explicitement ils formulent une demande de soutien informationnel). Les plus « pudiques » des patients (Mme M.E.) demandent uniquement du soutien informationnel, reconnaissant, en revanche, le « droit de cité » du dispositif des soins de support, du soutien professionnel et de celui du groupe des pairs, mais uniquement « *pour les patients seuls, qui n'ont pas de famille* ». Cette même patient réticente ne s'autorise pas à exprimer ses opinions ou sentiments de manière claire, mais par le biais de phrases impersonnelles, dans un style vague et fuyant. Et pourtant... une fois la confiance installée et les barrières tombées, ce genre de patients arrivent à dépasser/outrepasser les prescriptions sociales constitutives qui agissent à leur insu et à évoquer le besoin/ le rôle du soutien affectif.

Je souhaite approfondir à l'avenir l'analyse pour ces cas précis (dont Mme B.E.), afin de déterminer quelle est la part d'action de la norme sociale intégrée et quelle est celle des traits de personnalité ou du contexte (sinon d'autres facteurs qui auraient pu éventuellement biaiser l'enquête).

Malgré ce phénomène, n'empêche que même la personne la plus réticente de mon échantillon définit le soutien de manière chargée émotionnellement : « *ça vous porte, ça vous porte aussi* » (Mme M.E.)

Par rapport à la teneur réelle de la demande de soutien informationnel, cette demande s'adresse aux professionnels de santé et concerne toutes les étapes de la maladie, mais tout particulièrement le diagnostic et l'issue. La notion de « vérité » apparaît souvent en rapport avec la demande d'informations précises et véridiques sur l'apparition, l'évolution et l'issue de la maladie (60% des cas), rattachée souvent à la notion de « temps » (temps des soins, temps de maladie, temps de vie).

Malheureusement, 60 % des patients cités n'arrivent pas à obtenir les informations souhaitées sur leur maladie, soit parce-que le médecin « *n'a pas le temps* », soit parce qu'il

« n'osait pas », soit parce qu'il traite le patient comme un « *cobaye* » : « *On n'est pas traités comme une personne entière qui aurait un esprit* » (Mme M.E.).

Comme vous pouvez le constater, le SOUTIEN INFORMATIONNEL devient une sorte de plaque tournante entre un besoin réel de connaître la vérité (les tenants et les aboutissants de sa maladie) et un besoin d'être traité comme « *une personne à part entière* » (Mme W.R.), voir à être soutenu. Cette formule revient souvent, dans la bouche de différents patients, illustrant bien le besoin du patient d'être reconnu, entendu et pris en compte dans sa globalité, en tant que sujet et non pas comme simple objet de sa maladie.

En ce qui concerne le SOUTIEN TANGIBLE, instrumental ou pratique, qu'un patient peut recevoir en provenance de l'une ou l'autre de ses sources de soutien, les malades y font plus souvent référence, de manière explicite, qu'au soutien émotionnel ou évaluatif.

Je pense, qu'il s'agit là-encore, du même phénomène qui régit l'utilisation intensive du « soutien informationnel » à la place de toute autre forme de soutien. Soutien instrumental ou informationnel, ils sont tous deux des types de soutien tangibles, techniques, plus ou moins « neutres » aux yeux des patients, en tout cas, en apparence, pas connotés affectivement et par conséquent en accord avec la norme sociale intégrée portant sur la réticence, la non-extériorisation des sentiments personnels, l'injonction sociale à être fort et l'illusion d'invincibilité. C'est là où intervient essentiellement le travail du Psychologue, pour déchiffrer les non-dits et les significations, décoder les demandes implicites qui cachent parfois une souffrance et sont souvent rattachées à des objets on ne peut plus concrets.

Il faut rappeler aussi que le terme de « soutien » est encore dans le mental collectif synonyme « d'aide ». Or, on sait à quel point la notion « d'aide » peut produire des blocages psychologiques chez la plupart des usagers, soient-ils des malades ou des personnes bien portantes. Et ce, parce-que le terme « d'aide » revêt dans les représentations collectives une connotation négative, synonyme de « faiblesse », de « vulnérabilité », de « perte de soi » et « d'échec », renvoyant aux modèles sociaux qui valorisent l'opposé, à savoir la toute-puissance, l'autonomie et l'auto-suffisance de l'individu. Les patients en sont imprégnés à des degrés différents, selon leur fonctionnement psychique et le degré d'intériorisation des prescriptions sociales.

Là encore, des professionnels de santé comme : le psychologue ou l'assistante sociale, sont appelés à bien expliquer les tenants et les aboutissants du soutien ainsi que du dispositif des soins de support (dispositif créé pour améliorer le bien-être personnel, social, et environnemental du malade du cancer), afin de dissiper la crainte d'une « mise à nu » des sentiments les plus intimes ou des vulnérabilités individuelles.

Compte tenu de ces considérations, nous pouvons appréhender le soutien informationnel et instrumental, dans une double hypostase : en tant que formes de soutien tangibles effectivement nécessaires aux patients, d'une part et comme une « porte d'entrée » dans l'univers du sujet lui aidant à accéder au soutien et par extension au bien-être, d'autre part.

Toujours dans la catégorie du soutien TANGIBLE, nous remarquons le SOUTIEN que j'ai appelé OCCUPATIONNEL, qui consiste en le support que les activités (quelles qu'elles soient) peuvent apporter au sujet. Prenons l'exemple de Mr I.J., qui souhaite « *travailler, bricoler, jardiner comme avant* » ou de Mme B.F. qui pense que pouvoir retravailler équivaut à une rémission : « *Eh, bien, à partir du moment où je peux retravailler, je pense reprendre la vie d'avant, en levant le pied quand même, en ayant plus de calme* ».

Qu'il s'agisse de soutien émotionnel, appréciatif ou même de formes de soutien tangibles (informationnel, matériel), elles sont toutes en fait chargées de significations pour le sujet. Et c'est justement cette signification, qui si elle n'est pas captée et comprise par l'environnement aidant, peut faire obstacle à l'expression ou à la perception du soutien.

Pour revenir au SOUTIEN EMOTIONNEL, ce type de soutien tient une place essentielle chez les patients, même s'il n'est pas souvent exprimé de manière explicite. Des formules courtes, condensées mais riches de sens, rendent compte des sentiments et attentes des patients : une « *présence* », « *être là pour moi* » ... « *j'ai besoin, ... j'ai besoin des autres* » (Mme S.S.)

La personne qui offre le soutien est très importante pour le receveur (Mme M.E.) ainsi que la qualité de la relation, de l'échange, la confiance que le receveur accorde au donneur. Le plus souvent ce n'est pas de l'aide concrète que les sujets malades attendent, mais bien un proche de confiance, pour « être là ». Ainsi Mme S.S., ravagée par les douleurs et l'anxiété, téléphone pendant la nuit à sa fille.

« *Etre là. Si j'ai besoin de parler. Etre là...*

*Enquêteur* Et lorsque vous l'avez appelée à 4 heures du matin, elle vous a écouté, elle vous a dit quelque chose ?

*Patiente* Pas tellement de choses. Elle m'a écoutée.

Alors que le soutien émotionnel est la forme de soutien la plus importante pour les patients, il est le moins exprimé aussi. C'est une force muette et parfois invisible, qui est là, en filigrane mais que les malades ont du mal à évoquer. Il s'agit bien de l'influence exercée par la norme sociale d'autonomie, toute-puissance et auto-suffisance qui impose à l'individu un modèle de « dignité réticente » intégré et appliqué par ce dernier. Et pourtant, malgré la force des prescriptions sociales, 40 % des patients arrivent à libérer leur envie d'être soutenus.

Concernant le SOUTIEN RECU et le SOUTIEN PERCU, il me semble difficile de comparer ces deux formes de soutien, dans la mesure où le « soutien réel ou reçu » ne peut être qualifié ou quantifié objectivement. Qu'est-ce en fait le soutien « réel » ou « reçu » et qui atteste de son objectivité (?), alors que toute personne porte sur le monde et la réalité un regard subjectif, fortement influencé par ses propres représentations. Je pourrais tout au plus, lancer le débat sur l'opinion et la perception des patients concernant le dispositif des soins de support. Justement, ce dispositif semble unanimement reconnu – ainsi que son utilité – par l'ensemble des patients cités, même s'ils ne s'en servent pas directement. Pour vari raisons (crainte de se retrouver face à eux-mêmes ou à un professionnel qui « fouillerait » dans les profondeurs de leur psychisme, de leur vie, ou toucherait à leur corps – parfois de honte et de souffrance -) les patients cités n'ont pas recours au dispositif. Les autres 60 % qui s'en sont servis, par contre, en sont très satisfaits.

Ce que les patients attendent secrètement de la part des professionnels de santé, c'est en fait un soutien COMPLET (à la fois informationnel, technique, appréciatif et émotionnel)

« *Je pense que c'est important. Parce-que d'une part ça permet de faire la partie traitement, mais vraiment et surtout la personne en entier... Hier d'ailleurs j'ai pu aller chez l'esthéticienne pour la 1<sup>ère</sup> fois et c'était agréable car c'était autre chose que de vivre et faire les soins... Ce n'est pas forcément un geste en soi mais c'était de voir quelqu'un d'autre, d'en discuter un petit peu. Simplement, voilà avec quelqu'un d'autre qu'avec ceux qui sont directement impliqués dans les soins.* » (Mme W.R.)

Et ce « quelqu'un d'autre », un professionnel repéré comme un interlocuteur agréable, devient parfois à l'insu du patient, la personne de confiance ou son pourvoyeur de soutien. Ce phénomène arrive souvent dans la pratique, les professionnels tenant souvent plusieurs rôles, dont celui de soignant et de soutien affectif (et pas forcément pour les personnes seules). Nous touchons là à *l'univers du care* et à *celui du soin*.

Cette reconnaissance « à demi-mesure » des soins de support, par les patients, représente à mon sens un premier pas dans l'évolution des normes sociales. La peur paralyse souvent les patients de tout bord, entre autres celle de toucher à des « endroits » qui font mal : le corps, le psychisme, ses propres représentations. Il en faut du courage à ceux ou celles qui

vont aller vers les différents professionnels (psychologue, assistante sociale, esthéticienne, diététicienne et autres) pour en faire la demande explicite. Mais justement, il n'y en a pas beaucoup. C'est pourquoi la démarche institutionnelle devrait se faire en sens inverse : les psychologues ou assistantes sociales n'ont pas à attendre que le patient manifeste « librement » son choix (comme j'ai pu constater dans d'autres établissements), mais que les professionnels de santé aillent vers les patients pour leur expliquer le dispositif et ses bienfaits. C'est d'ailleurs la demande claire, formulée sans équivoque, par certains des patients que j'ai interrogés (Mr. A.R.)

En ce qui concerne le SOUTIEN SOCIAL PERCU, il va parfois de pair avec le SOUTIEN SOCIAL DONNE ou offert par le patient lui-même, quelqu'en soit sa nature (tangibile, affectif, etc.). Aussi Mme S.S. offre-t-elle son soutien à des personnes âgées et seules et elle affirme en tirer un grand réconfort. Mme B.F., elle, s'est occupé longuement de plusieurs membres de sa famille atteints par des maladies chroniques ou invalidantes, Mr I.J. aide sa femme pour les tâches ménagères, etc.

60% des patients précités veulent apporter, à leur tour, du soutien aux autres, selon leurs moyens. Ca semble se faire spontanément, aucun calcul ne semble ternir la volonté des malades à s'investir pour aider les autres.

Un cas particulier, si je puis dire, sur l'ensemble des patients interrogés et notamment sur le petit « échantillon » précité comme exemple, le cas de Mme S.S. Cette patiente puise dans ses propres ressources symboliques et imaginatives pour se construire du soutien. Il s'agit d'une *source fantasmée de soutien*, mais efficacement supportive (selon les dires de la patiente) : elle fait des voyages imaginaires, investis de propriétés auditives, gustatives et odorantes qui lui procurent un bien-être physique et mental. J'ai appelé cette forme de soutien de « L'AUTO-SOUTIEN ».

En ce qui concerne le soutien NON-PERCU, les raisons de cette absence de perception sont souvent à chercher dans les représentations du patient, la méconnaissance des dispositifs, son relationnel difficile avec le donneur de soutien, des traits de personnalité, éléments contextuels ou la qualité de l'échange. Pour ce qu'il est des représentations (influencées à leur tour par la norme sociale intégrée), nous avons pu constater leur force à l'œuvre dans le cas de Mr. I.J., qui lui nie tout rôle supportif que le dispositif des Soins de support (et de ses professionnels) pourraient lui apporter :

*« Non, non, non, pas pour le moment. Moi je suis bien come ça. Du moment où je peux bouger et ma famille est là, je ne veux pas de ça » (Mr I.J.)*

En ce qui concerne ce dispositif de SOINS DE SUPPORT, implanté relativement récemment dans les structures hospitalières pour les maladies chroniques et notamment en oncologie, nous ne disposons pas jusqu'à présent d'enquêtes qualitatives officielles comportant l'avis des patients. Or, il se trouve que mon enquête comporte des questions concernant ce sujet ainsi que l'opinion des patients en retour (dont celui de Mr I.J. – cité précédemment).

Quant à mon micro-échantillon de 5 patients précités, ils s'accordent tous pour reconnaître l'existence du dispositif pluri-professionnel et pluridisciplinaire des soins de support. En revanche, seulement 80 % de ces patients, les patientes femmes, y font recours et en apprécie les bénéfices. Les usagers des soins de support, cherchent un interlocuteur privilégié parmi les professionnels qui exercent à l'intérieur du dispositif : Mme S.S. souhaite contacter le psychologue, Mme B.F. se sent bien avec l'esthéticienne, Mme M.E. a été bien renseignée par une attachée de recherche, etc. La question de l'interlocuteur privilégié se pose également pour ce qu'il est des soins médicaux ainsi que des différentes prises en charge.

Nombreux sont les patients, en revanche, qui attendent que les professionnels de santé « viennent vers eux » [et qui l'ont exprimé lors de mes différents entretiens]. La démarche

d'aller vers un soignant reste encore rare et pénible pour le malade (une causalité multifactorielle étant à l'origine de ce phénomène).

Ce que les patients attendent surtout (dans notre micro-échantillon, en proportion de 60 %) c'est d'être considérés par les professionnels de santé (et notamment par le médecin) comme « *des personnes à part entière* » (Mme W.R.), qui « *ont un esprit* » (Mr. M.E). Ils expriment le besoin de traitement global de leur personne et surtout de prise en compte de leur dimension humaine.

### **Concernant les SOURCES de soutien social (SOU\_S3)**

Chacun des 5 patients cités a ses propres sources de soutien, et de soutien émotionnel en particulier, mais ce qui revient le plus souvent dans leur discours, ce sont le CONJOINT ET LES ENFANTS (100% pour les 5 cas précités). Des gestes tendres, des paroles d'encouragement, des fleurs, la compréhension profonde de leurs besoins, les patients ont les larmes aux yeux quand ils en parlent (sans pour autant évoquer explicitement ce que ce type de soutien représente dans leur vie).

En ce qui concerne le soutien en provenance des PARENTS, l'approche semble plus délicate. L'une des patients appartenant au micro-échantillon s'inquiète par rapport aux soucis que les parents ont à son sujet. Ceci fait une réaction en chaîne d'inquiétudes au point où la même patiente s'interroge sur « la manière de parler à ses parents ...Quoi leur dire », comptant consulter un Psy à cet effet :

*« ...Je pense que voilà, ils peuvent soutenir, mais il y a certaines choses qu'ils n'ont peut-être pas. La psychologue pourrait-elle me dire que dire à ses proches ? »*

Le soutien émotionnel peut également venir des collègues de travail et ce qui touche, dans ce cas, le patient c'est le caractère inattendu du soutien (Mme B.F.). Perçu comme un « juste retour des choses » par certains (Mme B.F), la force du lien est là et elle le touche plus que le patient ne veut l'admettre.

Les sources de soutien émotionnel ne correspondent pas toujours aux représentations sociales - qui placent la famille en première place. Un animal de compagnie, la foi, peuvent très bien remplir ce rôle.

Sur l'ensemble des 5 patients, cités à titre d'exemple ici, 80 % font état, de manière explicite de leur envie, besoin, émotions lorsqu'on leur offre un soutien affectif ou appréciatif. Pour nos 5 patients précités, c'est la famille, en effet qui arrive en tête de liste lorsqu'il s'agit d'hierarchiser les sources de soutien par ordre d'importance : conjoint, enfants, parents, belle-famille, etc. La famille est repérée, en effet, par nos 5 patients comme celle qui fournit par le biais de paroles, présence, gestes, un soutien affectif et un encouragement constant au malade. Quelques variations toute de même, Mme M.E. laisse comprendre (ainsi que son époux présent à l'entretien que j'ai mené), que Dieu, la Foi représentent énormément pour eux ....La source de soutien la plus forte et fiable reste pour cette patiente, ainsi que pour son époux, le soutien spirituel, DIEU ET LA FOI.

*E : Est-ce que pour vous le soutien des autres est important ?*

*Patiente : Non. Le soutien des autres il compte, hein, les marques d'affection, les petits mots, le soutien des autres quelque part, mais moi je m'attache quand même aussi à la parole de Dieu tous les jours et ça m'aide. Je lis ma Bible.*

*E : Ca, c'est votre support principal.*

*Epoux patiente : C'est le support principal, mais je peux vous citer la parole de Jésus,*

*qui a dit : « Venez à moi, vous tous qui êtes fatigués et chargés, je vous emmène au repos ». Et j'ai de multiples fois expérimenté ce verset, et quand je suis fatigué et je veux aider ma femme, je dis : « Seigneur donne-moi la force ! ». Et il me la donne.*

Au sujet du GROUPE DE PAIRS, il représente une source de soutien contradictoire, parfois même contestée.

*« C'est triste, certains ne parlent pas, ils montent dans les chambres, ils ne parlent pas. Parfois ils sont à cinq, ils parlent pas. Mais il y en a qui aiment parler... Parfois on entend, la chambre du fond il y en a cinq dedans, elle est tellement petite cette chambre. Parfois c'est tout calme... Et d'autres fois, mais rarement, on entend des rigolades, des gens parlent ensemble, des femmes entre elles qui parlent, qui...ça bouge, il y a de la vie [voix enjouée] » (Mme M.E.).*

Sur l'ensemble des patients constituant le mini-échantillon de 5 personnes, il n'y a qu'une seule patiente, Mme B.F., qui perçoit le groupe de pairs comme un soutien effectif pour elle (cette source ne représente donc que 20 % du soutien perçu par les patients).

*P : Bien, on entend du mauvais, qu'on est mal foutu, que vous allez être mal en pointe [balbutie, incompréhensible, sa voix baisse]...Moi, même si je vais perdre mes cheveux, je survivrai. On est vraiment mal, on n'est pas bien, on a... c'est dur à passer, tu vas être accrochée à la cuvette des WC, tu vas... Après, je pense qu'il y a toujours du progrès, les médicaments qu'ils donnent aident et... le fait de me retrouver ici, il y a trois semaines, et en discuter avec les gens, eh bien, on se rend compte que finalement bien, c'est bien. Ce n'est peut-être pas si grave que ce qu'ont d'autres personnes, et...confrontée... voir que d'autres gens ont autre chose, qui est sûrement parfois plus grave que ce que tu as. Eh bien, ça minimise, et... Au début bon, personne ne parle, et bon après les langues se délient...*

*E : Qu'est-ce qui fait ce déclic, à votre avis ?*

*P : Et bien il suffit que quelqu'un lance le sujet, que quelqu'un...J'ai demandé à la dame à côté de moi, qui ressemblait un peu à ma belle maman : « Ah, ça fait longtemps que vous êtes là ? »... Moi c'est la première fois, je suis un peu dans l'inconnu, et puis un Monsieur s'en est mêlé, donc...Moi j'ai des métas à l'estomac, foie.... Je me suis dit : « Mon Dieu, qu'est-ce que j'ai comme chance ! ». Ca permet un peu de minimiser....Ici on se sent moins seule.*

L'existence du groupe de pairs est reconnue en général, dans une approche plutôt descriptive, il y a par contre une faible perception par les patients du rôle supportif du groupe des pairs (20 %).

Même la patiente qui évoque le plus son plaisir à offrir du soutien (sur le mini-échantillon de 5) ainsi que son multiple réseau de soutien, ne décrit pas en termes positifs le GROUPE DE PAIRS, mettant en avant l'approche négative des autres malades :

*P : ...J'ai parlé déjà avec autres personnes malades, elles ne prennent pas ça comme ça. Alors comme ça, je laisse chacun penser ce qu'il veut. Si ce n'est pas nécessaire, je ne discute pas. Je ne peux pas transmettre des choses positives alors qu'elles, elles essayent de transmettre des choses négatives. Et ça je ne peux accepter.*

*E : Quelles sont ces choses négatives que les autres vous transmettent ?*

*P : Ah, tout est négatif. Les piqûres c'est négatif, les chimios c'est négatif, les radios c'est négatif, tout est négatif.*

Concernant le soutien apporté par les AMIS, il ne répond pas toujours aux attentes des patients en matière de disponibilité et satisfaction sur la qualité de l'échange. Mme W.R., par exemple, se sent marginalisée par ses amis, qui hésitent de la contacter. La « gêne » qu'évoque la patiente, manifestée par ses amis, pourrait provenir des représentations sociales, voir collectives sur le cancer, dont ces derniers en sont dépositaires et vecteurs.

*P : Après au niveau des amis, j'ai l'impression que ma maladie, ça leur fait peur, et du coup et bien, ils font comme si de rien n'était, mais plutôt par gêne. Ils sont mal à l'aise, ça se sent*

*E : Vous vous mettez en retrait, vous vous sentez isolée ?*

*P : Mais oui, je me sens isolée ! [d'une voix ferme]. Dans le genre, si on ne me pose pas la question « Comment ça va ? » spontanément, j'en parlerai pas. Donc c'est vrai, que les amis proches j'ai pu en parler, mais d'autres on sent que malgré une.... Moi ils me gênent, je n'ose pas les aborder, il m'est impossible...*

*Il y en a parmi vos amis qui ne vous appellent plus tellement*

*Ah oui, oui. A cause de la gêne, je pense.*

Les gestes, paroles, comportements des COLLEGUES et/ ou du SUPERIEUR HIERARCHIQUE, peuvent être contradictoires aussi, parfois supportives, parfois le contraire.

Ainsi Mme W.R. fait-elle état de l'incompréhension de ses collègues de travail, mais en même temps du soutien apporté par sa patronne prévenante (de par son expérience préalable similaire) :

*« Des remarques : encore une fois, comme quoi j'ai l'air fatiguée... Ou « waw ! », que je suis pâle, alors qu'elles le savent très bien. Là bas disons que ...il n'y a pas de diplomatie. Je fais comme si de rien n'était, voilà, et je me repose quand je suis chez moi. » [concernant ses collègues] (Mme W.R.)*

*« Non, parce-que j'ai eu la chance d'avoir une cadre qui est très compréhensive. Donc elle le sait, que je suis malade. Je lui ai demandé de pouvoir faire à mi-temps et du coup ils ont engagé quelqu'un d'autre à mi-temps...pour me garder. J'ai beaucoup de chance. » [concernant sa supérieure hiérarchique] (Mme W.R.)*

Une autre patiente, Mme B.F. signale des paroles, émotions et comportements supportifs de la part de son entourage professionnel, d'autant plus émouvants pour elle, qu'elle ne s'y attendait pas :

*« Mais bon, je suis très entourée. J'ai beaucoup d'amis qui appellent régulièrement. Je n'ai jamais caché que j'ai un cancer.... J'ai même des collègues avec lesquelles je travaille qui m'ont dit « ouf, je te rappellerai »... Parce qu'elles ne pouvaient pas me parler au téléphone. Ça les faisait... Je sentais qu'elles commençaient à pleurer, quoi. Après, bien, on est... parce-que ça fait 30 ans qu'on est ensemble. Voilà....*

*« ...Non, je ne m'y attendais pas ! Mais ils m'ont dit : « Ecoute, quand on avait un souci, tu étais toujours-là, il n'y a pas de raison qu'on ne soit pas là. C'est peut-être un retour, mais je ne m'y attendais pas ! Ça m'a beaucoup touché. Même vis-à-vis de tous les coups de fil de mes collègues de travail... qui m'ont dit : « Tu étais toujours là quand on avait un souci, qu'il fallait rester, combler un trou, un machin »... bien, voilà. Si on fait quelque chose, ce n'est pas pour avoir un retour. Ça m'émeut beaucoup, parce-que c'est vraiment quelque chose qui me touche...j'en parle... ça me touche. Je peux...enfin, je me passe plus facilement de ma maladie comme ça... parce-que je ne m'y attendais pas ... d'avoir autant de gens qui effectivement appellent régulièrement... et qui... Ça m'a surtout surpris, parce-que je ne m'attendais pas. »*

Concernant les sources de soutien émanant des PROFESSIONNELS DE SANTE, il en ressort que ceux derniers et notamment les infirmières représentent le plus souvent une plaque tournante entre l'univers du care et l'univers des soins, investies de la confiance des malades et de qualités humaines. C'est bien la preuve que le soutien émotionnel n'est pas en opposition avec le soutien formel technique (les soins), ou bien informationnel, ou instrumental (matériel, financier). Ces différents types de soutien peuvent coexister, parfois se complètent.

Concernant les sources de soutien (toute source de soutien confondue), j'en conclus que : malgré une multitude de sources potentielles de soutien, les patients perçoivent celles qui sont en adéquation avec leurs propres attentes, leur système de significations et représentations sur le soutien, leur psychisme, les modèles sociétaux intégrés, avec la confiance accordée au donneur de soutien, leur propre personnalité ainsi que celle du donneur, en adéquation aussi avec la qualité de l'échange et parfois même avec l'élément de surprise.

La spécialisation des professionnels de santé dans un certain type de soutien (formel, institutionnel, informationnel, tangible) n'exclue pas l'extension de leur interventions en tant qu'aidants dans d'autres champs (en l'occurrence le soutien émotionnel). Nous assistons à une flexibilité de la notion de soutien, une dynamique des *rôles qui sont interchangeables* (de celui de soignant à celui de care giver) sans pour autant perdre en contenu. L'univers du soin et celui du « care » se côtoient et s'entremêlent.

Le phénomène d'interchangeabilité ou d'extension et de mobilisation des ressources propres n'est pas spécifique aux soignants. Les patients sont à leur tour des aidants pour des membres de leurs familles ou des amis. Le soutien donné et le soutien reçu coexistent et se croisent, quelques en soient leur origine ou leur destination. L'essentiel consiste, à mon sens, dans la perception du soutien.

#### **Concernant les PERSONNES et /ou les « OBJETS » en rapport avec le soutien (P\_O\_S4)**

J'ai inclus sous ce titre générique : « personnes » et « d'objets », tout ce qui ressort du discours du patient en lien avec sa personne, son corps, sa vie, l'avènement de la maladie, son environnement (à la fois familial, professionnel, hospitalier), les changements induits par la maladie (comme le diagnostic, les soins, la prise en charge, les structures hospitalières, les

prises en charge, les faits sociaux, les éléments de la nature, etc.) ainsi que toute personne qui n'est pas perçue comme une source de soutien mais qui apparaît néanmoins dans sa vie et dans son discours.

Les patients évoquent leur vie personnelle, sociale, professionnelle, avant et pendant la maladie. Avec l'avènement du cancer, leur univers entier en est bouleversé. Après le choc de l'annonce, pour 80 % des cas de notre micro-échantillon, le patient est à l'écoute de chaque signe de son corps, acquiert une connaissance profane de sa maladie, passant des dizaines de minutes à vous raconter en détail chaque symptôme, traitement ou soin. Son univers entier tourne autour du cancer, il vit complètement au rythme de son cancer, à fond dans sa maladie, même s'il souhaite ou essaie en faire autrement :

« Pour parler d'accord oui, mais pas de la maladie ou du soutien. Je leur parle d'autre chose. D'autre chose, pas de la maladie ! « Tu es malade ? – Oui »... Alors on parle d'autre chose » (Mr J.I.).

Et finalement ce même patient parle à ses compères d'un livre portant sur ...le cancer. Il s'agit là de mécanismes défensifs qui se mettent en place automatiquement (comme le déni, la régression, l'évitement).

La notion de TEMPS, avec toutes ses facettes est présente dans le discours des patients, en rapport avec eux-mêmes, avec la maladie et les autres. Le temps se décline sur plusieurs versants : biologique, psychologique, de la relation et du lien, professionnel, le temps de la prise en charge (soins, traitements, déplacement à l'hôpital, etc.), le temps de maladie (notamment découverte, évolution et issue de la maladie), le temps du bilan de vie, le temps de vivre (sentir, réfléchir, agir, etc.), le temps perçu, le temps reçu, le temps donné, la fin de vie, etc.

Compte tenu de l'omniprésence de ce concept dans le discours des patients ainsi que de la richesse du concept, j'ai consacré une thématique en soi qui porte sur la polysémie du temps évoquée et vécue par les malades.

Le MEDECIN, tel qu'il apparaît dans le discours des patients, est perçu moins comme une source de soutien, mais plutôt comme un professionnel qui doit répondre à des critères de compétence technique et de « vérité ». 40 % des patients de notre micro-échantillon perçoivent le médecin comme un soutien informationnel concernant l'évolution de leur maladie, alors que les autres 60 % le perçoivent comme un professionnel plus recentré sur les chiffres et statistiques en rapport avec la maladie que sur la dimension humaine de ses malades. Des paroles de patients fortes marquent le désarroi engendré justement par la non prise en compte du malade en tant que sujet.....

### Concernant les EFFETS du soutien (ES5)

Ils sont *bénéfiques* pour l'ensemble des patients de notre micro-échantillon (100%). Les malades se sentent écoutés et compris par les personnes proches, aidés surtout par la *présence*, mais aussi par les paroles prononcées, les gestes et les actes. Ceci semble jouer un *rôle positif* sur leur santé mentale et physique. « *Je me passe plus facilement de ma maladie comme ça* »... affirme Mme B.F.

« ...*Ca m'émeut beaucoup, parce-que c'est vraiment quelque chose qui me touche...j'en parle... ça me touche. Je peux...enfin, je me passe plus facilement de ma maladie comme ça... parce-que je ne m'y attendais pas ... d'avoir autant de gens qui effectivement appellent régulièrement... et qui... Ca m'a surtout surpris, parce-que je ne m'attendais pas... »* (Mme B.F.).

En rapport avec l'approche positive de la maladie, une autre patiente, Mme S.S. évoque les attitudes et paroles positives, les siennes et celles de son environnement proche (famille, amis). A l'opposé, se trouve l'attitude mentale « négative » du groupe de pairs, pour lequel tout est « négatif ». Cette antinomie que la patiente établit entre le positif et le négatif,

va au-delà de l'approche de la maladie. On en conclut que le soutien aussi peut avoir des effets délétères s'il n'est pas perçu en tant que tel par le receveur.

La question du soutien en tant que « retour » se pose chez certains patients.

« ...ils m'ont dit : « Ecoute, quand on avait un souci, tu étais toujours-là, il n'y a pas de raison qu'on ne soit pas là. **C'est peut-être un retour**, mais je ne m'y attendais pas ! Ca m'a beaucoup touché. Même vis-à-vis de tous les coups de fil de mes collègues de travail... qui m'ont dit : « Tu étais toujours là quand on avait un souci, qu'il fallait rester, combler un trou, un machin »... bien, voilà. Si on fait quelque chose, ce n'est pas pour avoir un retour. Ca m'émeut beaucoup, parce-que c'est vraiment quelque chose qui me touche (Mme B.F.)

La patiente précitée cherche absolument *une logique au soutien* offert par ses collègues qui se résumerait de la manière suivante : Pourquoi est-on si gentil et prévenant avec moi ? Parce-que moi aussi je l'étais quand on avait besoin de moi. Le soutien est dans ce cas perçu comme « le juste retour des choses ». Le soutien est, par ailleurs, perçu comme un apport d'équilibre et de justice, dans une vie que la même patiente dépeint comme éprouvante - pour avoir tourné dans un univers familial de maladie, de deuils, de souffrance, de gros efforts (voir sacrifices) au bénéfice des siens. Le geste de soutien offert par ses collègues a une valeur apaisante et arrive à gommer, en quelque sorte, le sentiment profond d'injustice qui semble habiter cette patiente (injustice par rapport à sa maladie ; par rapport au don de soi fait en tant qu'aidante de plusieurs membres de sa famille âgés et grabataires ; par rapport à toutes les choses qu'elle a manquées dans sa vie ; par rapport au rythme de vie effréné qu'elle s'était imposé pour faire face à ses devoirs et qu'elle désigne comme cause de son cancer). Mme B.F. laisse éclater sa surprise face à un comportement collectif de soutien, en provenance de ses collègues de travail, justement, parce-que, de toute vraisemblance, à ce juste retour-là elle ne s'y attendait plus.

On constate donc non seulement les effets bénéfiques du soutien en soi sur cette patiente, mais également une représentation involontairement positive du cancer, perçu dans ce cas comme un *déclencheur de solidarité et de soutien, un modérateur relationnel et de stress*.

Mme S.S., dans une approche que l'on pourrait qualifier de « particulière » par rapport aux autres patients, essaye de *se créer et d'entretenir par un investissement personnel constant et important, ses sources de soutien* émotionnel. D'autres patients offrent également du soutien (et notamment à leurs proches), mais ce qui semble distinguer Mme S.S. de ses compères est justement la force de son investissement dans le soutien qu'elle donne aux autres. S'agirait-il, une fois de plus de la logique d'un « juste retour » du soutien donné ? Ou bien d'un soutien perçu secrètement par cette patiente comme sa raison de vivre, comme *un don* qu'elle fait aux personnes qu'elle apprécie et qu'elle ne veut pas accabler du poids de sa maladie ou de sa souffrance.

« *Simplement on prend un café ensemble, on peut un peu discuter. Une des personnes a 81 ans, qui n'a pas d'enfants, ça me fait du bien, si je sonne ou elle sonne chez moi, elle n'a pas d'enfants, alors ça fait quand même..., elle se fait bichonner, on discute un tout petit peu le journal. Jamais je ne me suis permis de... Si j'ai cette maladie, ou ça, ma maladie reste complètement en dehors de ça.* »

« *...C'est essentiel dans la vie. Et puis, je crois que sans dialogue on ne peut pas arriver à vivre correctement. Sans dialogue nous sommes beaucoup trop... Je ne sais pas comment on dit à ça ?...* » (Mme S.S.)

On constate là-encore, la volonté du patient de se défaire de cette maladie qui semble lui « coller à la peau » et de se replonger dans l'univers de la « normalité ».

Par ailleurs, de manière générale, recevoir et, qui plus est, demander de l'aide, peut être troublant parce que cette situation a pour effet d'afficher une certaine *vulnérabilité* et ce,

dans un contexte socio-culturel qui valorise grandement l'autonomie et l'indépendance. On constate, une fois de plus, l'impact des valeurs et prescriptions sociales sur les sujets.

### **Concernant les EMOTIONS en rapport avec le soutien (E\_LS6)**

Les EMOTIONS éprouvées par les patients sont en lien à la fois avec la maladie et tout ce qui tourne autour de la maladie (en termes de diagnostic, évolution, issue, prises en charges, soignants, etc.) mais également en lien avec leur propre psychisme, leur environnement privé (famille, maison, loisirs, etc.), et socio-professionnel (amis, collègues, voisins, etc.), en lien bien entendu avec la dynamique psycho-sociale et la matérialité environnante. Les malades ne « débarquent » pas dans la maladie libres de toute charge, bien au contraire. Ils ramènent dans l'univers du cancer tous les problèmes auxquels est confronté l'être humain dans son existence, y compris des échecs perçus, une mémoire douloureuse, des drames en tout genre.

Tout au long du parcours de cette grave et éprouvante maladie, le patient « trimballe » ses autres « poids », comme une charge supplémentaire, relevant non pas de la maladie, mais cette fois de sa propre existence d'être humain. Et le tout fait « boule de neige » écrasant la personne malade de tout son poids. D'où le rôle exceptionnel du soutien à chaque étape, de l'entrée en maladie jusqu'à la toute fin.

Nous voyons dans les exemples issus du micro-échantillon analysé, défiler tour à tour les incertitudes, angoisses, conflits, peines, remords, culpabilité, en lien ou pas avec la maladie. Le cancer ne fait que les amplifier et créer parfois des cercles « vicieux » qui en serrent de plus en plus les malades : un 1<sup>er</sup> cancer accepté est suivi d'un 2<sup>ème</sup> cancer qui choque horriblement.

Le soutien sert à rendre l'existence supportable à toutes ces personnes prises dans l'univers de l'oncologie, à desserrer certains « corsets » qui les tiennent emprisonnés, dont le tissu invisible fait de barrières sociales ainsi que de leur propres barrières intérieures. Le soutien sert aussi à apaiser la souffrance intérieure, les conflits en tout genre, même la douleur, il sert à ne pas se sentir seul (alors que les angoisses vous prennent au beau milieu de la nuit – comme pour Mme S.S.) et pourquoi pas à renforcer ses mécanismes défensifs et à relativiser la maladie.

Le registre des émotions est aussi riche que variable chez une même personne, par moment ambivalent, d'où les affirmations parfois contradictoires des patients. C'est ce que j'ai appelé : « la chose et son contraire ».....Pour Mr I.J. un établissement spécialisé en oncologie est identifié avec la maladie elle-même, les deux étant mis en effet miroir avec les représentations sociales sur le cancer. D'où son discours de forme contradictoire, mais qui dans le fond fait du sens pour le patient.

*P : Oooh, ça parle de cancer là-bas [d'une voix complice, en changeant le ton]. S(...) c'est grand. Mais là aussi. Quand on dit ..., c'est trop grand, c'est trop cancer. J'aime mieux ici à S-A [...]. Quand vous dites à quelqu'un que vous êtes à S [...], il dit : « Ah, ça c'est cancer ! » C'est quand je parle avec les amis, avec les voisins... vous voyez !*

*E : Vous n'avez donc pas envie que ça se sache ?*

*P : Non. Mais si, bien sur. De toute façon les voisins, et tout le monde le sait (Mr I.J)*

Un mot, un regard, celui du médecin évidemment, mais aussi celui de la collègue de bureau ou d'un autre patient, peuvent produire des dégâts sur les patients dont on a du mal à

imaginer l'ampleur. Les patients sont fragiles, d'abord parce-que ce sont des êtres humains et seulement ensuite parce qu'ils sont des malades. Le cancer fragilise le plus souvent jusqu'à la déstructuration ou la destruction totale.

Ce micro-échantillon, choisi parmi les patients soignés à l'hôpital de jour, censés ne pas être dans un stade avancé de maladie, comporte cependant des cancers métastasés et des récidives, des douleurs d'intensité 4 sur une échelle de 5, des interventions chirurgicales multiples. Les bilans de vie sont d'autant plus âpres, alors qu'il faut compter en plus les blessures passées et présentes, la mémoire individuelle des deuils, la maladie de ses proches, l'incompréhension ou l'injustice perçue de la part des uns et des autres.

En quête d'équilibre et de paix intérieure, ces patients se construisent eux-mêmes des stratégies d'ajustement et d'adaptation : Mme S.S. fait des voyages imaginaires (source de soutien fantasmée, ajustement centré sur l'émotion) ; Mme W.R. cherche à occuper son temps et son esprit avec des activités plus adaptées à ses capacités actuelles ; Mr I.J. fantasme sur le retour à ses activités « d'avant » ; Mme M.E. se réfugie dans la foi. Seule Mme B.F., malgré des apparences d'acceptation et d'espoir, n'arrête pas de « ruminer » et a du mal à mettre en place des mécanismes défensifs.

LE SOUTIEN EMOTIONNEL, qui ressort du discours des patients prend souvent des formes concrètes, dans leur discours tout au plus. C'est encore les patients qui tiennent à préciser à quel point ils en ont été touchés, souvent jusqu'aux larmes.

- Le langage et les comportements protecteurs de sa femme, la foi et la force de l'exemple - pour Mr I.J.

- La relation fusionnelle avec sa fille, la présence du mari, le soutien qu'elle offre à ses amis, son approche « positive » de la maladie et ses voyages imaginaires – pour Mme S.S.

- La présence quasi-permanente de son époux (même à ses séances de chimiothérapie et consultations médicales), la surprotection de ses beaux-parents, les paroles tendres et respectueuses de ses parents, les arrangements horaires proposés par sa supérieure hiérarchique au travail – pour Mme W.R.

- Les nombreux appels téléphoniques et visites à l'hôpital de la part de sa famille, collègues et amis, les larmes de compassion de ses collègues et amies, les fleurs reçues à l'hôpital de la part des membres de sa famille ou différentes connaissances, les gestes inattendus de solidarité de la part de son milieu professionnel – pour Mme B.F.

En parlant de larmes, par respect pour la sensibilité et les émotions profondes des patients interrogés, je ne mentionnerai pas le nombre de fois ou de personnes qu'il a fallu apaiser et consoler pendant les entretiens.

Au-delà des dispositifs performants et prises en charges diverses, c'est la dimension humaine, qu'il faut prendre en compte avant tout et par tout le monde. Les émotions des patients sont complexes, entremêlées, à l'image de leur complexité intérieure et à l'immensité des problèmes auxquelles ils sont confrontés.

Le cancer représente pour la plupart des malades « une bataille », un « combat », surtout pour ceux qui se trouvent en début de soins (soignés à l'hôpital du jour par exemple) – comme c'est le cas de notre micro-échantillon.

*« Mais moi je ne veux pas penser ça. Moi je dis « je veux gagner cette guerre » et j'ai gagné (Mme S.S.)*

Nous verrons par la suite, avec les autres patients, ceux qui sont soignés en service d'hospitalisation ou de soins palliatifs, ce que devient le statut de « combattant », que le patient se plaisait bien « d'enfiler » en début de son parcours de maladie.

En parlant de l'anxiété, il faut rappeler la souffrance des malades due à l'incertitude. Il s'agit d'une incertitude qui provient non pas tellement de l'absence de pronostic vital, mais plutôt de l'absence d'explications et de tact que certains membres du corps médical (notamment les médecins) manifestent à leur égard.

« *Je trouve qu'un médecin devrait suivre des cours de psychologie. D'abord analyser la personne : est-ce qu'elle est capable de subir ce choc, je vais le lui dire ou pas, hein ?* » [Mme M.E.)

Etre considéré et traitée comme une personne « à part entière » qui « a de l'esprit », avec un peu de « diplomatie », c'est ce que souhaitent et clament les patients dans une proportion de 80 % (sur notre micro-échantillon).

« *C'est-à-dire que... enfin, je sais qu'il est très, très cru sur les chiffres [18 :00]. Il regarde bien sur le bilan sanguin, il dit : « à telle date, c'est comme ça, à telle date ... » et puis au bout de cinq, dix minutes, il dit « Au faite, comment ça va ? ». Ca serait peut-être simplement commencer par « comment ça va ? » et puis après et bein : « effectivement, là vous étiez fatiguée, et bein oui voilà, la prise de sang elle montre bien que... Lui, il parle d'abord des chiffres et puis, après il se rend compte que finalement il y a une personne derrière, mais... »* (Mme W.R.)

Malgré un « combat », le plus souvent extrêmement dur et perçu comme injuste, les patients nourrissent des espoirs : l'espoir de ne pas subir les effets secondaires des chimiothérapies, l'espoir de rester autonome et de pouvoir entreprendre telle ou telle activité, l'espoir d'une rémission, l'espoir de pouvoir quitter les services d'oncologie et retourner à leur « vie d'avant ». Il s'agit en somme justement de ce grand *espoir*, presque d'une vision fantasmée, miraculeuse et omniprésente de « **vivre comme avant** » - qui est exprimé, parfois de façon lancinante, par l'ensemble des patients interrogés.

Cette même vision fantasmée de la « vie d'avant » revient lorsque les mêmes patients sont interrogés sur la signification de l'état de santé pour eux : « faire ce que l'on veut...vivre comme avant ».

La notion de temps est omniprésente, engendrant des émotions à la fois positives et négatives, qui varient au fil des périodes de pause entre traitements ou de rémission – toutes deux vécues comme un véritable sursis, un temps gagné pour la vie.

### **Concernant les ACTIONS/COMPORTEMENTS en rapport avec le soutien (A\_CS7**

J'ai regroupé sous cet intitulé générique les activités et *comportements à la fois de santé et de maladie*. Par extension, on aurait pu élargir cette rubrique également aux comportements de soutien.

J'en traiterai d'abord, dans la présente analyse, de la comparaison entre d'une part les comportements de santé évoqués par l'ensemble des patients au passé (travailler, bricoler, couper du bois, jardiner, faire du sport, se distraire en compagnie des amis, partir en vacances, faire le ménage, etc.) et d'autre part les comportements de maladie conjugués au présent (venir à l'hôpital pour les consultations et des soins, suivre la chimiothérapie, subir des opérations, « être barbouillé », revenir à l'hôpital, avoir peur, attendre, espérer, etc.).

Les activités repérées par les patients comme des indicateurs de bonne santé, laissent place à présent à des comportements contraignants, de maladie. La limite corporelle est là et ne peut être transcendée la plupart du temps. C'est ce qui semble faire le plus de mal à ces patients de l'hôpital du jour.

Le leit-motif du patient « **je veux vivre comme avant** » se voit mis de plus en plus à mal ou repoussé sur le plan symbolique, fantasmé ou onirique. A présent, ces 5 patients vivent exclusivement *au rythme de leur maladie*, un choc qui vient en prolongation de celui de l'annonce du diagnostic.

Des MECANISMES D'ADAPTATION se mettent automatiquement en place entre le malade, son environnement humain (personnes qui entourent le patient ; facteurs sociaux) et l'environnement non humain (environnement physique ; environnement construit ou naturel). Si l'adaptation (ou la résilience) permet au malade de : intégrer son vécu ; trouver un nouvel équilibre fonctionnel ; se construire une qualité de vie satisfaisante ; faire face à un

traumatisme majeur, à l'opposé, l'inadaptation elle mène à la décompensation face à un traumatisme mineur (il s'agit de sujets fragiles). Concernant notre micro-échantillon, malgré des fragilités imminentes, aucun des patients ne semble en situation de décompensation.

Les mécanismes d'adaptation consistent en règle générale dans les stratégies de *mobilisation de l'entourage* et le recentrage sur les variables liées au choix d'une personne d'avoir ou non recours à une aide extérieure.

Dans le cas de notre échantillon, l'entourage se mobilise par lui-même, alors que les patients demandent uniquement du soutien informationnel à des sources extérieures.

Nous avons évoqué précédemment le champ sémantique de la notion de « mobilisation de l'entourage » (sources de soutien ; soutien social perçu, etc.), sans pour autant approfondir le rôle et les missions institutionnelles dans ce domaine.

Lorsqu'une personne se trouve devant une situation stressante ou qui lui pose problème, elle se trouve devant un choix : elle peut choisir de se débrouiller seule et ainsi faire appel à ses forces personnelles pour améliorer sa situation (comme c'est le cas à priori de l'ensemble des 5 patients de notre micro-échantillon) ; ou encore, elle peut choisir de recourir à du soutien de personnes extérieures. Dans ce dernier cas, les différentes sources de soutien (informelles, semi-formelles, formelles) sont susceptibles d'être mobilisées. La proportion dans laquelle les individus ont recours à leur entourage lorsqu'ils expérimentent une difficulté reste imprécise. Dans notre micro-échantillon nous assistons à une auto-mobilisation de l'entourage, à l'exception de la patiente Mme S.S. qui appelle la nuit sa fille, ayant besoin d'une présence et d'une écoute chaleureuse et rassurante.

La plupart des chercheurs conviennent qu'une majorité de personnes vivant un stress intense ne font aucune requête de soutien. La question qui se pose pour moi est : pourquoi les gens dans le besoin ne font pas appel au soutien ?

Les motifs pour lesquels certaines personnes refusent d'être aidées peuvent varier, en fonction de :

- *Déterminants situationnels* du refus de faire appel à de l'aide, c'est-à-dire dans quelles circonstances une personne décide de se fier à ses propres ressources et sur les facteurs individuels. Des travaux scientifiques ont étudié quel type de personne est le plus hésitant à faire appel à de l'aide. Un des facteurs vraisemblablement lié au choix de se débrouiller seul est la perception que la situation n'est pas particulièrement problématique et qu'elle ne nécessite pas une aide ;
- De plus, une personne décidera de ne pas avoir recours à de l'aide si elle a l'impression que les *coûts symboliques* associés à une telle requête sont plus grands que les bénéfices qu'elle en retirerait ;
- Par ailleurs, des recherches en psychologie sociale ont clairement expliqué comment le soutien peut comporter des effets paradoxaux, c'est-à-dire un *impact négatif sur l'estime de soi* et un soulagement relié à la réception d'aide.

En ce qui me concerne, j'ai expliqué ce phénomène *par la mise en place de processus inconscients, du genre norme sociale*, qui influencent l'individu dans ces choix, à partir des éléments valorisés socialement. Or recourir à l'aide et au soutien est non seulement perçu socialement comme une « faiblesse » mais mène le plus souvent au stigmatisme social.

« Attendez, je pense qu'il faut arrêter de faire de chaque individu un assisté. Je fais partie d'une société, chacun doit fournir un minimum pour que cette société fonctionne. C'est pas à l'Etat, ou c'est pas à tous les organismes de vous prendre par la main et de... » - affirme Mme B.F.

Cette patiente semble assujettie à une norme sociale constitutive, de jugement et de comportement, véhiculant des représentations sociales stéréotypées.

On peut également se poser des nouvelles questions sur la façon d'établir les contours du réseau social et sur le fait qu'à des segments différents du réseau social peuvent

correspondre des attentes différentes et des appréhensions différentes quant à la pertinence d'une demande d'aide formulée par le patient.

Il est difficile de tracer un portrait-type des individus portés à recourir à l'aide (ce que l'on appelle des « help-seekers »). On peut quand même en cerner les principales caractéristiques. La recherche identifie quelques facteurs associés le plus souvent à une demande d'aide, comme : (1) la reconnaissance de la sévérité du problème par le patient ; (2) il faut également que la personne croie qu'une assistance extérieure va améliorer le problème. Les catégories de patients qui font appel à la consultation professionnelle sont plutôt : les personnes les plus jeunes ; les femmes, les plus éduqués, les personnes séparées ou divorcées et les gens qui n'adhèrent à aucune religion. Ces résultats de recherche, sont confirmés par notre propre étude, car en effet, les personnes de notre échantillon qui recourent au soutien sont toutes des femmes, dont une très jeune femme (Mme W.R.) et d'autres patientes plutôt éduquées, ne pratiquant pas spécialement de religion.

D'autre part, plus les personnes avancent dans l'âge, moins elles consultent leur entourage pour de l'aide informelle, avec une diminution marquée pour les femmes âgées. Dans notre cas, c'est tout le contraire, les patients sont tous dans une démarche active de recherche et demande d'informations, quelque soit leur âge – ce qui infirme les résultats de la recherche précitée, entreprise par....

Par ailleurs, une estime de soi élevée, un noyau de contrôle externe (« external locus of control »), un besoin marqué pour la réussite personnelle et le fait d'attribuer le besoin d'aide à ses propres déficits [cf. à la norme sociale d'attribution interne de causalité] conduisent le patient à penser que l'on devrait solutionner le problème seul. Ces caractéristiques potentielles des patients sont négativement associées à la volonté d'avoir recours aux gens de l'entourage pour obtenir de l'aide. Ca me paraît être le cas de Mme M.E. et de son époux, qui évoquent la dichotomie « faible » - « fort », lorsque je les interroge sur le soutien social.

Face à des situations de choc, de crise profonde comme celle d'un cancer, les patients mettent également en place - de manière plus ou moins consciente - des *mécanismes (1) de défense* (du genre régression ou dénégation – comme le patient I.J., qui nie partiellement la maladie, ses risques ainsi que le recours à toute forme de soutien en dehors de sa famille) ; et (2) des *mécanismes d'ajustement* (ou de coping) : comme les 4 autres patientes.

Sur l'ensemble du micro-échantillon pré-cité, 60 % des patients interrogés mettent en place des *stratégies d'ajustement à la maladie centrées sur le problème*, un coping de type actif (recherche d'informations, planification d'actions). Ils cherchent donc à faire des efforts cognitifs et comportementaux pour modifier la situation, efforts qui leur coutent, par contre sur le plan affectif. En revanche, 40 % des patients mettent en place des stratégies d'ajustement centrées sur l'émotion : pour Mme S.S. ce sont les voyages imaginaires, alors que pour Mme M.E c'est le refuge spirituel, sa foi – toutes deux dans le but de se construire un lieu de paix et de refuge intérieur et d'acquérir la tranquillité de l'esprit (même si dans les stratégies de coping adoptées par ces deux patientes il y a des légères différences : l'une est une stratégie d'évitement alors que l'autre plutôt une approche positiviste du monde).

### **Concernant les OPINIONS ET VALEURS en rapport avec le soutien (OVS8)**

L'analyse de contenu thématique dans le cas des représentations se fait à partir des opinions, attitudes et comportements décelés, mis dans une situation d'ancrage social.

Ceci occupera l'espace d'une future discussion, qui partira de la grille d'analyse d'un autre thème portant sur les représentations des patients sur les soignants (en tant que sources de soutien).

Lors de la présente analyse, je signale une gamme riche et variée de valeurs, opinions, attitudes, stéréotypes qui transparaissent à travers le discours des patients. Retenons les

valeurs : familiales, spirituelles, de solidarité, d'amitié, humanité, de vérité et de travail. Elles sont généralisées à l'ensemble du micro-échantillon et semblent fortement influencées par la norme sociale intégrée.

Certains patients comme Mr. I.J. élèvent au rang de valeur la *force intérieure*, alors que d'autres évoquent le *rapport existant entre la maladie et l'identité* : « *En ce moment je compte rester comme je suis. Je suis contente comme ça. A 100 %. Comme ça, je suis vraiment contente.* » (Mme S.S.). Ceci nous renvoie à l'idée que le patient, quelque soit la gravité de son état de santé ou les faiblesses du corps, compte rester une « *personne à part entière* » (Mme W.R.) qui doit être appréhendée et comprise en tant que telle. Sa dimension humaine ne doit pas être perdue de vue dans le feu des soins et de la médecine à caractère de plus en plus technique.

Si certains patients s'accrochent à leurs valeurs et opinions (Mr I.J.), d'autres ont le courage de les remettre en question (comme Mme B.F. qui regrette avoir perdu du temps dans les excès d'ordre et de nettoyage de sa maison). Mme B.F. semble par ailleurs une personne en situation de vivre un bouleversement important de ses habitudes et mentalités, bouleversement du à la maladie.

La notion du temps surgit à nouveau. Comme vous pouvez le remarquer, elle est **présente de manière transversale, à tous les niveaux, ancrée dans le conscient et l'inconscient**. Le temps évoqué ici est le temps consacré au malade, par les soignants. Un temps qu'ils voudraient plus long et plus personnalisé.

Parmi la multitude d'opinions, sur une variété de sujets, l'oncogénèse est abordée de manière intéressante. Chacun des patients émet des explications qui lui sont propres et qui ne semblent pas être influencées par les représentations collectives sur l'oncogénèse. Ainsi, Mr I.J., fervent admirateur de la valeur « travail » pense-t-il que l'origine de son cancer pourrait se trouver dans la pénibilité de son travail (nous rencontrons une fois de plus « la chose et son contraire » chez les patients). Madame B.F., dans un processus de remise en cause de nombres de ses valeurs et/ou comportements du passé, pense que la cause de son cancer se trouve probablement dans son rythme de vie agité : « Oui, c'est le stress, ça doit être le stress ». Mme M.E. et son époux avancent des explications des plus fantaisistes liés à des « *lampes par exemple, des lampes qui émettent ... Qui électrisent l'air et au bout, qui envoient des ions négatifs.* ». Deux autres patientes s'abstiennent à donner leur avis là-dessus.

En somme, sur l'oncogénèse, 60 % des patients y trouvent une causalité d'attribution externe, alors que le reste des patients déclare ne pas savoir. Cette « réserve » ressemblerait-elle plutôt à un « interdit » ( ?).

L'argent fait aussi objet de discussion. Placé entre valeur et moyen par une patiente (Mme B.F), la discussion sur l'argent a lieu en perspective culturelle ainsi que de valorisation par les modèles sociétaux en vigueur.

L'ensemble des opinions, attitudes, valeurs peuvent être mis en rapport à la fois avec les caractéristiques individuelles et les prescriptions sociales. Ce sujet sera développé lors d'analyses thématiques futures (concernant les autres thèmes retenus par mes soins).

### **Concernant l'EXPRESSION du soutien social (ES9)**

L'ensemble de notre micro-échantillon déclare *apprécier le soutien offert par ses sources choisies*.

Personne ne déclare d'ambly, de manière explicite, avoir besoin de soutien, mais les discussions sont souvent passionnées, malgré l'utilisation fréquente de *la 3<sup>ème</sup> personne*. Une 3<sup>ème</sup> personne qui est là pour masquer des sentiments et opinions personnels. En somme : oui, le soutien est très bien pour les autres, pour les plus atteints, pour les personnes seules, démunies, etc. C'est très bien que ça existe. Je vais peut-être m'en servir, à condition que quelqu'un vienne vers moi et me le propose.

Une mentalité qui se trouve entre la pudeur, la dignité, les mécanismes adaptatifs (comme le déni) ou d'ajustement (notamment centrés sur le problème), les prescriptions sociales intégrées et dont il faut en tenir compte si l'on veut améliorer le bien-être des patients, en leur facilitant l'accès au soutien.

Mais l'expression des patients va souvent au-delà de leurs mentalités, l'implicite peut se dissiper tout doucement lors des rencontres avec des personnes de confiance, soient-elles des proches ou des professionnels. L'intervention psychologique (quelqu'en soit sa forme) peut s'avérer salutaire sur ce plan-là.

Il y a parfois décalage entre les opinions, attitudes, comportements, mimiques, langage corporel, etc. Ce décalage peut, de premier abord prêter à confusion : le discours du patient peut paraître contradictoire (« la chose et son contraire »), voire factice. Mais les langues se délient et c'est dans cette liberté de parole-là que je vois une possibilité d'aller à l'essentiel de lui-même, au rythme et au respect de la volonté pour chaque patient. Pour pouvoir comprendre les conflits intérieurs qui déchirent souvent les patients et y apporter des réponses.

### Conclusions

Le message des patients, même si exprimé souvent de manière implicite, nous semble clair. Etre entendus, compris, mais pas surprotégés. Savoir que le soutien existe et choisir, chacun à son rythme, selon sa personnalité et le contexte qui lui sont propres, les solutions et les sources de soutien qui lui conviennent, en fonction de l'évolution de sa maladie et pourquoi pas de sa propre évolution en tant que malade. Recevoir du soutien mais l'accepter uniquement au moment venu, de la part de la personne de son choix, à laquelle il a donné sa confiance et qui correspond à ses attentes, tel est le souhait des patients. Pour certains, le soutien est accepté, à condition d'en donner à son tour ou mieux encore, le soutien est offert comme un don de soi. Pour d'autres, le soutien est perçu comme un juste retour sur son propre investissement auprès d'autrui.

Le soutien est un concept à visages multiples, mais aucun patient n'y est indifférent, quelques en soient ses formes et moments de manifestation. Tel qu'il ressort de mes 150 entretiens sur ce thème (dont 5 sont seulement analysés de manière approfondie, à titre d'exemple ici), interviews avec patients, professionnels et proches (et ce dans établissements et pays différents), personne n'est indifférent au soutien, bien au contraire. Le soutien social influence toute la trajectoire de l'être humain quelques soient ses rôles et ses statuts respectifs, le statut de malade en priorité. Entre le soutien perçu par le patient, le soutien donné par ce dernier et sa santé, existe de toute vraisemblance un rapport étroit.

L'analyse thématique du discours des patients sur le thème du soutien social perçu et donné - discours formulé de manière implicite ou explicite - conduit à la conclusion que ce thème est un thème majeur et majoritaire par rapport à d'autres thèmes que j'ai abordés dans ma recherche principale.

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## HEALTH CARE WASTE MANAGEMENT PRACTICES IN THE HOSPITALS OF TABUK CITY

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### Abstract

The study determined the frequency of practice of the health care waste management practices on segregation, minimization, collection, storage, transport, disposal and treatment in the hospitals in Tabuk City.

The study utilized a descriptive cross-sectional design. Interviews and ocular surveys/on-site observation, and the interviewer-administered questionnaire were utilized to gather data from the head nurse, waste handler during collection, waste handler during transport and waste manager.

Data collected were treated using a five point Likert scale, and quantified using the frequency count, ranking, percentage and the Weighted Mean.

The revealed that the health care wastes management practices are sometimes implemented in the hospitals in Tabuk City; segregation of wastes was generally often practiced, however, the use of plastic bags/plastic-lined cardboard boxes/leak-proof as containers of infectious and pathological wastes was seldom practiced. Waste minimization was often practiced, but composting was seldom practiced. Waste collection was sometimes practiced, but the collection of general wastes every shift and collection of biohazard wastes every shift was seldom practiced by the respondents.

Waste storage and waste transport were sometimes practiced by the hospitals; but labeling properly all bags/containers with basic information of content, written or attached on the bag, and using transport vehicles exclusively for HCW were never practiced.

Waste disposal was sometimes practiced, but offsite disposal exclusively for HCW was never practiced. Waste treatment was seldom practiced. Treating HCW before disposal, onsite treatment and using chemical disinfection as a type of treatment were seldom practiced while categorizing HCW when treating and treating wastewater prior to discharge off-site" were never practiced.

From the conclusive results, the following recommendations were formulated: There is a need for the DOH to monitor regularly the management of health care wastes in each hospital

1. For waste segregation, in the use of labels and color coding scheme, all body fluids and excreta should be disposed in the infectious category.
2. Waste minimization through source reduction and recycling not only of plastics but also other recyclable materials such as papers
3. Strengthen the practice of composting
4. Due to the lack of appropriate storage area, collection and transport of biohazard waste should be done daily.
5. The city government should propose a separate disposal site for all healthcare wastes and set limit to public access to decrease the risk of infectious diseases
6. Burial pits should be lined with material of low permeability, such as clay, to prevent groundwater contamination. However, burial pits are recommended if they are located within

the premises of the establishment. Encapsulation is the best method for disposal of sharps and should be practiced.

7. Waste treatment should be done to all infectious wastes.
8. The KASC Midwifery Department can initiate and conduct education and information campaign (IEC) for the hospital personnel, patients and guests at least once a year

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**Keywords:** Helath care, hospitals, Tabuk city

### **Introduction**

There are five hospitals in Tabuk city that include Kalinga Provincial Hospital, Almora General Hospital, Holy Trinity Hospital, St. Peter Claver hospital, and St. Jude Hospital. All these hospitals are licensed under Department of Health which is the fundamental criteria for the selection of hospitals for inclusion in this study. Kalinga Provincial hospital is a government hospital, classified as secondary hospital and largest in Tabuk city and the whole province of Kalinga. It operates with a 100-bed capacity and has four departments to include Surgery, Pediatrics, OB-Gyne and Medicine with basic services on radiology, X-ray, anesthesia and laboratory. The Kalinga Provincial Hospital is also the core referral hospital in the province of Kalinga. At present, facilities and services of the Kalinga Provincial Hospital are being upgraded as part of the Provincial Government's program to provide quality health services to the people. The Kalinga Provincial Hospital is governed by the board of Governors and headed by the Secretary of Health as provided by PD 1411. The daily operation is undertaken by Dr. Romulo Gaerlan, the provincial Health Officer.

Almora General Hospital is a private institution owned by Dr. Jaime Almora located at Purok 04, Bulanao. It is classified as secondary hospital and operates with a 15-bed capacity. It has four departments to include Surgery, Pediatrics, OB-Gyne and Medicine with basic services on radiology, X-ray, anesthesia, laboratory, laparoscopy and bone densitometry. The owner is a practicing surgeon and also the medical director of the Almora General Hospital (AGH).

Holy Trinity Medical Clinic is located at Purok 06, Bulanao, Tabuk, Kalinga. It is classified as primary hospital and operates with 10-bed capacity. The owner is Dr. George Taclobao, medicine doctor, and is also the medical director of the hospital.

St. Peter Claver Hospital is formerly St. Luke's Emergency Hospital which is located at Poblacion, Tabuk City, Kalinga. It is classified as primary hospital and operates with 22-bed capacity. The current hospital administrator and owner is Jane A. Claver, a nurse by profession. St. Jude Hospital is found at Mabini St., Poblacion, Tabuk, Kalinga. It is classified as primary hospital and operates with 20-bed capacity. The present medical director is Dr. Clifford John R. Gacuya who is the owner of the hospital.

### **Conceptual framework**

Waste management practices of hospitals today on environmental configurations are anchored on the concept on Environmental theory of Florence Nightingale.

Nightingale stated in her nursing notes that nursing "is an act of utilizing the environment of the patient to assist him in his recovery" (Nightingale 1860/1969), that it involves the nurse's initiative to configure environmental settings appropriate for the gradual restoration of the patient's health, and that external factors associated with the patient's surroundings affect life or biologic and physiologic processes, and his development.

The above idea goes along with the same path to the study since the study aims to determine the waste management practices of hospitals. The suggested waste management

practices of the Department of Health are forms of environmental configurations that would not only restore patient's health but the public at large.

Nightingale also believed that pure fresh air, pure water, effective drainage, cleanliness and light are the environmental factors affecting health that any deficiency in one or more of these factors could lead to impaired functioning of life processes or diminished health status.

Hence, this study intended to determine the frequency of practice of segregation, minimization, waste treatment, proper storage and proper waste disposal in the hospitals covered guided with the concepts that segregation and minimization of wastes in the forms of recycling and reusing would help in maintaining cleanliness of the environment because wastes are lessened. Waste treatment leads to pure water. Proper storage and proper waste disposal also leads to cleanliness, pure air, pure water and effective drainage.

### **Significance of the Study**

This study was conducted to provide data on the health care waste management of the abovementioned hospitals. The results will help provide the framework for policy formulation and promote regulatory compliance on the health care waste management guidelines of the Department of Health. Through this study, it is hoped that there will be (1) protection of the health of waste generators, waste handlers, clients, and the entire community; (2) protection of the environment from the potential hazards; (3) economic benefits resulting from reuse and recycle of waste; (4) opportunities for private sectors to provide waste treatments and final disposal sites for HCW; and (5) healthier and safer environment.

### **Objectives**

General objective: The study aimed to determine the health care waste management practices of hospitals in Tabuk city.

Specific objective: To determine the frequency of practice of the health care waste management practices on segregation, minimization, collection, storage, transport, disposal and treatment in the hospitals in Tabuk City.

### **Procedure/Methodology**

The respondents were the personnel from the hospitals licensed by the Department of Health particularly waste manager, head nurse, and the waste handlers during collection and transport. The Head nurse supervises nursing staff and nursing aids who are most responsible in segregating waste, the waste handler (collection and storage) is the janitor/ institutional worker responsible in the collection, storage, and treatment (if any) of healthcare waste within the hospitals, the Waste handler for transport and disposal site is the Janitor/ city garbage truck driver/ utility person in disposal site who is responsible in the transportation of HCW and off-site treatment and final disposal, and the Waste manager refers to the hospital administrator knowledgeable of the waste treatment plan of the hospital.

### **Final Procedure**

The study utilized a descriptive cross-sectional design. Through interviews and ocular surveys/on-site observation, and the interviewer-administered questionnaire for the head nurse, waste handler during collection, waste handler during transport and waste manager. The questionnaire was constructed patterned from the study "Waste management practices of Free-standing clinical laboratories in Zamboanga city" (Alfaro, 2009).

Data collected were quantified for description using a five point likert scale with the indicated limits and corresponding descriptive equivalent.

Scale	Limits	Descriptive Equivalent
5	4.21 – 5.0	Always (A)
4	3.41_ 4.20	Often (O)
3	2.61_ 3.40	Sometimes(S)
2	1.81 _ 2.60	Seldom (Se)
1	1.0 – 1.80	Never (N)

Frequency count, ranking, percentage and the Weighted Mean were used to quantify data for description.

## Results and discussions

### Frequency of Health Care Waste Management Practices of Hospitals in Tabuk city

The findings on health care waste management practices are presented along waste segregation, waste minimization, waste collection, waste storage, waste transport, waste disposal and waste treatment.

#### Waste Segregation

Table 1 shows the frequency of practice of the management practices on waste segregation.

Table 1. Frequency of Practices on Waste Segregation in Tabuk City

Waste Segregation Practices	WM	Interpretation
1. Waste is segregated at point of generation (by staff)	4.0	Often
2. Use of color-coding scheme for HCW segregation	2.40	Seldom
3. Waste containers are labeled	3.6	Often
4. Waste containers are stored away from drains	5.0	Always
5. General waste containers are placed beside infectious waste containers	4.0	Often
6. Sharps are collected together whether or not they are contaminated	5.0	Always
7. Sharps containers are puncture-proof (metal/ high-density plastic)	2.6	Seldom
8. Containers of infectious and pathological wastes are placed in plastic bags/plastic-lined cardboard boxes/leak-proof	1.4	Not Practiced
9. Appropriate containers or bag holder are placed in all locations where particular categories of waste maybe generated	2.60	Seldom
10. Body fluids(blood, serum, sputum, urine, discharges, etc) are disposed down the drain	5.0	Always
11. Chemicals are disposed down the drain	4.30	Always
Total Mean	3.63	Often

As shown by the table, the waste management practices on segregation were generally often practiced as revealed by the Total Mean of 3.63

The researchers identified 11 practices on segregation of which 3 of these were always practiced as revealed by the obtained Mean of 5.0 each. These were the indicators of waste containers are stored away from drains, and body fluids(blood, serum, sputum, urine, discharges, etc) are disposed down the drain. Similarly, the practice that chemicals are disposed down the drain was always practiced with an obtained mean of 4.30.

The practice that general waste containers are placed beside infectious waste containers was often practiced with a Mean of 4.4 together with the practice of “waste containers are labeled” as evidenced by the Mean of 3.6.

The practice of using color-coding scheme for HCW segregation was seldom practiced as shown by the obtained Mean of 2.40 together with the practice that sharps

containers are puncture-proof (metal/ high-density plastic) as reflected by the Mean of 2.6. Appropriate containers or bag holders are placed in all locations where particular categories of waste maybe generated was also sometimes practiced in the hospital as revealed by the Mean of 3.0 while the practice that “containers of infectious and pathological wastes are plastic bags/plastic-lined cardboard boxes/leak-proof” was seldom practiced in the hospitals in the City of Tabuk with a Mean of 1.4.

The above findings generally imply that wastes segregation in the hospitals are practiced as expected except the practice of “containers of infectious and pathological wastes are placed in plastic bags/plastic-lined cardboard boxes/leak-proof” which is seldom practiced. These containers are handled just like those containers of non-infectious and pathological wastes.

### Waste Minimization

Table 2 presents the frequency of practice of the management practices on waste minimization.

Table 2. Frequency of Practices on waste minimization

Waste minimization	WM	Interpretation
1. Recycling plastic bottles	4.20	Often
2. Reuse of vials	4.0	Often
3. Segregation	4.0	Often
4. Composting	2.40	Seldom
Total Mean	3.65	Often

The Total Mean of 3.65 shows that the practices on waste minimization were often practiced by the respondents in the hospitals in the City of Tabuk. Waste minimization practices covered recycling plastic bottles, 4.20; reuse of vials,4.0; segregation, 4.0; and composting, 2.40. The results show that there is the practice of minimizing wastes among the hospitals by recycling plastic bottles, reusing vials, and segregating wastes in way that those infectious ones be placed in proper containers while those degradable ones can be separated for composting. It is noted however, that composting is seldom practiced. The finding could be attributed to the nature of hospital wastes where they are mostly plastics and bottles not suited for composting.

### Waste Collection

Table 3 reveals the frequency of practices on waste collection.

Table 3. Frequency of Practices on Waste Collection

Waste Collection	WM	Interpretation
1. Containers are immediately replaced with new ones of the same type after collection	3.6	Often
2. Collection of general wastes is done every shift	1.81	Seldom
3. Collection of biohazard wastes is done every shift	1.81	Seldom
4. In collecting wastes, protective gear is used.	4.0	Often
5. A supply of fresh collection bags are readily available at locations where waste is produced	4.4	Often
Total Mean	3.12	Sometimes

Table 3 shows a Total Mean of 3.12 which indicates that the practices on waste collection were sometimes practiced as a whole. The result was attributed to the result of the 5 indicators under waste collection. These were the practices of a supply of fresh collection bags are readily available at locations where waste is produced with the highest Mean of 4.4 interpreted as “often” practiced; followed by the practice that in collecting wastes, protective gear is used, 4.0; and containers are immediately replaced with new ones of the same type

after collection, 3.6. On the other hand, the two practices of collection of general wastes is done every shift and collection of biohazard wastes is done every shift were both seldom practiced by the respondents as shown by the similar Means obtained of 1.81 each

### Waste Storage

Table 4 shows the frequency of practice of the waste management practices on storage.

Table 4. Frequency of Practices on Waste Storage

<b>Waste Storage</b>	<b>WM</b>	<b>Interpretation</b>
1. Collected wastes are stored in waste storage area until transported	3.0	Sometimes
2. Number of days wastes are kept in storage area Within: 2-3 days	3.80	Often
3. Biohazard wastes are stored not more than 2 days	3.00	Sometimes
Total Mean	3.00	Sometimes

As a whole, the waste management practices on storage were sometimes practiced by the hospitals as shown by the Total Mean of 3.00. The finding was attributed to the Means obtained by the three indicators where two were sometimes practiced with one often practiced. The practices that the number of days wastes are kept in storage area within 2-3 days was often practiced with a mean of 3.80 while the practices that biohazard wastes are stored not more than 2 days both obtained a Mean of 3.0 described as sometimes practiced while the practice that collected wastes are stored in waste storage area until transported got 3.0 Mean with an interpretation of "sometimes" practiced.

It noted from the data that wastes in the hospitals are not always stored properly before they are transported for disposal.

### Waste Transport

The frequency of practice of the waste management practices on transporting wastes is shown by Table 5.

Table 5. Frequency of Practices on Waste Transport

<b>Waste Transport</b>	<b>WM</b>	<b>Interpretation</b>
1. All bags/containers are labeled properly with basic information of content, written or attached on the bag	1.0	Never
2. The containers of HCW are robust for their content for their normal conditions of handling and transportation	4.0	Often
3. The HCW containers are tightly closed or sealed before transport	4.0	Often
4. The City Garbage Truck transport wastes	4.0	Often
5. Transport vehicles are exclusive for HCW	1.0	Never
6. Frequency of general waste transport is done 2x a week	4.0	Often
7. Biohazard waste transport is done daily Daily	4.0	Often
Total Mean	3.14	Sometimes

As a whole, the waste management practices on transport were sometimes practiced as revealed by the Total Mean of 3.14 as indicated on the table.

Seven (7) practice indicators under waste management on transport were identified from which 5 were often practiced, and two never practiced. The practices that the HCW containers are tightly closed or sealed before transport, the City Garbage Truck transport wastes, frequency of general waste transport is done 2x a week, and biohazard waste transport is done daily were perceived by the respondents to be always practiced; and the practice that the containers of HCW are robust for their content for their normal conditions of

handling and transportation were often practiced with similar Means of 4.0 while the practices that all bags/containers are labeled properly with basic information of content, written or attached on the bag and transport vehicles are exclusive for HCW were never practiced as shown by the Means of 1.0 each.

The findings generally reveal that wastes collected were not properly labeled before transporting them for disposal and there were no city vehicles exclusively for transporting wastes.

### Waste Disposal

Table 6 reveals the frequency of practice of waste management practices along disposal.

Table 6. Frequency of Practices on Final Disposal

<b>Disposal (onsite)</b>	<b>WM</b>	<b>Interpretation</b>
1. The site is exclusive only for HCW	4.0	Often
2. Type of disposal sites for HCW Septic/ concrete vault (wastewater and infectious waste) Small burial pit(sharps)	4.0	Often
3. The site is secured from public access	3.4	Sometimes
Area Mean	3.80	Always
<b>Disposal (offsite)</b>	<b>WM</b>	<b>Interpretation</b>
1. The site is exclusive only for HCW	1.0	Never
2. Type of disposal sites for HCW is the Sanitary landfill	4.0	Often
3. The site is secured from public access	4.0	Often
Area Mean	3.0	Sometimes
Total Mean	3.40	Sometimes

The Total Mean of 3.40 reveals that the practices on final waste disposal were sometimes practiced generally.

Final waste disposal is divided into onsite and offsite disposal. As indicated on the table, onsite disposal practices were always practiced with an Area Mean of 3.80 while the practices along offsite disposal were sometimes practiced with an area Mean of 3.0.

Of the 3 indicators under onsite disposal, “the site is exclusive only for HCW” was often practiced with a Mean of 4.0, which means that the onsite for disposal of HCW is a site used for disposing health care wastes only. Similarly, the types of disposal sites for HCW which were either Septic/ concrete vault (wastewater and infectious waste) or Small burial pit(sharps), with a Mean of 4.0, while practice that the site is secured from public access was sometimes practiced with a mean of 3.40 an indication that there are times when the site for HCW is also used for disposing other kinds of wastes by the public. Under offsite disposal, it has 3 indicators of which 2 were often practiced with one never practiced. The indicators of “type of disposal sites for HCW is sanitary landfill” and “the site is secured from public access” both obtained Means of 4.0 each while the indicator “the site is exclusive only for HCW” got a Mean of 1.0, interpreted as “never” practiced. It is implied in the finding that the site for disposing health care wastes is the same site for the final disposal of other kinds of wastes.

### Waste Treatment

The frequency of practice of the waste management practices on treatment is presented on Table 7.

Table 7. Frequency of Practices on Waste Treatment

Waste treatment	WM	Interpretation
1. HCW are treated before disposal	1.8	Seldom
2. Treatment is done onsite	1.8	Seldom
3. Type of treatment used chemical disinfection	1.8	Seldom
4. Treatment of HCW is by category	1.4	Never
5. Treatment is done to wastewater prior to discharge off-site	1.0	Never
Total Mean	1.56	Never

The Total Mean of 1.56 indicates that as a whole the waste treatment practices were never practiced. The finding resulted from the findings on the 5 indicators along waste treatment where 3 of them were seldom practiced with 2 never practiced. The 3 indicators which obtained similar Means of 1.8 each interpreted as “seldom” practiced were “HCW are treated before disposal”, “treatment is done onsite” and “type of treatment used chemical disinfection”.

On the other hand, the practices that “treatment of HCW is by category” and “treatment is done to wastewater prior to discharge off-site” both got similar Means of 1.0 each which indicated that the indicators were never practiced. The findings imply that in the hospitals in Tabuk City, healthcare wastes are not being categorized when treated and wastewater are not treated before disposal.

It can be deduced from the data gathered that hospital wastes are not properly treated before they are finally disposed.

## Summary and conclusions

### Summary of the HCW management practices

Table 8 shows the summary of the HCW practice

Table 8 shows the summary of the HCW practice

HCW Management Practices	Mean	Description	Rank
1. Waste Segregation	3.62	Often	2
2. Waste Minimization	3.65	Often	1
3. Waste Collection	3.12	Sometimes	6
4. Waste Storage	3.40	Sometimes	3.5
5. Waste Transport	3.14	Sometimes	5
6. Waste Disposal	3.40	Sometimes	3.5
7. Waste Treatment	1.56	Never	7
TOTAL MEAN	3.13	Sometimes	

The health care waste management practices are sometimes practiced by the hospital in Tabuk City as evidenced by the Total Mean of 3.13. Of the 7 practices for implementation, 2 were often implemented. These are waste segregation and minimization with obtained means of 3.65 and 3.62. Four were sometimes practiced which included waste collection, waste storage, waste transport, and waste disposal, while waste treatment was never practiced generally in the hospitals except the provincial hospital.

The data and information provides an idea that there is a need to strengthen the practice or implementation of the different practices for a better environment in the workplace and for the patients who are being served by each hospital.

## Conclusion

1. The health care wastes management practices are sometimes implemented in the hospitals in Tabuk City

1.1 The waste management practices on segregation were generally often practiced

- 1.2 The practice that containers of infectious and pathological wastes are plastic bags/plastic-lined cardboard boxes/leak-proof" was seldom practiced
- 2.1 Waste minimization was often practiced by the hospitals
- 2.2 Composting was seldom practiced
  - 3.1 Waste collection was sometimes practiced by the hospitals
  - 3.2 The collection of general wastes every shift and collection of biohazard wastes every shift were seldom practiced by the respondents
  - 4.1 Waste storage was sometimes practiced by the hospitals
  - 4.2 Storage of biohazard wastes for 2-3 days is sometimes practiced
5. 1 The waste management practices on transport were sometimes practiced by the respondents
  5. 2 The practices that all bags/containers are labeled properly with basic information of content, written or attached on the bag, and transport vehicles are exclusive for HCW were never practiced
    - 6.1 The practices on waste disposal were sometimes practiced.
    - 6.2 The onsite disposal practices were often practiced while the offsite disposal practices were sometimes practiced or implemented by the respondents
    - 6.3. Offsite disposal for exclusively HCW was never practiced
- 7.1. The waste treatment practices were seldom practiced
  - 7.2. Treating HCW before disposal, onsite treatment and using chemical disinfection as a type of treatment were seldom practiced while categorizing HCW when treating and treating wastewater prior to discharge off-site" were never practiced.

### **Recomendation**

1. There is a need for the DOH to monitor regularly the management of health care wastes in each hospital
2. For waste segregation, in the use of labels and color coding scheme, all body fluids and excreta should be disposed in the infectious category.
3. Waste minimization through source reduction and recycling not only of plastics but also other recyclable materials such as papers
4. Strengthen the practice of composting
5. Due to the lack of appropriate storage area, collection and transport of biohazard waste should be done daily.
6. The city government should propose a separate disposal site for all healthcare wastes and set limit to public access to decrease the risk of infectious diseases
7. Burial pits should be lined with material of low permeability, such as clay, to prevent groundwater contamination. However, burial pits are recommended if they are located within the premises of the establishment. Encapsulation is the best method for disposal of sharps and should be practiced.
8. Waste treatment should be done to all infectious wastes.
9. The KASC Midwifery Department can initiate and conduct education and information campaign (IEC) for the hospital personnel, patients and guests at least once a year

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### Appendices

#### Research Pictorials



Figure 8. Storage for sharp objects in the Kalinga Provincial Hospital



Figure 9. Storage for biodegradable, infectious, and non-biodegradable (KPH)



Figure 10. New Disposal for waste waster (Kalinga Provincial Hospital)



**Figure 11. Old Disposal for Waste Water (Kalinga provincial Hospital)**



**Figure 12. Storage for vials (Kalinga Provincial Hospital)**



**Figure 13. Storage for sharp objectives and medical supply wastes (Almora General Hospital)**



**Figure 10. Storage for plastic**



**Figure 14. Storage for medical wastes (Almora General Hospital)**

## DEVELOPMENT & OPTIMIZATION OF ALLYL AMINE ANTIFUNGAL NANOEMULGEL USING 2<sup>3</sup> FACTORIAL DESIGN: FOR THE TREATMENT OF *TINEA PEDIS*

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### Abstract

Drug permeation through skin from topical nanoemulsion (NE) depends on the concentration of the oil phase, aqueous phase, surfactant and co surfactant. Hence it is very important in optimizing the composition of NE. The conventional method of experimentation is costlier and is restricted to changing one factor at a time, the other factors being kept constant. Hence, there is a need of design of experiment (DoE), a statistical tool for finding optimum combination, using relationship between factors affecting a process and output of that process. The levels of the critical factors influencing the NE formation, were obtained from pseudo ternary phase diagram. From the design matrix of DoE, formulation matrix was generated which were analyzed for globule size as response. The model was found to be highly significant from the F ratio (71.49) and R<sup>2</sup> value of 0.9940. The optimized formulation was found to pass the stability and viscosity test (approx.120 cP). *Ex-vivo* skin permeation test of nanoemulgel (NG) formulation showed skin permeability of approximately 20% of the drug, while the marketed cream (MC) showed a permeability of 18% only. The amount of drug retained in the skin by the NG formulation was found to be approximately 31% while for the MC it was found to be only 20%. The NG formulation was found to treat the infected rat skin within 12 days of treatment while the MC took about 16 days for complete removal of the infection. Thus the NG formulation effectively permeates to the layers of the skin and treats the fungal infection more efficiently than the MC.

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**Keywords:** Nanoemulsion, design of experiment, *ex-vivo* skin permeation tests, *in-vivo* treatment of infected skin

### Introduction

Topical preparations are those formulations meant for application to the surface of the skin for localized effect to treat various skin infections, as pain relieving medications etc.,(1). Dermatophytes, in the evolutionary process have acquired the ability to metabolize and subsist upon keratin, a protein resistant to most other organisms (2). The fungi attack skin, nails, and hair, where keratin is the major structural protein, leading to a wide variety of disease states. Three types of dermatophytes account for the majority of infections: *Epidermophyton*, *Trichophyton*, and *Microsporum*. Dermatophytoses have varied presentations, are named by location, and have similar treatments. The major types of dermatophyte infections include: involvement of the scalp (tinea capitis), feet (tinea pedis), groin (tinea cruris), and other body surfaces (tinea corporis). These are typically superficial, involving the epidermis (2,3). The conventional topical agents like creams, ointments, lotions pose many disadvantages. They are sticky causing uneasiness when applied, have less spreading coefficient, exhibit stability problems also. Nano emulsions are heterogenous,

isotropic, thermodynamically stable, transparent systems, where the dispersions of oil and water are stabilized by use of surfactant molecules (4).

Drug permeation through skin from topical nanoemulsion formulations depends on their composition of the oil phase, aqueous phase, surfactant and co surfactant. Hence it is very important in optimizing the composition of these 4 factors in the formulation of nanoemulsion (5). The conventional method of experimentation is costlier and is restricted to changing one factor at a time, the other factors being kept constant. This fails to show interaction effect that may exist between some of the factors consequent on which optimum combinations are difficult to be determined. Hence, there is a need of design of experiment (DoE), a statistical tool for finding optimum combination, using relationship between factors affecting a process and output of that process (6).

Butenafine is a synthetic benzylamine derivative used for the topical treatment of *tinea pedis*. It works by inhibiting the synthesis of ergosterol by inhibiting squalene epoxidase, an enzyme responsible for the creation of sterols needed in fungal cell membranes (7). Lacking ergosterol, the cell membranes increase in permeability, allowing their contents to leak out. Though the marketed formulations effectively treat the fungal infection they require prolonged use of the drug. The present work is aimed at formulating nanoemulgel of butenafine hcl, with increased permeability and thus reduce the duration of treatment.

### Materials

Butenafine Hcl was obtained as a gift sample from Vasista laboratories (Hyderabad, India). Capryol 90, Capmul MCM, Labrafac (LF), Isopropyl myristate (IPM), Lauroglycol (LG), Labrafac Lipophile (LL) and Soya oil (SO) were received as a gift sample from Gattefosse Pvt. Ltd. (Mumbai, India). Cremophore RH 40 was obtained as gift samples from Gattefosse (Mumbai, India). Ethanol was purchased from Rankem Pvt. Ltd. Carbopol 934P was purchased from Corel Pharma (Ahmedabad, India). *T. rubrum* (MTCC No. 296) and *C. albicans* (MTCC No.3018) were procured from Institute of Microbial Technology (Chandigarh, India). Double distilled water was used throughout the study. All other chemical reagents and solvents used were of analytical grade.

### Method

Nanoemulsion was formulated by spontaneous emulsification technique using slow aqueous titration method and is dispersed into the carbapol gel (8).

### Solubility studies (9)

Solubility of Terbinafine was determined in various oils such as Capryol 90, Capmul MCM, LF, IPM, LG, LL, and SO by shake flask method. An excess amount of drug was taken in 2 ml of the oil in vials, and mixed using vortex mixer. The vials were then kept at  $25 \pm 1^{\circ}\text{C}$  in an isothermal shaker for 72hrs to reach equilibrium. The equilibrated samples were then centrifuged at 3,500rpm for 15min. The supernatant was filtered through a  $0.45\mu\text{m}$  membrane filter. The amount of drug dissolved in the oil was determined using UV spectrophotometer at their respective wavelength (table 1).

### Construction of pseudoternary phase diagram (10)

Pseudo ternary phase diagrams were constructed to examine the formation of oil in water nanoemulsion with 4 components oil, surfactant, cosurfactant, and aqueous phase. The 4-component system consists of (i) Labrafac Lipophile (Selected from solubility studies) (ii) surfactant Cremophore RH40 (iii) a Cosurfactant (Ethanol) and (iv) distilled water (aqueous phase). Surfactant and cosurfactant in each group were mixed in different weight ratios (1:1 to 1:9 and 1:1 to 9:1). These ratios were chosen in increasing concentration of surfactant

with respect to co surfactant and viceversa. For each phase diagram, oil and specific surfactant and co surfactant mixture (ScoS) was mixed in different weight ratios from 1:9 to 9:1 in different glass vials. Seventeen combinations of oil and SCoS, 1:9, 1:8, 1:7, 1:6, 1:5, 1:4, 1:3, 1:2, 1:1, 9:1, 8:1, 7:1, 6:1, 5:1, 4:1, 3:1, 2:1 were made so that maximum ratios were covered for the study to depict the boundaries of phases precisely formed in the phase diagrams. Slow titration with aqueous phase was done to each weight ratio of oil and SCoS and visual observation was carried out for transparency and flowability of the nanoemulsions. Only the nanoemulsion regions were plotted in the pseudoternary phase diagram. The pseudo-ternary phase diagrams were built using CHEMIX School software ( fig 1 to 6).

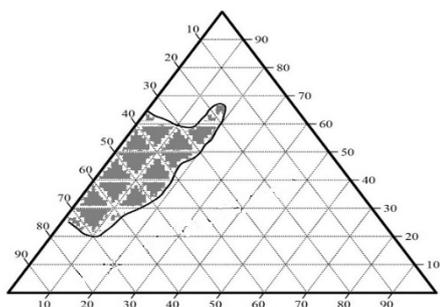


Fig 1: ScoS 2:1

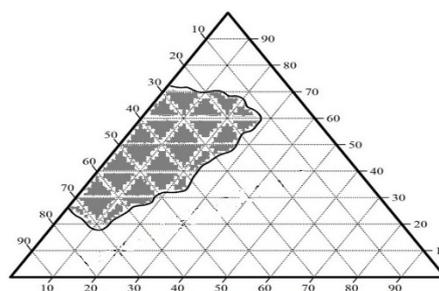


Fig 2: ScoS 2:3

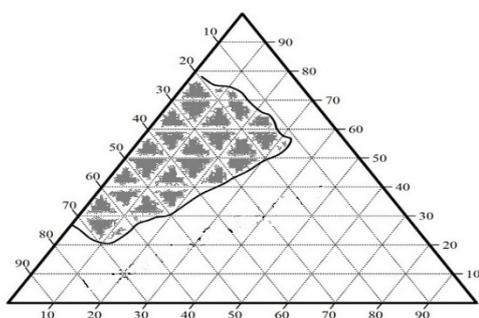


Fig 3: ScoS 3:2

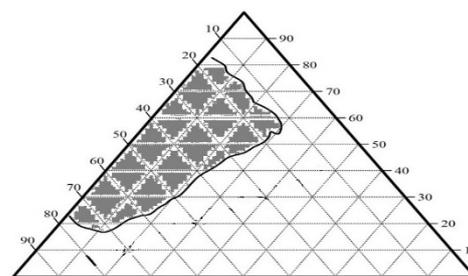


Fig ScoS 4:1

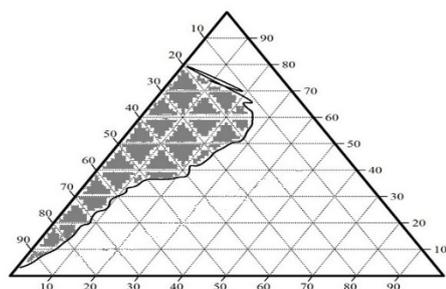


Fig 5: ScoS 5:2

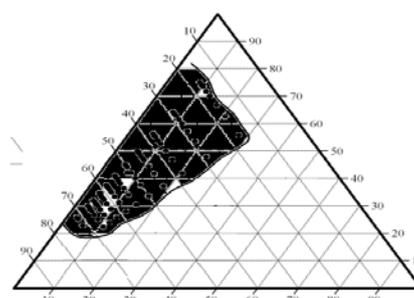


Fig 6 : ScoS 6:3

#### 4.3 2<sup>3</sup> Factorial design (11)

Full factorial design allows studying the effect of each factor on the response variable, as well as the effects of interactions between factors on the response variable. The minimum and maximum levels of the independent variables were obtained from the pseudo ternary phase diagrams and are incorporated in the DoE design matrix (table 2). The optimized formulation of the nanoemulsion was achieved by analysis of the results of the design matrix using UNSCRAMBLER 10.3X software, with three critical factors which influence globule size of the nanoemulsion (table 3).

The batches were formulated and evaluated for globule size of the emulsion and the design matrix was analysed (table 4). Three batches of the optimized formulation (A, B, C) as given by the results of DoE were prepared and stability studies were performed.

### **Thermodynamic Stability studies (9)**

The batches A, B and C were formulated with the optimized composition of SCoS 2:1 and Oil:SCoS 1:1 and were subjected to different thermodynamic stability studies such as centrifugation, heating cooling cycle and freeze thaw cycle, to avoid the selection of metastable formulations (table 5).

### **Incorporation of drug**

Stable and optimized nanoemulsion formulations from stability studies were selected and formulated by incorporating the drug in the oil phase such that it accounts to 1% of the total nanoemulgel.

### **Preparation of gel**

4% Carbapol gel was prepared using 10% Triethanolamine and the pH was adjusted to 7.2.

### **Incorporation of nanoemulsion into the gel**

The nanoemulsion was incorporated into the gel by simple dispersion.

### **Evaluation of nanoemulgel**

Thus the formulated nanoemulgel is evaluated for viscosity (12) (table 6) using Brookfield DV III ultra V6.0 RV cone and plate rheometer using spindle # CPE40 at  $25\pm 0.5^{\circ}\text{C}$ , homogeneity by visual characterization, *ex-vivo* drug permeation through skin using Franz diffusion cell, and *in vivo* treatment of infected rat skin.

### **Ex-vivo drug permeation through rat skin using Franz diffusion cell (13):**

Ex-vivo skin permeation studies for formulation A, B and C, marketed formulation and a blank were performed in a Franz diffusion cell with a diffusion area of  $2.26\text{cm}^2$  and receptor volume of 22.5mL using abdominal rat skin. Abdominal rat skin was excised and washed with isotonic NaCl. The excised skin was then mounted between the donor and the receptor chambers of the Franz diffusion cell with the dermal side in contact with the receptor medium and the stratum corneum side facing upwards into the donor compartment. Then, optimized NE formulation equivalent to 250 mg of Butenafine Hcl was evenly applied on the surface of the rat skin in the donor compartment. The receptor compartment was filled with physiological saline solution (pH 5.5 acetate buffer/methanol (9:1)). The temperature in the receptor compartment was maintained at  $37\pm 0.5^{\circ}\text{C}$  to simulate the skin temperature and was magnetically stirred at 50 rpm. Samples were withdrawn at predetermined time intervals of 0.15, 0.30, 0.45, 1, 2, 4, 6, and 9hrs, filtered through  $0.45\mu\text{m}$  cellulose membrane filter and analyzed for butenafine content by UV spectroscopy (fig 7). Fresh buffer solution was immediately replaced into the receptor chamber after each sampling.

After 9hrs the % drug retained on the skin at the end of 9<sup>th</sup> hr was determined. The rat skin is minced, equilibrated with physiological buffer solution to extract the drug from the skin layers. The equilibrated solution is filtered through  $0.22\mu\text{m}$  filter and was analyzed for drug content spectrophotometrically.

### **Infecting the rat skin (14)**

12 male wistar rats, each weighing 180 to 200gms were selected with 3 in each group. One group for formulation A, the other for formulation B, the third for marketed formulation

and the fourth group is maintained as control. On the back of each animal, the areas of 4 cm were cleaned and depilated. The infectious inoculum was prepared from a 7 day old culture of *Trychophyton mentagrophytes*. The inoculum was applied on the animal back immediately after the depilation and left for 7 days. The establishment of active infection was confirmed by visual examination of the erythematous lesions.

### ***In vivo* treatment of infected rat skin**

To the infected area the formulated gel was applied and the animals were kept undisturbed for 24hrs. They were examined for the disappearance of the lesions and this procedure was repeated until complete disappearance of the lesions.

## **Results and discussion**

### **Solubility studies**

Solubility of the drug in the oil phase plays a crucial role in the formulation of nanoemulsion. So the oil in which the drug shows maximum solubility is selected for further studies. From table 1 it shows that Labrafac lipophile shows maximum drug solubility of 127mg/mL. Hence LL is selected as the oil phase for nanoemulsion formulation.

Table 1: Solubility studies

OIL	SOLUBILITY(mg/mL)
CAPRYOL 90	48
CAPMUL MCM	27
LF	62
IPM	21
LG	34
LL	127
SO	40

### **Pseudo ternary phase diagram study**

Phase behavioral studies were performed by constructing phase diagrams that depict the boundaries of different phases, as a function of composition and temperature, to investigate the structural organization of the emulsions formed. The concentration of surfactant and co-surfactant is responsible for the barrier formation at the interface required to prevent the coalescence of the formed nanoemulsion. SCoS gets adsorbed at the interface, reducing the energy required for nanoemulsion formation thus improving the thermodynamic stability of the nanoemulsion formulation. From the pseudoternary phase diagram study, it is evident that the oil concentration of 1 to 5mL and surfactant concentration of 2 to 6 mL and cosurfactant concentration of 1 to 3 promotes the nanoemulsion region with required consistency. Hence these limits were inserted in the design matrix and analysed for optimized formulation.

Table 2: Variables for optimization and their limits

INDEPENDENT VARIABLES			LEVELS	
			LOW	HIGH
SL.NO	VARIABLE	UNIT	-1	+1
1	OIL	mL	1	5
2	CREMOPHORE RH 40	mL	2	6
3	ETHANOL	mL	1	3

Table 3: Variable optimization using DoE: Matrix generated by UNSCRAMBLER 10.3 X software and the response values

STD	RUN	BATCH	FACTOR 1, OIL (mL)	FACTOR 2, CREMOPHORE RH 40 (mL)	FACTOR 3, ETHANOL (mL)	GLOBULE SIZE (nm)
1	9	F1	1	2	1	40
2	2	F2	5	2	1	25
3	3	F3	1	6	1	18
4	4	F4	5	6	1	12
5	10	F5	1	2	3	56
6	1	F6	5	2	3	60
7	6	F7	1	6	3	20
8	11	F8	5	6	3	60
9	5	F9	3	4	2	15
10	7	F10	3	4	2	32
11	8	F11	3	4	2	28

Table 4: ANOVA results of DoE

ANOVA	SS	DF	MS	F-RATIO	p-VALUE
SUMMARY					
MODEL	1113.5	7.0	159.0714	71.4198	0.0025
ERROR	6.6818	3.0	2.2273		
CORRECTED TOTAL	1120.1820	10.0			
VARIABLES					
OIL(A)	578.0	1.0	578.0	259.5102	0.0005
CREMOPHORE RH 40 (B)	480.0	1.0	480.5	215.7347	0.0007
ETHANOL (C)	50.0	1.0	50.0	22.4490	0.0178
OIL*CREMOPHORE RH 40	2.0	1.0	2.0	0.8980	0.4132
OIL* ETHANOL	0.5	1.0	0.5	0.2245	0.6680
CREMOPHORE RH 40 * ETHANOL	2.0	1.0	2.0	0.8980	0.4132
OIL*CREMOPHORE RH 40 * ETHANOL	0.5	1.0	0.5	0.2245	0.6680
MODEL CHECK					
LINEAR	1108.5	3.0	369.5	165.8980	0.0008
INTERACTION 2	4.5	3.0	1.5	0.6735	0.6234
INTERACTION 3	0.5	1.0	0.5	0.2245	0.6680
LACK OF FIT					
LACK OF FIT	6.6818	1.0	6.6818		
PURE ERROR	0	2.0	0		
ERROR	6.6818	3.0	2.2273		
QUALITY					
METHOD USED	FULL FACTORIAL DESIGN				
R <sup>2</sup>	0.9940				
ADJUSTED R <sup>2</sup>	0.9801				
PREDICTED R <sup>2</sup>	-0.4050				
S	1.4924				
MEAN	22.7273				
C.V IN %	6.5666				
PREDICTED SS	573.88				

SS= SUM OF SQUARES; DF= DEGREE OF FREEDOM; MS= MEAN SQUARED;

The actual and predicted plots fall close to the line. ANOVA (partial sum squares-type-III) reveals the model with F ratio of 71.4198, and R<sup>2</sup> value of 0.9940 which implies the model to be significant. The optimized batch as given by the analysis of the results of DoE is ScoS ratio of 2:1 and Oil: ScoS ratio of 1:1.

## Thermodynamic stability studies

Table no 5: Thermodynamic Stability studies

FORMULATION	THERMODYNAMIC STABILITY STUDIES		
	CENTRIFUGATION	HEATING & COOLING CYCLE	FREEZE THAW CYCLE
A	Pass	Pass	Pass
B	Pass	Pass	Pass
C	Pass	Pass	Pass

Thermodynamic stability studies differentiate those nanoemulsion formulations from those of kinetically stable formulations which undergo phase separation. The formulations which pass the thermodynamic stability studies are those formulations which contain adequate amounts of SCoS concentration required for nanoemulsion formulation, and which decreases the energy required for nanoemulsion formation. This decreased energy contributes to the stability of nanoemulsion. From table 5 it is evident that the formulation A, B, C passed the stability studies. Hence formulations A, B, C were kinetically stable with adequate amounts of SCoS concentration.

## Evaluation of nanoemulgel

### Viscosity and homogeneity studies

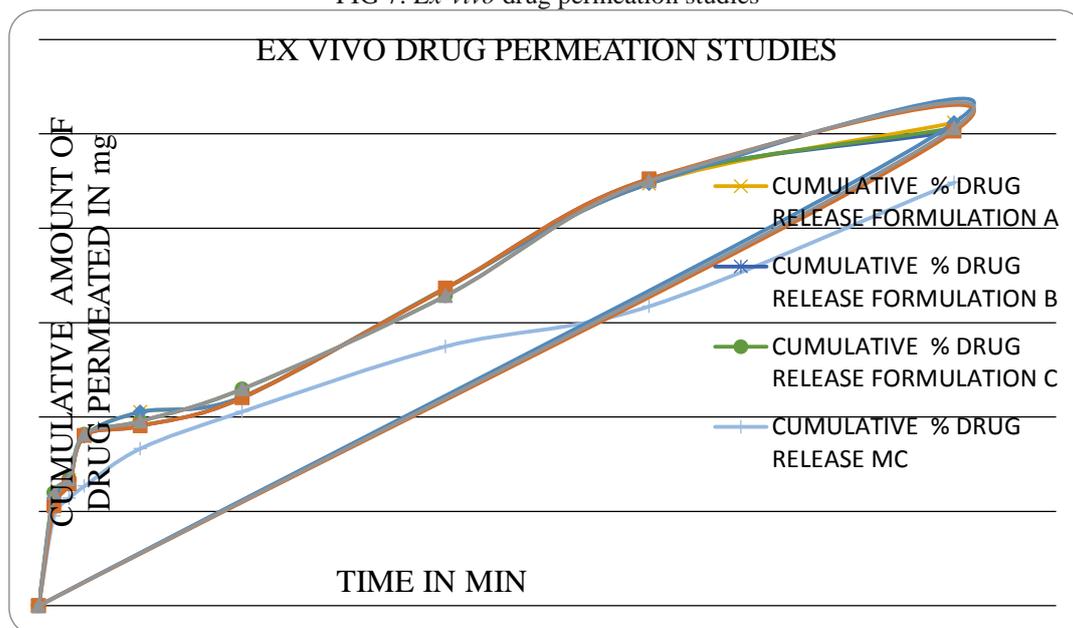
Table 6: Viscosity and homogeneity studies

FORMULATION	MEAN VISCOSITY (CP)	HOMOGENEITY
A	119.86	Clear & translucent
B	119.28	Clear & translucent
C	120.05	Clear & translucent

The viscosities of the formulations A, B, and C were not higher, which indicates that the rate of drug permeation from the NG formulation is not hindered by the gel structure of the gelling agent and they also have good spreadability on the surface of the skin. Moreover the concentration of SCoS and the oil did not oppose for the flow and hence the viscosity. This adds an additional advantage to the NE formulation. The formulations were found to be clear and translucent.

### *Ex-vivo* drug permeation through rat skin using Franz diffusion cell

From the drug permeation studies it was observed that butenafine concentration steadily increased in the receptor chamber with increase in time, where the permeation profile generally followed Fick's law of diffusion. The amount of butenafine that permeated through the skin by the end of 9hrs after application was found to be 51.19 mg, 50.28 mg, 50.64 mg and 44.84 mg from formulation A, B, C and M.C respectively. This may be attributed to the smaller globule size of the NE formulation which provides larger area for permeation of drug in to skin and high drug concentration on the affected area results in a larger concentration gradient, which is necessary for efficient dermal drug delivery. The increase in drug concentration in the receptor compartment may also be due to the decreased interfacial tension by SCoS, which is responsible for the decreased globule size. The presence of triglyceride in the formulation also might have accounted for the permeation. Since the basic nature of stratum corneum is lipid and the lipophilic nature of the NE droplets are responsible for loosening of the structure of stratum corneum instead of rupturing it, which is the case with other permeation enhancers.

FIG 7: *Ex-vivo* drug permeation studies

The amount of drug that retained in the skin was found to be 30.33, 31.52, 30.86 and 19.78 for formulation A, B, C, and marketed cream respectively. This indicated that the nanoemulgel formulation is more permeable through skin and is retained in the skin more effectively due to less globule size and viscosity when compared to the marketed cream formulation.

#### ***In vivo* treatment of infected rat skin:**

Symptoms of erythematous lesions around 20mm diameter were observed on the 5<sup>th</sup> day of infection. Treatment of these bloody lesions was initiated on the 8<sup>th</sup> day of infection which continued for 14 days. The lesions and the wounds started to cure from the 3<sup>rd</sup> day of treatment. By the end of 11<sup>th</sup> day of treatment there were no visually observed symptoms. Animals treated with marketed cream, were cured after 16 days of treatment. This may be attributed to the fact that the nanoemulgel formulations has less globule size, decreased interfacial tension and high lipophilicity which allows high concentrations of drug to penetrate the skin and is effectively retained in the layers of the skin. Due to sufficient quantity of drug in the aqueous bed of the skin which the MC formulation could not reach, while the NG could because of its decreased globule size and lipophilic nature, the drug effectively inhibits the synthesis of ergosterol by inhibiting squalene epoxidase, an enzyme responsible for the creation of sterols needed in fungal cell membranes. Lacking ergosterol, the cell membranes increase in permeability, allowing their contents to leak out.

#### **Conclusion**

NG formulation of Butenafine Hcl was formulated by the use of DoE with optimized concentrations of oil phase, and SCoS. Pseudo ternary phase diagrams were constructed from which the levels of oil, surfactant and co surfactant at which NE is formed was obtained. The optimized concentration of NE formulation was derived by the use of DoE, and analyzing the results of DoE. The actual and predicted plots fall close to one another. ANOVA (partial sum squares-type-III) reveals the model to be significant with F-ratio 71.4198 and  $R^2$  value 0.9940. The optimized formulations were thermodynamically stable, with good spreadability and were homogeneous. From the *ex-vivo* skin permeation studies it can be concluded that the NG formulation was more permeable through skin and was retained in the skin more effectively than the MC formulation due to less decreased interfacial tension, hence

decreased globule size and viscosity when compared to the MC formulation. From *In-vivo* treatment of infected skin studies it can be concluded that the NG formulation effectively treats the fungal infection when compared to the MC formulation.

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# DESIGN, DEVELOPMENT AND EVALUATION OF FENOFIBRATE AND ROSUVASTATIN NANODROPLETS

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## Abstract

Fibrate and statin combinational therapy is used to treat severe and refractory mixed hyperlipidemia. Hence lipid based SNEDDS were prepared using the concentration oil (2:1) and SCoS (1:1) which resulted in enhanced extent of absorption and relative bioavailability of 1.69 (fibrate) and 1.64 (statin). An approximately 40% of drug was available for systemic circulation via lymphatic route of absorption. The results showed a significant difference between the marketed and the SNEDDS

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**Keywords:** Fibrates, statins, SNEDDS, hyperlipidemia, lymphatic absorption

## Introduction

Oral route is the most commonly preferred route for drug delivery of wide variety of drugs. BCS Class II drugs suffer from poor water solubility and high lipophilicity resulting in fluctuations in drug plasma level, influence by food, rapid metabolism leading to failure of conventional drug delivery systems (1). These drug exhibit variable bioavailability and need improvement in the dissolution rate by different methods like lipid formulations, amorphous formulations like solid dispersion systems etc., for improving bioavailability(2). The choice of formulation is often of critical importance in establishing a successful product for oral administration of a BCS class II drug. Even though they contain potential pharmacodynamic activity they fail to reach market (3). The solubility of the drug could be increased in three ways: changing the chemical structure in the lead optimization phase; prodrug approach and the formulation approach. Lipid based drug delivery systems (LBDDS) are gaining importance these days due to their ability to deliver drug via lymphatic route restraining the hepatic metabolism. LBDDS (4) are a diverse group of formulations which are classified into 4 types: Type I (oils without surfactants), Type II(oils and water insoluble surfactants), Type III(oils, surfactants, co solvents), Type IV(water soluble surfactants and co-solvents). Of which Type III, popularly known as Self Nano Emulsifying Drug Delivery Systems (SNEDDS) are widely used because of its ease of formulation : simple self emulsification technique. SNEDDS (5) are defined as isotropic mixtures of natural or synthetic oils containing solid or liquid surfactants and one or more hydrophilic solvents. They form fine oil in water (o/w) emulsions on contact with GI fluids. The drug in SNEDDS remains in the solution form throughout its GI transit time whereby they circumvent the dissolution step. It involves digestion of the excipients and formation of different colloidal structures. The drug gets partitioned into these structures before it is absorbed. Thus they enhance the bioavailability of CLASS II drugs (6). SNEDDS improve the bioavailability by facilitating transcellular and paracellular absorption and inhibiting P-gp & CYP450 enzymes thereby decreasing intestinal efflux and drug biotransformation (7,8). The drug is absorbed through the lymphatics while chylomicrons are synthesized from the fatty components of the oil phase of the emulsion (9).

The main objective of the study is to formulate SNEDDS of the BCS Class II drugs, Fenofibrate and Rosuvastatin (10), as bioactives so that the drug can be delivered in the form of nanodroplets. Fenofibrate is an antilipidemic agent that reduces both cholesterol and triglycerides in the blood by activating peroxisome proliferator activated receptor  $\alpha$  (PPAR $\alpha$ ). Rosuvastatin is an antilipidemic agent that competitively inhibits hydroxymethyl glutaryl-coenzyme A (HMG-CoA) reductase, which catalyses the conversion of HMG-CoA to mevalonic acid, the rate limiting step in cholesterol biosynthesis. Fenofibrate and Rosuvastatin combinational therapy is recommended for the treatment of severe or refractory mixed hyperlipidemia(11).

The present marketed formulations face bioavailability problems, affected by first pass metabolism and pose toxicity due to intake of high doses (10). Hence suggesting SNEDDS for formulating Fenofibrate and Rosuvastatin improves bioavailability, bypass first pass metabolism and thereby decreases the dose of the drug and hence the toxicity. The thus formulated nanodroplets are characterized and evaluated for *in-vitro*, *in-vivo* performance and lymphatic absorption. Orally administered highly lipophilic compounds reach systemic circulation via intestinal lymphatic system (12). This alternative pathway from GIT has been shown to be significant contributor for overall bioavailability of a number of highly lipophilic drugs. Lymphatic transport of the drug provides many advantages such as avoidance of hepatic first pass metabolism and improved plasma profile of the drug.

## **Materials and methods**

### **Materials**

Fenofibrate and Rosuvastatin drugs were obtained as a gift sample from Zim Laboratories, Nagpur; Capryol 90, Capmul MCM, Labrafac (LF), Isopropyl myristate (IPM), Lauroglycol (LG), Labrafac Lipophile WL 1349 (LL), Poloxamer 188, Cremophore EL, Cremophore RH 40, Gellusire 44/14 and Labrasol, Transcutol HP, Labrafil M 1944 CS were obtained as gift samples from Gattefosse Pvt. Ltd. (Mumbai, India). Neusilin was obtained from Fuji Chemical Industry Co. Ltd, Japan. Ethanol and Methanol (HPLC grade) were obtained from Merck chemicals India Pvt. Ltd., Mumbai. Avocado oil was obtained from Swastik Eucalyptus Oil Co.

### **Methods**

#### **A Solubility studies (13)**

Solubility of Fenofibrate and Rosuvastatin was determined in various oils such as Capryol 90, Capmul MCM, LF, IPM, LG, LL, by shake flask method (14). An excess amount of drug was taken in 10 ml of the oil in vials, and mixed using vortex mixer. The vials were then kept at  $25 \pm 1^{\circ}\text{C}$  in an isothermal shaker for 72hrs to reach equilibrium. The equilibrated samples were then centrifuged at 3000rpm for 15min. The supernatant was filtered through a  $0.45\mu\text{m}$  membrane filter. The concentration of the drug (Table 1) was determined using UV Spectroscopy at 286.5nm and 243.5nm respectively.

(Compatibility studies were performed using FTIR 8400 S, Shimadzu. The IR spectrum of the physical mixture was compared with those of pure drug, lipid and surfactants and peak matching was done to detect any appearance or disappearance of peaks).

#### **Methodology (15)**

SNEDDS were formulated by spontaneous emulsification technique using slow aqueous titration

### Construction of pseudo ternary phase diagrams (16, 17)

Pseudo ternary phase diagrams were constructed to examine the formation of oil in water nanoemulsion with 4 components oil, surfactant, co surfactant, and aqueous phase. The 4-component system consisted of (i) Capryol 90 and Capmul MCM 2:1 (Selected from solubility studies) (ii) surfactant Cremophore RH 40 with HLB value 12.5 (iii) a Co surfactant (Ethanol) and (iv) distilled water (aqueous phase). Surfactant and co surfactant mixture (SCoS) in each group were mixed in different volume ratios (1:0, 1:1, 1:2, 1:3, 2:1, 3:1, 4:1). Seventeen combinations of oil and SCoS, 1:9, 1:8, 1:7, 1:6, 1:5, 1:4, 1:3, 1:2, 1:1, 5:1, 4:1, 3:1, 2:1 were made so that maximum ratios were covered for the study to depict the boundaries of phases precisely formed in the phase diagrams Fig (1-2). Slow titration with aqueous phase (18) was done to each volume ratio of oil and SCoS and visual observation was carried out for transparency and flowability of the nanoemulsion.

Different concentrations of oil from NE region of phase diagrams were selected, and the drug is incorporated. For each % of oil selected, the formula that used the minimum concentration of SCoS for its NE formulation was selected.

### Characterisation of nanoemulsion (19,20)

The formulations were subjected to different thermodynamic stability studies (Table 2) such as centrifugation, heating cooling cycle (21) and freeze thaw cycle, to avoid the selection of metastable formulations. Thermodynamic stability of nanoemulsion differentiates them from those systems which are kinetically stable and eventually phase separate. The dispersibility of the nanoemulsion was assessed using a standard USP XXII dissolution apparatus II. The *in vitro* performance of the formulations was visually assessed by phase clarity, self emulsification time, and rate of emulsification. Rapidly forming (within 1min) nanoemulsion, having a clear or bluish appearance, rapidly forming, slightly less clear emulsion, having a bluish white appearance were selected for further studies (22) (Table 3). The selected formulations were prepared by dissolving 67 mg (single dose) of Fenofibrate and 5mg of Rosuvastatin in oil (10%, 15%, 20%, 25% etc.). Respective SCoS ratio was added to the oil, and mixed using vortex mixer.

The formulated SNEDDS were evaluated for the following parameters *in vitro* (table 3).

SLNO	PARAMETER	METHOD
1	Globule size & polydispersity index	Zetasizer 3000 ( Malvern Instruments Worcestershire, UK) (fig 6)
2	External Morphological Study	Scanning Electron Microscopy(fig 7)
3	Viscosity determination	Brookfield DV-II ultra+ viscometer
4	Electroconductivity study	Electroconductometer (Conductivity meter 305, Systronic).
5	Refractive index and % transmittance	Abbe refractometer & UV spectrophotometer.
6	<i>In vivo</i> performance	50,100, 1000 times dilution with various dissolution media viz: Water and Simulated gastric fluid (pH 1.2).
7	Drug content	UV Visible spectrophotometry.

From the stock solution of Fenofibrate and Rosuvastatin, dilutions were prepared and the calibration curve in acetonitrile (ACN) constructed between concentration and peak area.

### Chromatographic conditions for simultaneous estimation of Fenofibrate and Rosuvastatin

The following is the optimized chromatographic conditions were selected for the simultaneous estimation of Fenofibrate and Rosuvastatin (23). Shimadzu gradient HPLC system was used with following configurations: stainless steel column (Inertsil ODS, 250 x 4.6mm, 5 $\mu$  column), which was maintained at 25°C. The dual analytical were set, 248 nm for Rosuvastatin and 286 nm for Fenofibrate and samples of 5 $\mu$ l were injected to HPLC system. The mobile phase was a mixture of water (pH 2.5 adjusted with ortho-phosphoric acid) and

acetonitrile in ratio of 30:70 (v/v) at a flow rate of 1.0ml/min. The mobile phase was filtered through 0.45 $\mu$ m filter (Sartorius, Germany) and degassed for 10 minutes by sonication.

### ***In vitro* drug release in simulated gastric fluid pH 1.2**

The quantitative *in vitro* release test (15) was performed in 250 ml pH 1.2 simulated gastric fluid using USP dissolution apparatus Type I at 50 rpm at 37 $\pm$ 0.5<sup>0</sup>c. The Optimized SNEDDS formulation containing single dose of Fenofibrate and Rosuvastatin were filled in Size 1cs of Hard gelatin capsule (24, 25) (CONISNAP). Samples were withdrawn at regular time intervals (0, 0.5, 1, 1.5, 2, hrs) and an aliquot amount of dissolution media was replaced. The release of drug from SNEDDS formulation was compared with the conventional tablet formulation and the samples were analyzed for the drug content (table 4).

### ***In vivo* bioavailability studies (26)**

The experiments were carried out after getting the approval of the CPCSEA and IAEC, JSS College of Pharmacy, Ooty. Proposal no: JSSCP/IAEC/M.PHARM/PH.CEUTICS/01/2012-13 and their guidelines were followed throughout the experiment.

### **Estimation of drug in rabbit plasma**

Healthy overnight fasted Male Sprague-Dawley rats weighing about 350-370gm were used for both *in-vitro* and *in-vivo* the experiments. The animals were given water *ad.libitum* during fasting and throughout the experiment. Zero hour fasting blood samples were withdrawn early in the morning. The animals were then divided into 2 groups each containing two animals. The dose for the rabbits was selected based on the surface area ratio of rabbit and man; and the dose was administered with an oral cannula. Group 1 received drug conventional marketed tablet formulation and group 2 received SNEDDS. Immediately after administration the animals were given 5ml of water. The animals were anaesthetized and the carotid artery is cannulated (27).

Blood samples (0.5ml) were withdrawn from the carotid artery at 0,0.25,0.5,0.75,1,2,4,6,8,12 hours with a sterile syringe. The blood samples were collected in a ria vial containing anti-coagulant (0.4 ml of 2.5% sodium citrate), centrifuged at 2500rpm for 4 min and the plasma samples were separated and stored at -20<sup>0</sup>C. The plasma samples were deprotonated and extraction of drug was done by solid phase extraction (SPE) using ACN-water mixture and analyzed. Estimation of plasma samples by HPLC was carried out using optimized chromatographic conditions mentioned earlier (table 5).

### **Pharmacokinetic data analysis**

Predicting the release behavior of the drug *in vivo* can be done by pharmacokinetic treatment of data. Pharmacokinetic parameters (table 6) after oral administration of Olanzapine in rabbits were calculated by Wagner-nelson method. The pharmacokinetic data was analyzed by one-way analysis of variance (ANOVA) using Tukey-Kramer method.

### ***In-vivo* lymphatic absorption studies (28)**

All the animals were suitably anesthetized, and cannulation of mesenteric lymph duct for collection of intestinal lymph and duodenum for the administration of rehydration solution was done as per the procedure (27). To study the lymphatic absorption, the lymph that drains from the intestinal lymphatic duct was collected at predetermined time intervals for 12 hrs, analyzed for drug concentration and multiplied with the volume of the lymph collected(fig 4).

## Results and discussion

### Solubility studies of drug in different oils

Solubility is an important criterion in formulation of SNEDDS, as the drug remains in the liquid form solubilized in the oil phase. Hence the oil phase in which the drug shows maximum solubility is to be selected for the purpose. From table 1 it was evident that Capryol 90 shows maximum solubility of Fenofibrate i.e 180 mg/mL and Capmul MCM shows maximum solubility of Rosuvastatin i.e 30 mg/mL. Hence the combination of Capryol 90 and Capmul MCM in the ratio of 2:1 (which was calculated based upon the dose of the drugs) was selected for the formulation of SNEDDS.

Table 1: Solubility studies

OIL	FENOFIBRATE SOLUBILITY(mg/mL)	ROSUVASTATIN SOLUBILITY(mg/mL)
CAPRYOL 90	270	30
CAPMUL MCM	110	60
LF	96	42
IPM	72	21
LG	84	24
LL	126	44

### Pseudo ternary phase diagram study

When surfactant alone (SCoS 1:0) was used only a small area of nanoemulsion is formed with oil solubilized upto 18% and SCoS 65%, while surfactant and co surfactant were taken in equal ratio (SCoS 1:1) there was a slight increase in nanoemulsion region but the oil solubilization increased upto 23% with 59% of SCoS. This could be due to the addition of co-surfactant which leads to greater penetration of oil phase into the surfactant thereby decreasing the interfacial tension.

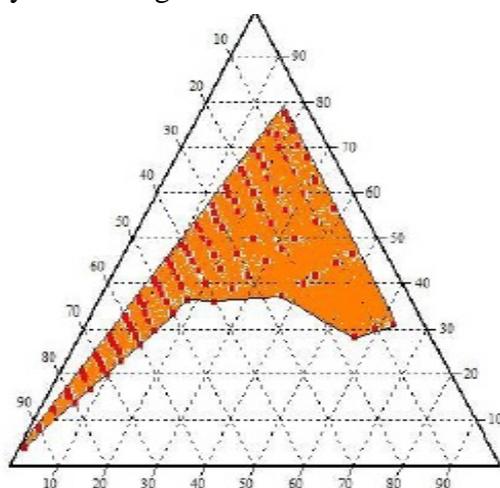


Fig 1: SCoS 1:1

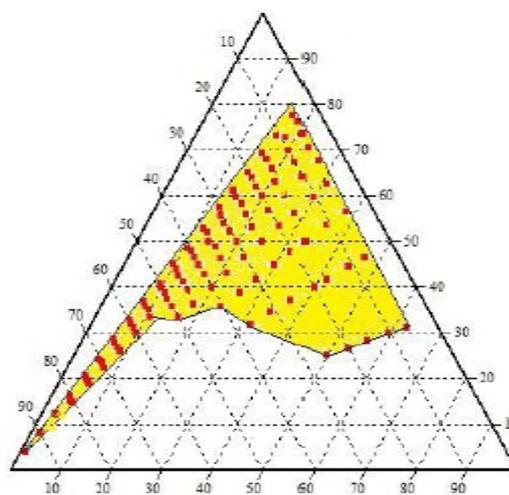


Fig 2: SCoS 1:2

When the concentration of co-surfactant is doubled (SCoS 1:2) nanoemulsion area increased considerably with 30% oil solubilized with 55% SCoS. There was no difference in nanoemulsion region and the oil solubilization remained same for (SCoS 1:3). But on further increase of co-surfactant (SCoS 1:4) the oil solubilization decreased to 28%.

When Surfactant concentration (SCoS 2:1) was doubled nanoemulsion area was large and the maximum oil solubilization was up to 32% with only 52% of SCoS. A further increase in surfactant concentration i.e., SCoS 3:1 resulted in decrease of oil solubilization of only up to 25%. For SCoS 4:1 even a high concentration of SCoS 65% resulted in less nanoemulsion area with only 19% of oil solubilization.

### Thermodynamic stability studies and dispersibility tests

The selected formulations from the pseudo ternary phase diagrams were subjected to different thermodynamic stability studies and the formulations which survived thermodynamic stability studies were taken for dispersibility test. (Table no: 2). Thermodynamic stability studies differentiate those nanoemulsion formulations from those of kinetically stable and undergo phase separation. This implies that the formulations contain adequate amounts of SCoS concentration required for nanoemulsion formulation, which decreases the energy required for nanoemulsion formation. This decreased energy contributes to the stability of nanoemulsion. The nanoemulsion formulation on entering the GI tract undergoes infinite dilution leading to phase separation of the formulation due to poor aqueous solubility of the drug. Formulations which passed the dispersibility studies were certain to remain as nanoemulsion upon dispersion in the aqueous environment of the GIT. For oral nanoemulsion the process of dilution by the GI fluids will result in the gradual desorption of the surfactant located at the globule interface. The process is thermodynamically driven by the requirement of the surfactant to maintain an aqueous phase concentration equivalent to its critical micelle concentration.

SCoS	Oil %	SCoS %	Aq %	Centrifugation	H/C cycle	Freeze Thaw	Dispersion
1:0	10	30	60	F	P	P	-
	15	56	29	P	F	F	-
1:1	10	18	72	P	P	P	-
	15	25	60	P	P	P	***
	20	36	54	P	P	P	-
	25	45	30	P	P	P	***
1:2	10	27	63	P	F	P	-
	15	33	52	P	P	P	***
	20	37	43	P	P	F	-
	25	44	31	P	P	P	-
	30	54	16	P	P	P	***
1:3	10	18	72	P	F	F	-
	15	19	66	P	P	P	-
	20	30	50	P	P	P	-
	25	36	39	P	P	F	-
	30	51	19	F	P	P	-
1:4	10	18	72	P	P	P	-
	15	21	64	P	P	P	-
	20	35	45	P	P	P	-
2:1	10	22	68	F	P	F	-
	15	25	60	P	P	P	-
	20	33	47	P	F	P	-
	25	40	35	F	P	P	-
	30	45	15	P	P	P	-
3:1	10	18	72	P	P	P	-
	15	25	60	F	P	P	-
	20	32	48	P	P	F	-
4:1	10	20	70	F	P	P	-
	15	25	60	P	F	P	-

Table no: 2 Thermodynamic stability studies and dispersibility test.

\*\*\* Formulation which passed the dispersibility test; P- pass; F- fail.

Formulations which passed thermodynamic stability tests and dispersibility test were subjected to globule size analysis, refractive index determination, viscosity determination and *in vitro* release studies.

### Characterization studies

Optimized formulations selected from phase diagram at a difference of 5% w/w of oil having least SCoS concentration that passed dispersibility test were selected, named as formulation A,B,C, and D. They were subjected to *in vitro* characterization studies (Table 4).

The globule size increases with increase in concentration of oil in formulation and decreases with increase in the concentration of SCoS. The mean globule size of the formulation A containing 25% oil was 90 nm while as formulation, B containing 30% oil was 254.3nm and formulation D with 15% oil was 40 nm. Since the globule size of the droplets was much smaller than that of the blood capillaries (400nm), there are minimal chances of capillary blockage during transport of the droplets. Thus higher circulation time of the droplets after *in vivo* application is also favored. The polydispersity index (PDI) of formulation A and C was 0.287 and 0.398 suggesting uniformity in the globule size of the formulation but in the case of formulation B and D the PDI was 0.723 and 0.910 so these formulations were dropped from further studies.

Zeta potential of a formulation relates to its colloidal stability. It indicates the degree of repulsion between adjacent and similarly charged particles in the dispersion. For molecules that are small enough a high zeta potential confers stability and resists aggregation. The zeta potential of the formulations A and C were -19.0 and -22, indicates that the formulations are stable.

The viscosity of the optimized formulations was determined. It was observed that viscosity of all the formulations is less than 31 cp. Formulation A and C has the minimum viscosity 22.3cp and 19.2cP, while B has highest viscosity of 30.1cp perhaps because of its higher oil content. Lower viscosity is an ideal characteristic of the o/w nanoemulsion.

Conductivity of the optimized formulations was found in range of 451-522.3  $\mu\text{S}/\text{cm}$ . From the viscosity and the electro-conductivity study it is concluded that the system is of o/w type.

The refractive index of the developed system was similar to the refractive index of the water (1.333). In addition, the developed system showed percent transmittance > 97%. The observed transparency of the system is due to the fact that the maximum size of the droplets of the dispersed phase is not larger than  $1/4^{\text{th}}$  of the wavelength of visible light. Thus, NE scatters little light and was therefore transparent or translucent.

Fenofibrate and Rosuvastatin from the SNEDDS were extracted by dissolving in ACN, analyzed spectrophotometrically against solvent blank. Drug content of the optimized formulations were found to be 70mg, 5mg; 120mg, 8.5mg; 70mg, 5mg; 140mg,10mg for formulations A, B, C, D respectively.

Table 3: Characterization of Nanoemulsion

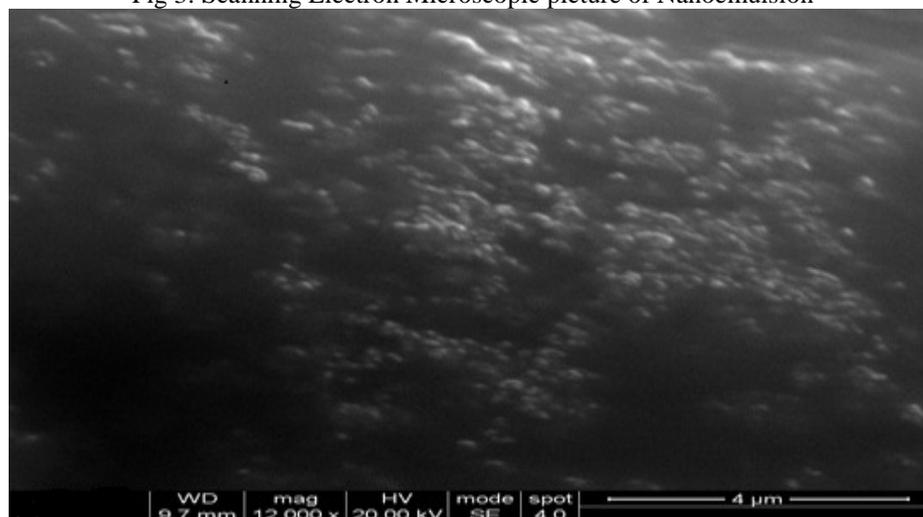
Formulation	A	B	C	D
SCoS(ml)	1:1	1:1	1:2	1:2
Oil %	15	25	15	30
S%	12.5	22.5	11	18
Cos%	12.5	22.5	22	36
Aq%	60	30	52	16
Globule size(nm)	90	254.3	212	40
PDI	0.287	0.723	0.398	0.910
Zeta Potential(mV)	-19.0	-17	-22	-5
Viscosity(cP)	22.3	30.1	19.2	-
Conductivity( $\mu\text{S}/\text{cm}$ )	451.3	-	522.3	-
Refractive Index	1.49	-	1.27	-
%Transmittance	99.43	-	98.9	-
Drug content(mg/mL)				
Fenofibrate	70	120	70	140
Rosuvastatin	5	8.5	5	10

From the above analysis the formulation A was selected for drug incorporation and *in vitro* and *in vivo* studies.

### Scanning electron microscopy (SEM)

The scanning electron microscopic study reveals the external morphology of the nanoparticles and from fig 3 it was evident that maximum nanoparticles were nearly spherical in shape.

Fig 3: Scanning Electron Microscopic picture of Nanoemulsion



### *In vitro* drug release

*In vitro* dissolution studies were performed in pH 1.2 simulated gastric media. Comparative dissolution studies were performed to investigate the drug dissolution from SNEDDS and marketed tablet formulation containing same quantity of drug. *In vitro* dissolution studies showed that Fenofibrate is rapidly released  $\geq 98\%$  and  $\geq 96\%$  of Rosuvastatin from the optimized SNEDDS. Initially during the first 15 min, the SNEDDS had shown a release of  $\geq 38\%$  of Fenofibrate and  $\geq 33\%$  of Rosuvastatin, but by the end of 30min, there was a drastic change in the release behavior which was upto  $\geq 64\%$  of Fenofibrate and  $\geq 56\%$  of Rosuvastatin. Out of this  $\geq 80\%$  of the drug released during first hour of the study. In contrast, the marketed formulation has shown a release of  $\geq 60\%$ . This is because of the small globule size, and eventually higher surface area in case of SNEDDS, which permits faster rate of drug release. Being droplets and the drug in solution form, instant absorption should have been taken place. Since the carrier is lipid, it undergoes lipolysis in the presence of bile salts and pancreatic lipases etc. Therefore the surfactant layer around the droplets gets released and is converted to micelles, reverse micelles etc. Sometimes this may lead to precipitation of drug since the drug gets detached from the droplets. This is the case where the surfactants are directly involved in the solubility of the drug. Infact the total amount of drug release is delayed due to this lipolysis process.

Table no: 4 *In vitro* dissolution data in pH 1.2 simulated gastric fluids.

Time (min)	% Cumulative release			
	SNEDDS		Marketed formulation	
	Fenofibrate	Rosuvastatin	Fenofibrate	Rosuvastatin
15	38.21	33.17	32.33	29.91
30	64.61	56.28	49.49	45.18
45	75.37	63.41	56.32	52.42
60	80.37	81.37	60.36	59.36
90	95.37	93.23	64.00	62.10
120	98.95	96.64	68.30	64.20

### ***In vivo* bioavailability studies**

*In vivo* bioavailability studies were performed to quantify SNEDDS formulation after oral administration and to compare the bioavailability of SNEDDS with that marketed formulation. From the table 5 it can be inferred that the SNEDDS formulation showed maximum plasma concentration of 80% by the end of first hour while the pure drug suspension and marketed formulations showed only 54 and 57% release by that time respectively. The pure drug suspension and marketed formulations took 2hours to reach maximum plasma concentration of 56 and 61% respectively. From the above analysis it is evident that the SNEDDS formulation showed improved rate of drug release compared to the conventional marketed formulations. The SNEDDS showed maximum drug concentration in half of the time taken by the pure drug suspension and the marketed formulation.

Table no: 5 Comparative *in vivo* bioavailability studies

Time (hrs)	Marketed Formulation (ng/h/ml)		SNEDDS (%)	
	Fenofibrate	Rosuvastatin	Fenofibrate	Rosuvastatin
0.25	21.44 ± 1.25	1.55±0.98	32.16±1.80**	2.05±0.92**
0.5	24.79 ± 1.71	1.79±0.52	48.64± 2.41***	3.23±0.16**
0.75	28.81 ± 1.90	2.13±0.85	53.6±2.76***	3.7±0.02***
1	32.83 ±1.92	2.31±0.64	56.54±2.14**	4.16±0.56***
2	35.175 ± 1.13	2.38±0.09	54.002±2.18**	3.96±0.80**
4	32.75 ± 1.74	2.21±0.62	48.48±1.79**	3.51±0.62**
6	26.66 ±1.79	1.85±0.33	42.96 ±1.74**	2.91±0.32**
8	24.12 ±1.51	1.70±0.02	37.25±1.58**	2.03±0.43**
12	21.44 ±1.64	1.45±0.56	22.38±1.19**	1.51±0.72**

Values are expressed as mean ±S.D; n=3

\*P<0.05; \*\*P< 0.01;\*\*\*P<0.001 when compared with marketed formulation.

One way ANOVA followed by TUKEY-KRAMERS multiple comparison tests.

### **Pharmacokinetic treatment**

Pharmacokinetic parameters were calculated from the *in vivo* release of Fenofibrate and Rosuvastatin in Sprague-Dawley rats for SNEDDS, and marketed tablet using Wagner-Nelson method (table 6).

Since the rate limiting step in the absorption of Fenofibrate and Rosuvastatin was dissolution from the formulation and the results from the study reveals that the dispersion of the drug (since the drug is completely dissolved in the oil phase) into the aqueous gastrointestinal environment is the rate limiting step in case of SNEDDS and plays a major role for absorption. It can be explained that, following oral administration, SNEDDS disperse spontaneously to form a nanoemulsion in the GI fluid where the active components are present in a solubilized form, and the small droplet size provides a large surface area for drug absorption. Such an ultra fine dispersion of the oil will afford rapid and extensive absorption. In addition high concentration of surfactant in SNEDDS may increase permeability of the oil across the cell membrane, and lymphatic transport through the transcellular pathway. As the lipolysis proceeds amount of drug available for absorption is also more. This could be the reason for the formulation to take around 1hr to achieve  $T_{max}$ . Whereas the conventional marketed formulation did not result in the same manner. Fact may be that since it takes more time for disintegration and to go into the solution. Hence it took more than 2hrs to achieve  $T_{max}$ , and moreover the extent of absorption which is evident from  $AUC_{0-t}$  and  $AUC_{0-\infty}$ , the SNEDDS achieved maximum which is statistically significant.

Table 6: Pharmacokinetic parameters

Pharmacokinetic parameters	Marketed formulation		SNEDDS	
	Fenofibrate	Rosuvastatin	Fenofibrate	Rosuvastatin
T <sub>max</sub> (h)	2	2	1	1
K <sub>e</sub>	0.283±0.0153	0.245±0.0124	0.7343±0.0162**	0.944±0.0132**
C <sub>max</sub> (ng/ml)	35.175±1.13	2.38±1.64	56.548±2.14**	4.16±2.56**
AUC <sub>0-t</sub> (ng h/ml)	326.1013±22.56	22.50125±2.48	489.305±98.9*	32.735±8.28*
AUC <sub>0-∞</sub> (ng.h/ml)	401.86±21.6	28.4196±23.8	519.78±59.35*	34.335±55.45*
F <sub>r</sub>	-----	-----	1.69	1.64

Values are expressed as mean ±S.D; n=3

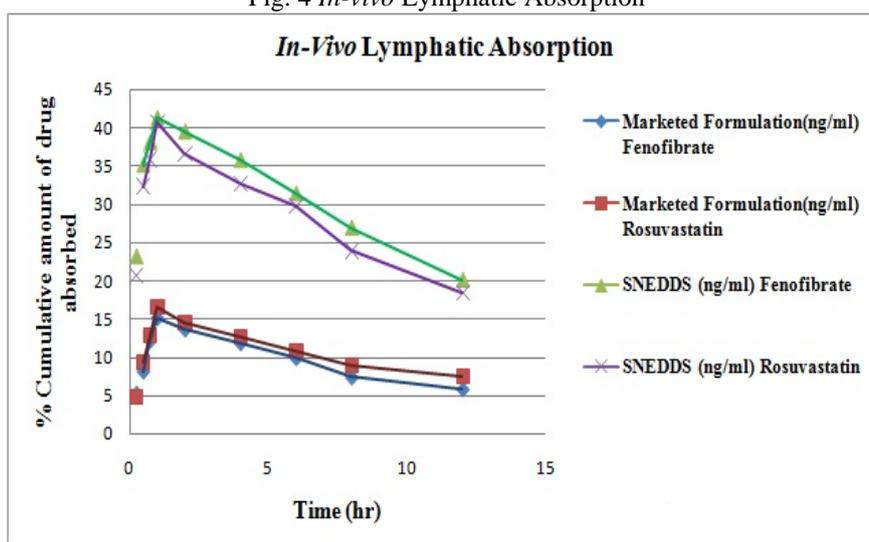
\*P<0.05; \*\*P< 0.01;\*\*\*P<0.001 when compared with marketed formulation.

One way ANOVA followed by TUKEY-KRAMERS multiple comparison tests.

The relative bioavailability of the SNEDDS was 1.69 and 1.64 for Fenofibrate and Rosuvastatin which is 0.69 and 0.64 folds increase when compared to marketed formulation. From the above discussion it was evident that SNEDDS showed improved bioavailability and drug disposition compared to the marketed formulation. This results shows the lymphatic absorption plays a major role in enhanced bioavailability of lipid formulations i.e SNEDDS.

### ***In vivo* lymphatic absorption studies**

*In vivo* lymphatic absorption studies in Sprague-Dawley rats were performed and the intestinal lymphatic fluid was collected for a period of 12hrs. The amount of drug that has been absorbed through lymphatic system was found to reach a maximum of 41% by 2 hr after administration of drug while the . From then the rate at which drug absorbed via lymphatic route showed a decline. This is due to the lipid nature of the droplets, micelles and reverse micelles formed during lipolysis. It is also evident that the result of lipolysis did not account for precipitation. Hence maximum amount of drug was available for absorption. Moreover the lipid carriers and the surfactants might have involved in overcoming the P-gp efflux, thereby increasing the drug available for absorption which is evident from the lymphatic drug absorption study.

Fig: 4 *In-vivo* Lymphatic Absorption

### **Conclusion**

By formulating Fenofibrate and Rosuvastatin as the SNEDDS (with appropriate selection of oil (2:1) and SCoS(1:1)) in combination, the problems faced by the conventional formulations could be overcome. Since being a lipid formulation enhanced bioavailability by lymphatic system mediated drug absorption is possible.

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# **REDUCING STIGMATISATION AND DISCRIMINATION THROUGH PROVISION OF CARE AND SUPPORT TO FELLOW PERSONS LIVING WITH THE HUMAN IMMUNODEFICIENCY VIRUS (PLHIV) IN GHANA: THE CASE OF THE 'MODELS OF HOPE'**

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## **Abstract**

In view of the stigma attached to HIV and AIDS, many family members and friends of Persons Living with HIV and AIDS (PLHIV) neglect them. In Ghana, some PLHIV voluntarily provide care and support for other PLHIV newly diagnosed of suffering from HIV. This study sought to ascertain what motivates them to undertake this task in Ghanaian hospitals, clinics and homes and what impact they make. Qualitative and quantitative methods were adopted for the study. Data for the study were obtained from 120 purposively selected PLHIV serving as 'models of hope'. Data collection methods employed for this study were questionnaire administration and in-depth interviewing. Quantitative data of the study were analysed using the Statistical Product for Service Solutions (SPSS), version 17.0. Additionally, qualitative data were manually analysed. The theoretical framework for the study is the hope theory. A major result of the study was that the respondents were motivated to care for and support their fellow PLHIV newly diagnosed of suffering from HIV with a view to helping them have some hope and live positively with HIV. Although they were faced with financial problems, stigmatisation and discrimination, the refusal of some clients to religiously take their drugs after adherence counselling, etc., they still provided the needed care and support. Through their services most of their clients gain a lot of hope, particularly when they regain their health, live positively with HIV and overcome self-stigma. The study recommends that stakeholders encourage these 'models of hope' by giving them adequate training and consistently motivating them through the recognition they give them.

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**Keywords:** Human Immunodeficiency Virus (HIV); Acquired Immune Deficiency Syndrome (AIDS); Models of Hope; Training; Benefits.

## **Introduction**

Informal caregivers are a critical source of support for PLHIV worldwide (Akintola, 2010). As at June 10, 2013, Ghana's HIV prevalence rate stands at 1.3 percent (Kloku, 2013). Compared to many other countries in sub-Saharan Africa, this figure is relatively low. However, there are many PLHIV in the country, who need care and support, since an estimated 235,982 persons, including children, are living with HIV and AIDS (Ghana Health Service, 2013). The onus lies on families and friends as well as health care providers to provide the needed care and support. However, families and friends are either ill-equipped to provide care and support (Akintola, 2010) or they blatantly refuse to take up the challenge because they themselves stigmatise and discriminate against the PLHIV or, as Mwinituo (2006) puts it, they experience stigmatisation and discrimination from other people. With

regard to the healthcare providers, the problems regarding the care and support they have to provide are at two levels. Firstly, most of the facilities are not adequately staffed because many healthcare providers have left the country to seek greener pastures (Quartey & Kwakye, 2008/2009). Secondly, as studies have shown, many healthcare providers are not able to manage the PLHIV for fear of contracting HIV through their intervention (Awusabo-Asare & Marfo, 1997; UNAIDS, 2002 cited in Amoa, 2005).

Under the circumstances, there are many PLHIV, who are not given the needed care and support (Amoa, 2005). As a result, many of them lose hope and die from isolation. In order to help surmount this problem and give themselves and others hope, PLHIV described as 'models of hope', who have had various degrees of experiences because of the infection, have taken it upon themselves to provide care and support to their fellow PLHIV.

Studies have shown that caregivers of PLHIV face undue burden (Ndaba-Mbata & Seloiwe, 2000; Flaskerud & Lee, 2001; Nnko, Chiduo, Wilson, Msuya & Mwaluko, 2000, Lindsey, Hirschfeld & Tlou, 2003 cited in Akintola, 2010; Kangethe, 2009). A study conducted by the Joint United Nations Programme on AIDS (UNAIDS) revealed that stress that stems from the nature and context of care work is pervasive among volunteers caring for PLHIV. Similarly, a study conducted by Akintola (indicated that volunteers caring for PLHIV are confronted with a myriad of challenges, including the sheer difficulty of caring, and maintaining confidentiality, among others.

However, according to Crook, Weir, Williams & Egdorf (cited in Akintola, 2010), research among volunteers working in AIDS service organisations in Ontario, Canada, reveals that volunteers experience intrinsic rewards, such as improved self-esteem and health, and self-actualization, as well as extrinsic rewards, such as recognition, constructive feedback and participation in decision-making. However, most volunteer caregivers are HIV negative persons. Most PLHIV prefer 'to go into hiding' once they are diagnosed of suffering from HIV because of the stigma associated with HIV.

The 'models of hope' choose not to hide but rather to take up the challenge of providing care and support to fellow PLHIV, when they themselves are faced with the burden of HIV. The study sought to ascertain what motivates the 'models of hope' to provide care and support to their fellow PLHIV, what knowledge they have about HIV and AIDS, what services they render to their fellow PLHIV, how beneficial their service is to them and their clients and what could be done to energize them into more action.

Given the negative experiences that PLHIV go through, when they 'go into hiding' because of the fear of being stigmatised and discriminated against, research on what motivates PLHIV to provide care and support to fellow PLHIV and the experiences they gather, as they do that, could play a critical role in encouraging other PLHIV to also provide care and support, thereby reducing the effects of HIV and AIDS stigmatisation and discrimination.

### **Theoretical underpinning of the study**

Research conducted has confirmed the phenomenon of hope as a reality. What came out of the studies embarked upon was a cognitive-based theory of hope (Synder, 1994a, 1994b; Synder, Irving & Anderson, 1991; Synder, Harris, Anderson, Holleran, Irving, Sigmon, Yoshinobu, Gibbs, Langelle & Harney, 1991; Synder, Sympson, Ybasco, Borders, Babyak & Higgins, 1996 cited in Helland & Winston, 2005). Hope theory has been studied in relation to physical and psychological health (Synder, 1996; 1998a; Synder, Irving & Anderson, 1991; Synder, Feldman, Taylor, Schroeder & Adams, 2000 cited in Helland & Winston, 2005), psychotherapy (Synder, Michael & Cheavans, 1999 cited in Helland & Winston, 2005), academic achievement and sports (Curry, Synder, Cook, Ruby & Rehm, 1997 cited in Helland & Winston, 2005).

The basic premise of the hope theory (Synder et al., 1991; Synder, 2002 cited in Helland & Winston, 2005) is that hope is comprised not only of emotion, but thinking as well. In actual fact people, who nurture hope, do a lot of thinking, and therefore thinking is at the core of hope (Synder, 2002 cited in Helland & Winston, 2005). The thinking done, which is the catalyst for future action, is goal-directed (Synder, 2002 cited in Helland & Winston, 2005). However, depending upon the hope orientation that people have, they may pursue their goals using different approaches. People nurturing high hopes pursue goals with “affective zest”, whereas people, who nurture low hope, demonstrate “affective lethargy” in their pursuit to attain their goals (Synder, 2002, p.252 cited in Helland & Winston, 2005). Another remarkable difference is that people nurturing high hope may not only reach their goals by applying a lot of energy, they may also “generate more goals” (p. 253). When obstacles or “surprise” events that may be positive or negative hit high hope persons and low hope persons in the face, what happens is that the former may comparatively experience less stress and adopt and execute more effective coping strategies than the latter. Whereas the high hope person is resilient and therefore is able to redirect goal pursuits, the low hope person doubts his/her ability to achieve his/her goals. He/she, therefore, may not take future actions (Michael, 2000; Synder, 1999; Synder, 2002).

In addition to the above, high hope persons build positive relationships and, when they and others make the efforts to attain goals, “high hoppers serve to make the group not only more productive but also perhaps equally important, an interpersonally enjoyable arena” (Synder, Cheavans & Sympson, 1997, p. 115 cited in Helland & Winston, 2005). High hoppers do aim at achieving their individual goals, just as they want the group in which they find themselves to attain collective goals. As high hoppers nurture hope, they do that in relation to others, and together with these other persons they pursue “common goals” (Synder et al., p. 114 cited in Helland & Winston, 2005).

As people pursue goals, they may not be cock sure that they would achieve them. However, it appears that this uncertainty does not have a negative impact on high hoppers. They appear to be better able to cope with uncertainties, since they are hopeful that there would be answers that for the moment have not been made manifest. As Ludema, Wilmot and Srivasta (1997 cited in Helland & Winston, 2005, p. 45) point out:

“When people hope, their stance is not only that reality is open, but also that it is continually becoming. Rather than trying to concretise and force the realisation of a preconceived future, hoping people prepare the way for possible futures to emerge. In this sense, hoping can be seen as a deeply creative process, one that requires steadfast patience and the willingness to accept uncertainty as the open future is explored and molded into a compelling image of possibility” (p. 12 cited in Helland & Winston, 2005, p. 45).

### **Study area**

Ghana is situated in West Africa and shares borders with Togo to the East, Burkina Faso to the North, La Côte d’Ivoire to the West and the Atlantic Ocean to the South. According to Population and Housing Census Report of the Ghana Statistical Service, Ghana’s population in the year 2010 stood at 24,658,823 million. With an intercensal annual growth rate of 2.5%, (Ghana Statistical Service, 2010), the population is further projected at 32.8 million in 2025 and 47.3 million in 2050. Ghana has an average density of 103 persons per sq. km (Ghana Statistical Service, 2012). It has a total land surface area of 230, 000 sq. km and experiences mostly tropical conditions. It has ten administrative regions that have been zoned into districts, municipalities and metropolises. Altogether there are 216 districts. The capital town of Ghana is Accra.

The Ghanaian population is made up of many ethnic groups. According to the results of the 2010 population census, the largest ethnic group, the Akan, accounts for 47.5% of the

population. Other major ethnic groups are the Mole-Dagbani (16.6%), Ewe (13.9%), Ga-Adangbe (7.4%), Gruma (5.7%), Guan (3.7%), Grussi (2.5%) and Mande-Busanga (1.1%). A number of smaller ethnic groups make up the remaining 1.6%. The prevailing religious beliefs and practices may be divided into three (3) major groups namely, Christianity, Islam and African Traditional Religion which account for 71.2%, 17.6% and 5.2% of the population respectively (IndexMundi, 2013).

The economy of Ghana is mixed, consisting mainly of small capital intensive modern sector involving mining and a few manufacturing establishments, a growing informal sector of small businessmen, artisans and technicians and a large traditional agricultural sector made up mostly of small-scale peasant farmers. The agricultural sector alone absorbs three-fifths of the country's labour force and accounts for more than half (51%) of the Gross Domestic Product. The duration of basic education has been reduced from 10-15 years to nine (9) years. This includes six (6) years of primary education and three (3) years of Junior High School (J.H.S.) Education. J.H.S. is followed by an optional additional three (3) years of Senior High School (S.H.S.) Education. These reforms seek to improve access to education for all children, increase the proportion of females in school, and increase the proportion that completes a given level of education.

### **Data and Methods**

Data for the study were collected through a questionnaire from 120 respondents serving as 'models of hope' in hospitals and clinics as well as homes throughout the length and breadth of the country. The targeted sample represented approximately 69 percent of the total number of 'models of hope' serving in the country as at the time of data collection in January/February, 2012. The respondents were sampled from a list obtained at the Head Office of the Association of PLHIV in Ghana, NAP+ Ghana.

The questionnaire was made up of two main sections. The first part, which covered the demographic characteristics of respondents, includes: age, educational level, religious affiliation, ethnicity and occupation, while the second section consisted of specific issues such as the respondents' motivation for caring for and supporting fellow PLHIV, their knowledge about HIV and AIDS, the benefit of their service to them and their clients and what problems they were confronted with. To ensure content validity, the researcher presented the questionnaire to a colleague in the Department of Sociology and Anthropology of the University of Cape Coast to determine whether the items in the questionnaire would adequately assist in obtaining information for answering the research questions and also detecting ambiguities in the items. His comments indicated that there were no serious ambiguities. Having done minor revisions of problems that the colleague pointed out, the researcher pre-tested the questionnaire. In order to analyze the data gathered from the questionnaire, quantitative content analysis was done with the use of the Statistical Product for Service Solutions (SPSS). Content analysis was used for the analysis of the open-ended questions from the questionnaire. Responses were categorised and coded based on themes that were generated. Once the codes were generated a systematic quantitative analysis of the occurrence of particular categories based on the themes were generated.

In-depth interviews were also conducted in addition to the administration of questionnaires to the respondents, in order to have more viewpoints and standpoints that cast light on the topic (Olsen, 2004) and help the researcher to achieve a deeper understanding of the respondents' world (Sarantakos, 1993). The interviews were conducted through face-to-face and telephone interactions, after the interviewees comprising 12 females and 9 males had been conveniently sampled. With their approval, all that they said was tape-recorded and later transcribed to enrich the quantitative analysis.

## Results

### Socio-demographic background of respondents

This section, as indicated in table 1 below, provides information on the socio-demographic characteristics of the 'models of hope' and covers age, sex, marital status, ethnicity, highest educational level attained, number of children and occupation/profession. The rationale behind the gathering of this information was to identify socio-demographic facts about the 'models of hope'. The data indicate that 77 out of the 120 respondents, representing 64.2 percent, were females and 43 (35.8 percent) were males. This finding supports the general recognition "that women and girls are the principal caregivers...and bear the greatest degree of responsibility for the psychosocial and physical care of family and community members" (Ogden & Esim, 2006, unpagged). The majority of them, 92 representing 76.7 percent were 35 years and above; 20 (16.7 percent) were between the ages of 30 and 34 years; 3 (2.5 percent) were between the ages of 20 and 24 years; 2 (1.7 percent) were between 25 and 29 years of age; 3 (3 percent) did not state their ages. Fifty-seven (57) of them representing 48 percent were married; 33 (28.3 percent) were single; 18 representing 15.3 percent were widowed; 6 (5.1 percent) were divorced; and 5 (4.2 percent) were separated from their partners. Forty-three (35.8 percent) had less than three children; 42 (38 percent) had between three and five children; 26 (21.7 percent) had no children; and 9 (7.5) had more than five children. A substantial proportion of them, 80 (66.7 percent) had been educated up to the basic level; 29 (24.1 percent) had been educated up to the senior high school level; eight (6.7 percent) had had tertiary education; and three (3) representing 2.5 percent indicated that they had had no formal education. The majority of the respondents (82.5 percent), had learnt various professions. Forty (40) of them (33.3 percent) were traders; 3 (2.5 percent) were drivers, 8 (6.7 percent) were secretaries, 11 (9.2 percent) were teachers and 21 (17.5 percent) were unemployed. With regard to the ethnic groups, to which the respondents belonged, 46 (38.3 percent) stated that they were Akans; 29 (24.2 percent) Ewe; 17 (14.2 percent) Ga/Adangbe; 6 (5.0 percent) Guan; and another group of 6 (5.0 percent) Mole/Dagbani. The fact that the greatest proportion of the respondents belonged to the Akan ethnic group is in support of the data from the 2010 Population and Housing Census that indicates that the majority of Ghanaians belonged to the Akan ethnic group.

**Table 1: Socio-demographic characteristics of respondents**

Variable	Frequency	Percentage
Sex		
Male	43	35.8
Female	77	64.2
<b>Total</b>	<b>120</b>	<b>100.0</b>
Age		
20-24	3	2.5
25-29	2	1.7
30-34	20	16.7
35 and above	92	76.7
Not stated	3	3.0
<b>Total</b>	<b>120</b>	<b>100.0</b>
Marital Status		
Single	33	28.3
Married	57	48.3
Divorced	6	5.1
Widowed	18	15.3
Separated	5	4.2
<b>Total</b>	<b>120</b>	<b>100.0</b>
<b>Ethnic Background</b>		
Ga/Adangbe	17	14.2
Ewe	29	24.2
Mole-Dagbani	6	5.0

Guan	6	5.0
Akan	46	38.3
Others	16	13.3
<b>Total</b>	<b>120</b>	<b>100</b>
Number of Children		
None	26	21.7
Less than 3	43	35.8
3-5	42	35
More than 5	9	7.5
<b>Total</b>	<b>120</b>	<b>100.0</b>
<b>Highest Educational Level Attained</b>		
No formal education	3	2.5
Basic level	80	66.7
Second cycle	29	24.1
Tertiary	8	6.7
<b>Total</b>	<b>120</b>	<b>100.0</b>
<b>Profession/Occupation</b>		
Teacher	11	9.2
Secretary	8	6.7
Trader	40	33.3
Driver	3	2.5
Others	37	30.8
Unemployed	21	17.5
<b>Total</b>	<b>120</b>	<b>100.0</b>

Source: Data from Fieldwork, 2012

### Respondents' motivation for providing care and support to their fellow PLHIV

The majority of the respondents, 80 (66.6 percent), indicated that they were motivated by the fact that they wanted the newly diagnosed PLHIV to have some hope and live positively with HIV; 20 (16.6 percent) stated that they wanted to support humanity; 15 (12.5 percent) indicated that they did not want their fellow PLHIV to go through suffering out of ignorance.

**Table 2: Respondents' motivation for providing care and support to their fellow PLHIV**

Response	Frequency	Percentage
Provide hope for positive living with HIV	80	66.6
Support humanity	20	16.6
Help fellow PLHIV not to go through suffering	15	12.5
Others	5	4.16
<b>Total</b>	<b>120</b>	<b>100.0</b>

Source: Data from Fieldwork, 2012

### Respondents' knowledge about HIV and AIDS

The researcher wanted to ascertain respondents' knowledge about HIV and AIDS. When asked to give the full meanings of HIV and AIDS, 103 (85.8 percent) out of 120 respondents gave the full meaning of HIV and 106 (88.3 percent) gave the full meaning of AIDS. In order to find out their knowledge about the modes of transmission of HIV, the researcher gave them a number of correct and incorrect answers to tick. Ninety-six (80 percent) stated that HIV can be spread by sharing contaminated skin-piercing instruments; 99 (82.5 percent) stated that when people receive contaminated blood they can contract HIV; 112 (93.3 percent) said HIV can be spread through casual sex and 114 (95 percent) indicated that HIV can be spread from mother-to-child; and 116 (96.6 percent) indicated that mosquitoes do not spread HIV. When asked to indicate whether one can tell from physical appearance whether someone is HIV positive or not, 77 (64.2 percent) said 'yes', while 43 (35.8 percent) said 'no'. The researcher also wanted to ascertain the respondents' knowledge

about the major and minor signs and symptoms of HIV and AIDS. Forty-two (35 percent) and 22 (18.3 percent) respectively indicated that they did not know the minor and major signs and symptoms. Of those, who claimed they knew the major and minor signs and symptoms, the majority could not provide correct answers. A male respondent, for example, indicated loss of weight, continuous diarrhoea and continuous malaria as major signs and symptoms and loss of weight, continuous diarrhoea and continuous boils or shingles as minor signs and symptoms. When asked whether they had undergone any training to enable them to do their work, 106 (88.3 percent) said 'yes', while 14 (11.66 percent) answered the question in the negative. Of those who indicated that they had had some training, they cited the National AIDS Control Programme (NACP), Catholic Relief Services (CRS), Strengthening HIV and AIDS Partnerships (SHARP), OIC International, Family Health International (FHI), Adventist Development and Relief Agency (ADRA) and Hope for Future Generations (HFFG) as the organisations that had trained them.

### Services respondents render to their fellow PLHIV

When the researcher asked the respondents about the services they provided to their fellow PLHIV, who came for treatment, care and support, they stated that they helped them to pick their folders, prepared them to see the physicians, counselled them and identified their close relatives/friends to help them adhere to the counselling they received on antiretroviral therapy by taking their drugs religiously.

**Table 3: Services respondents render to their fellow PLHIV**

Activity	Frequency	Percentage
<b>Open up folder for clients</b>		
Yes	75	62.5
No	42	35
Missing system	3	2.5
<b>Total</b>	<b>120</b>	<b>100.0</b>
<b>Prepare clients to see the physician</b>		
Yes	74	61.7
No	43	35.8
Missing system	3	2.5
<b>Total</b>	<b>120</b>	<b>100.0</b>
<b>Weigh clients</b>		
Yes	49	40.8
No	66	55.0
Missing system	5	4.2
<b>Total</b>	<b>120</b>	<b>100.0</b>
<b>Counsel clients</b>		
Yes	94	79.1
No	21	17.5
Missing system	4	3.3
<b>Total</b>	<b>120</b>	<b>100.0</b>
<b>Identify close relatives/friends to help them adhere to the taking of drugs</b>		
Yes	71	59.2
No	45	37.5
Missing system	4	3.3
<b>Total</b>	<b>120</b>	<b>100.0</b>
<b>Others</b>		
Yes	32	26.7
No	84	70.0
Missing system	4	3.3
<b>Total</b>	<b>120</b>	<b>100.0</b>

Source: Data from fieldwork, 2012

### **How beneficial respondents' service has been to them and their clients?**

The researcher wanted to ascertain how beneficial their service has been to them and their clients. From the responses given, it was evident that the respondents derived both intrinsic and extrinsic rewards from their service.

### **Gaining knowledge about HIV and AIDS and living positively**

The majority of the respondents stated that through their service they and their clients had gained a lot of knowledge about HIV and AIDS and they as well as their clients were living positively with HIV.

A male respondent, who was over 30 years stated: *I have acquired knowledge about HIV and AIDS*. Another male respondent said: *"It [service] has helped me to know the Dos and Don'ts in life"*. A female respondent, who was over 30 years old, mentioned: *"I know how to care for myself and my children as well as my clients"*. Another female respondent between the ages of 30 and 34 years stated: *"It [service] has helped built my life. It has also helped me to plan my life"*. Another female respondent, who was over 30 years old, indicated: *Through the service we are able to teach and know how to relate. I was not able to relate to people, but now I can educate and relate to people"*.

### **Making clients happy and feeling good about it**

The care and support provided by the 'models of hope' for clients make the latter happy. A female respondent in reference to their clients stated: *"It [service] makes them happy and hopeful and so they take their medications with the objective of living long"*. Another female respondent, who was over 30 years old, indicated the appreciation of their clients with regard to their service: *"It [service] makes them happy and if I am not able to go to the clinic to provide service, they [clients] call me on phone to know my whereabouts"*. A male respondent between the ages of 30 and 34 years said: *I love helping others and because of stigma if someone is diagnosed for the first time and you are able to disclose to her/him that you are with them they become happy*.

### **Fighting stigmatisation and discrimination**

Some respondents stated that through their service they had been able to respond effectively to HIV stigmatisation and discrimination. A male respondent, who was over 30 years old, stated: *"I am free from stigmatisation and discrimination and some clients have also overcome stigmatisation and discrimination"*. Similarly, a female respondent, who was also over 30 years old, indicated: *"It [service] gives them [clients] hope and reduces discrimination"*.

### **Problems respondents encounter in the execution of their service?**

When the researcher asked about problems the respondents encountered in the execution of their service, the majority, 88 representing 73.3 percent indicated that they were faced with a myriad of problems; 23 (19.2 percent) said 'no'; and 9 (7.5 percent) gave no response. This result confirms the findings of earlier studies (Akintola, 2008; Kangethe, 2009. Ama & Seloilwe). The following are some problems, which the respondents, who indicated that they had problems, stated:

A female respondent said: *The nurses don't give us chance to work; they say we are taking their jobs from them*. Another female respondent said: *Some nurses stigmatise the infected persons. We have problems with the nurses during our duties. Some nurses don't value us*. Yet another female respondent stated: *Some of the clients rely on us for financial assistance, and stigma forces some of them to plead to put up with us*. A male respondent said: *I find it difficult using the blood pressure machine [sphygmomanometre] to measure the*

*blood pressure of clients. A female respondent indicated: I do not know much because I am not a trained 'model of hope'. Another female respondent indicated: We face financial difficulties – how to cater for our utilities, children's school fees and money for transport to visit our clients. We are not remunerated for the work we do. Some of us are given incentives by some non-governmental organisations, while others get nothing. Even those who get the incentives do not get them regularly.*

### **Discussion and Conclusion**

The study ascertained what motivates PLHIV known as 'models of hope' to provide care and support to fellow PLHIV in Ghanaian hospitals and clinics and also to undertake home visits to their clients. Most of the literature on caregiving points out the fact that caregivers are confronted with a burden of care, such as adverse physical, mental and socio-economic consequences. The study revealed that majority of the 'models of hope' came face-to-face with burdens including financial difficulties, difficulty feeding themselves, stigmatisation, lack of incentives, etc. However, these experiences did not stop them from providing care and support to their fellow PLHIV, who needed their service. Using Charles Synder's hope theory as its theoretical underpinning, the study indicates that 'models of hope' are high hoppers, who in relating with the PLHIV they care for and support, aim at achieving a common goal with them, that is living positively with HIV. The study revealed that they did achieve their goals because most of their clients became happy and accepted to live positively with HIV. By providing the service, they derived some satisfaction because they gained a lot of knowledge about HIV and AIDS, which they needed, to educate and counsel their clients, adopted positive behaviours and perceived that they were effective in their work in view of the fact that their clients were happy with them. Just as Akintola (2010) indicated in his research on caregivers in South Africa, through the positive feedback that they get from their clients the 'models of hope' experience a high sense of well-being.

Although some hospital and clinic staff, particularly some nurses, did not value their service, as some of the respondents claimed, interviews with some management staff in these institutions indicated that they cherished their services. This positive feedback made the 'models of hope' develop a sense of pride and satisfaction. Majority of them, therefore, expressed their willingness to continue offering the service. They, however, indicated that they needed to be given regular incentives and offered more skills training by the Ghana AIDS Commission (GAC), NACP and civil society organisations. The views of these 'models of hope' are in line with similar sentiments expressed by Biriwasha (2010), as he writes: "It is critical for governments... to develop policy and legal frameworks as well as budgetary mechanisms that empower caregivers to properly cater for clients. International donors also need to seriously consider increasing the financial support targeted directly at making caregivers do their work better and not at the expense of their own lives".

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## **BACTERIAL MUTATION; TYPES, MECHANISMS AND MUTANT DETECTION METHODS: A REVIEW**

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### **Abstract**

Mutation is a very important concept in biology today that leads to variations in genes. A mutation is a permanent alteration in the sequence of nitrogenous bases of a DNA molecule. The result of a mutation is generally a change in the end-product specified by that gene. In some cases, a mutation can be beneficial if a new metabolic activity arises in a microorganism, or it can be detrimental if a metabolic activity is lost. Mutations can be spontaneous, or induced by a mutagen in the environment. Mismatching is probably mostly due to cellular processes such as Tautomeric shift of bases, oxidative damage to DNA, Depurination and Deamination or caused by "environment", i.e, chemicals, radiation, viruses, diet and lifestyle (Mutagens). Substitution of a nucleotide and Deletion or addition of them is two mechanisms of mutation. Mutation in bacteria has some results such as missense, nonsense, silent, frameshift, lethal, suppressor and conditional lethal mutation. Identifying these mutations requires detection methods. Classic methods i.e, Replica plating, Penicillin enrichment, Ames test, Use of chromogenic substrate and novel tests such as Polymerase chain reaction (PCR) and Gel electrophoresis, Gene probes and Southern blotting, DNA sequencing and DNA microarray are some of these methods that are highlighted in this review.

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**Keywords:** Mutation, Spontaneous and induced mutation, mechanisms of mutation and their results, detection methods

### **Introduction**

Today bacteria are an important tool in the study of genetics and biotechnology, but for 40 years after the rediscovery of Mendel's work and the rebirth of genetics, they were considered too simple to have genes, undergo mutation, or reproduce sexually. This is not surprising - bacteria are so small that it's very difficult to study individuals. Scientists had long observed differences between bacterial colonies, but had never realized that these differences were the results of mutations. Mutations are a very important concept in biology today. Mutations lead to variations in genes. These genes can have a good or bad influence in the characteristics of an organism. Variations are also very important in evolution. Without variations evolution would not be possible, and changes in any part of the environment affecting the organism could make the organism become extinct [1,2,3].

A mutation is any heritable change in DNA sequence. This may, or may not, affect the phenotype of the organism [4,5,6,7,8]. The term "mutation" was coined by Hugo de Vries, which is derived from Latin word meaning "to change"[5].

The process of mutation is called mutagenesis and the agent inducing mutations is called mutagen. (Organisms selected as reference strains are called wild type, and their progeny with mutations are called mutants). Changes in the sequence of template DNA (mutations) can drastically affect the type of protein end product produced [4,7].

## Types of mutations

Mutations can be classified by the kinds of alterations in the DNA, or by whether the mutation was spontaneous, or induced by a mutagen in the environment. Mismatching is probably mostly due to cellular processes such as Tautomeric shift of bases, oxidative damage to DNA, Depurination and Deamination or caused by "environment", i.e, chemicals, radiation, viruses, diet and lifestyle (Mutagens)[4,5,6,8,9].

## Mechanisms of mutation

a. Substitution of a nucleotide: Base substitution, also called point mutation, involves the changing of single base in the DNA sequence. This mistake is copied during replication to produce a permanent change. If one purine [A or G] or pyrimidine [C or T] is replaced by the other, the substitution is called a transition. If a purine is replaced by a pyrimidine or vice-versa, the substitution is called a transversion. This is the most common mechanism of mutation.

b. Deletion or addition of a nucleotide: deletion or addition of a nucleotide during DNA replication. When a transposon (jumping gene) inserts itself into a gene, it leads to disruption of gene and is called insertional mutation [2, 4,5,6,7].

## Mutation Sources

Mutations arise from a variety of sources, including:

### Tautomeric shift of bases

Each of the bases in DNA can appear in one of several forms, called tautomers, which are isomers that in the positions of their atoms and in the bonds between the atoms. The keto(C=O) and amino(C-NH<sub>2</sub>) form of each base is normally present in DNA, whereas the imino(C=NH) and enol(C-OH) forms of the bases are rare (Figure 1). Conversion of keto group in thymine & guanine to enol form and changing amino group in adenine & cytosine to imino form, are examples of tautomerization. Naturally, A in amino form pairs with T in keto form, whereas A in its imino form pairs with C and T in enol form match with G [1,6,8] (Figure 2).

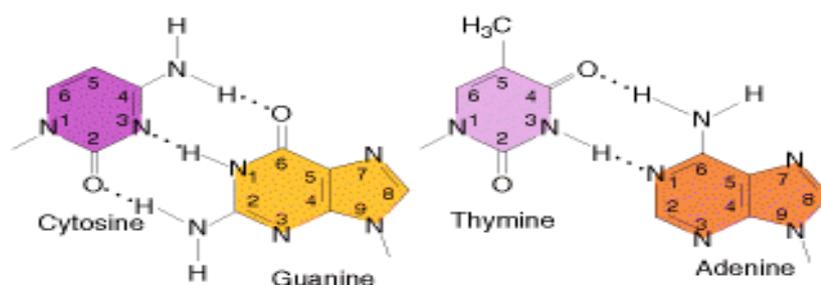


Figure 1 : Pairing between the normal (keto) forms of the bases.

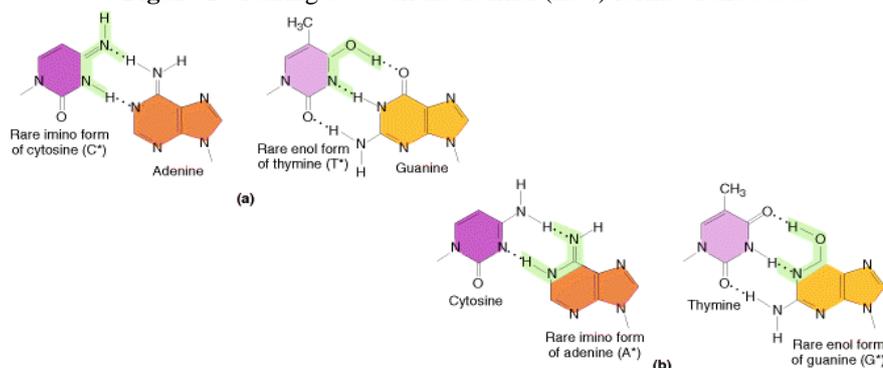
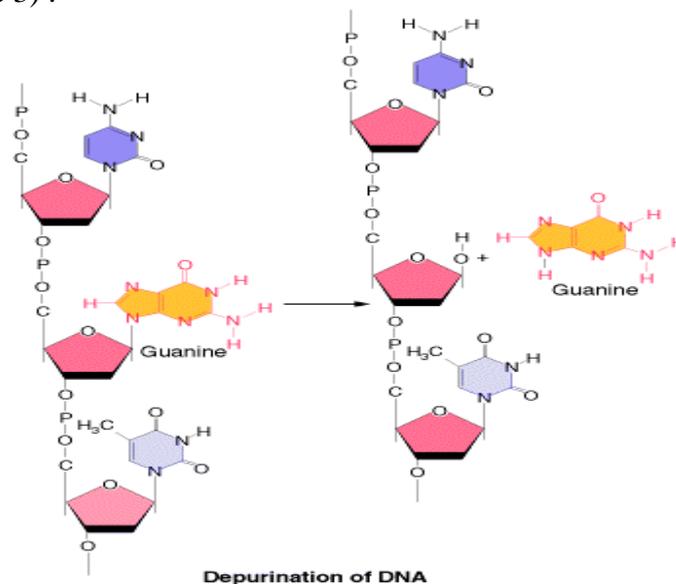


Figure 2 : Mismatched bases. (a) Mispairs resulting from rare tautomeric forms of the pyrimidines; (b) mispairs resulting from rare tautomeric forms of the purines.

## Depurination

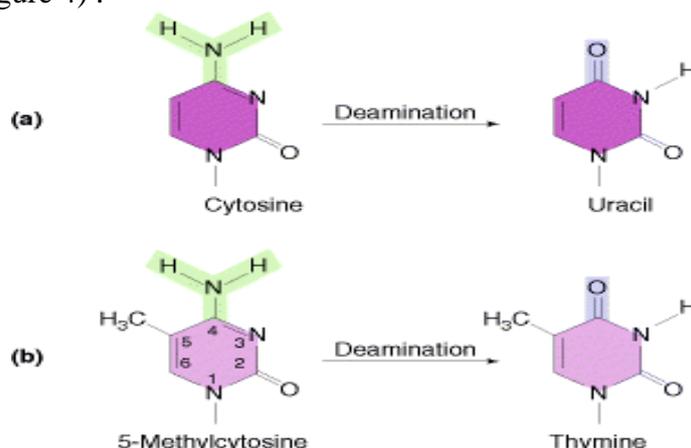
Depurination consists of the interruption of the glycosidic bond between the base and deoxyribose and the subsequent loss of a guanine or an adenine residue from the DNA. In replication, the resulting apurinic sites cannot specify a base complementary to the original purine. So, efficient repair systems remove apurinic sites. Under these certain conditions, a base can be inserted across from an apurinic site; this insertion will frequently result in a mutation [6] (Figure 3).



**Figure 3 :** The loss of a purine residue (guanine) from a single strand of DNA. The sugar-phosphate backbone is left intact.

## Deamination

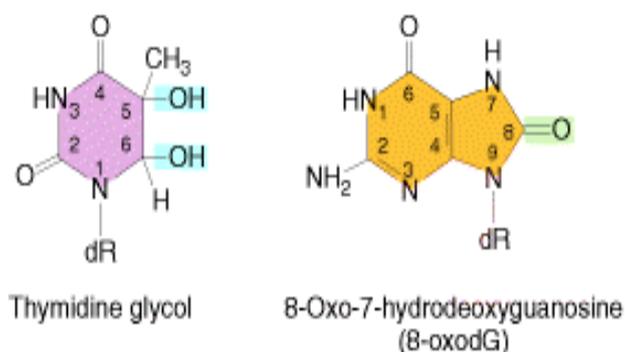
The deamination of cytosine yields uracil. Unrepaired uracil residues will pair with adenine in replication, resulting in the conversion of a G-C pair into an A-T pair (a GC → AT transition). Another example for deamination, is conversion of 5-methylcytosine to thymine [1,2,6] (Figure 4).



## Oxidatively damaged bases

Active oxygen species, such as superoxide radicals ( $O_2\cdot^-$ ), hydrogen peroxide ( $H_2O_2$ ), and hydroxyl radicals ( $OH\cdot$ ), are produced as by-products of normal aerobic metabolism. They can cause oxidative damage to DNA. For example, The 8-oxo-7-hydrodeoxyguanosine (8-oxodG, or GO) product frequently mispairs with A, resulting in a high level of G → T transversions. Thymidine glycol which induced of hydroxyl radical attack to thymine, blocks

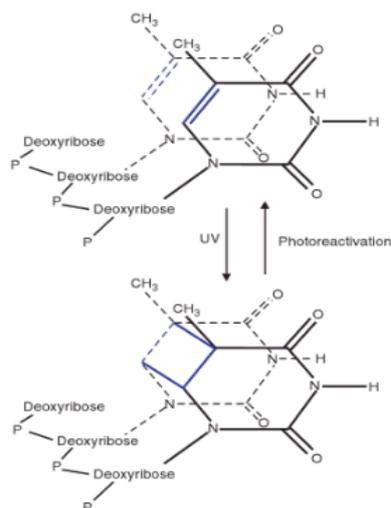
DNA replication if unrepaired but has not yet been implicated in mutagenesis [6,10] (Figure 5) .



**Figure 5 :** DNA damage products formed after attack by oxygen radicals.

### Ultraviolet irradiation

Ultraviolet light (opt 250 nm) causes bonds to form between adjacent pyrimidine residues (commonly referred to as thymine dimers, although the effect can also occur with cytosine) in the same polynucleotide strand. These are called pyrimidine dimers. UV irradiation can result in the formation of covalent links between pyrimidine dimers (Figure 6) .These bonds distort the DNA conformation and inhibit DNA replication and transcription [1,2,6,7,11].



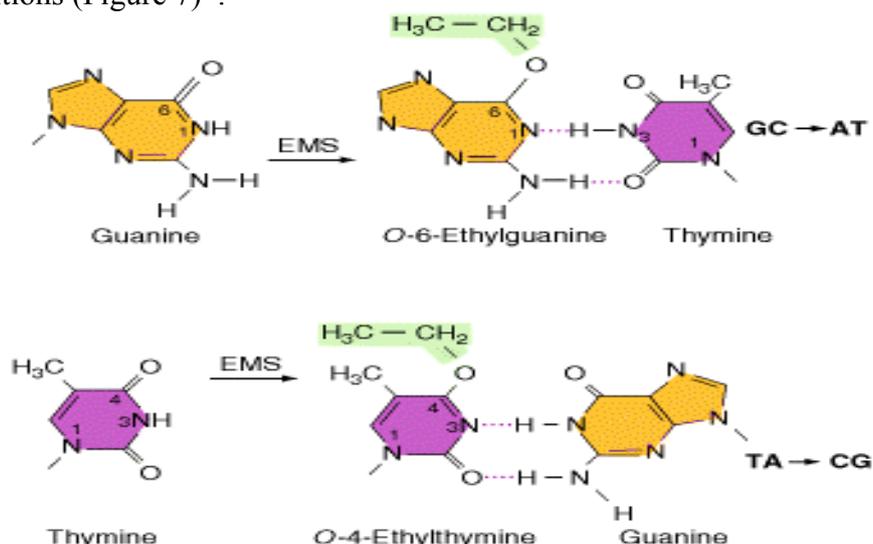
**Figure 6 :** Structure of thymine dimers.

### Chemical mutagens

Variety of chemical mutagens have been identified that are classified into three groups based on their function [1,2,6,8].

First group are those agents that act by chemically modifying a base on the DNA so that it resembles a different base. For example, nitrous acid causes an oxidative deamination in which amino groups are converted to keto groups and thus cytosine residues for example will be converted to uracil. Uracil will be capable of pairing with adenine, thus causing a change from a C–G pair to T–A. Similarly deamination of adenine creates the base hypoxanthines, which will base-pair with cytosine. Some types of chemical agent are not incorporated into the DNA but instead alter a base, causing specific mispairing. They act against the DNA within cells, rather than against isolated DNA. Certain alkylating agents, such as ethylmethanesulfonate (EMS) and nitrosoguanidine (NG), add alkyl groups (an ethyl group in EMS and a methyl group in NG) to many positions on all four bases, mutagenicity is best correlated with an addition to the oxygen at the 6 position of guanine to create an O-6-

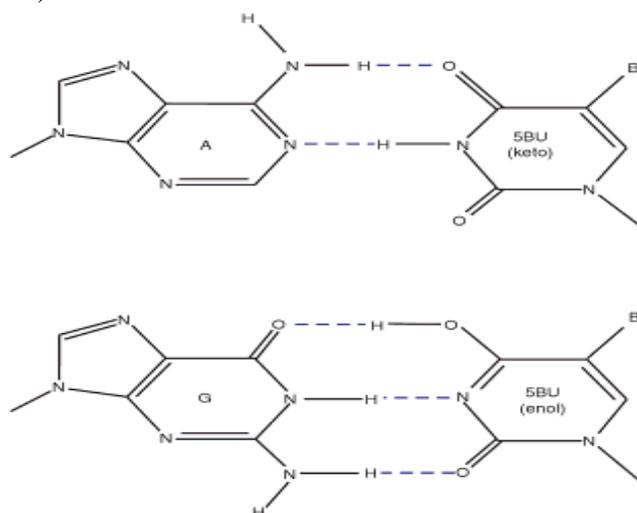
alkylguanine. This addition leads to direct mispairing with thymine, and would result in GC → AT transitions (Figure 7) .



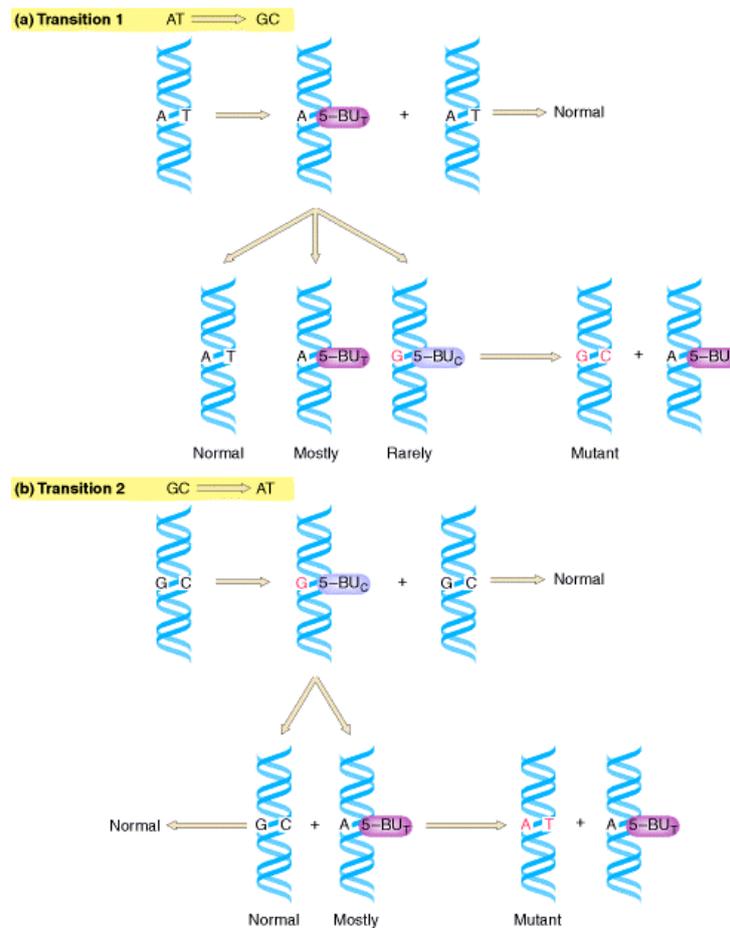
**Figure 7 :** Alkylation-induced specific mispairing. The alkylation (in this case, EMS-generated ethylation) of the O-6 position of guanine and the O-4 position of thymine can lead to direct mispairing with thymine and guanine, respectively.

Second group are mutagens that induct frameshift formation. The intercalating agents that include proflavin, acridine orange and ethidium bromide are planar molecules, which mimic base pairs and are able to slip themselves in (intercalate) between the stacked nitrogen bases at the core of the DNA double helix. In this intercalated position, the agent can cause single-nucleotide-pair insertions or deletions. Intercalating agents may also stack between bases in single-stranded DNA; in so doing, they may stabilize bases that are looped out during frameshift formation.

Third group are type of agent that acts only against growing cells consists of the base analogues such as 5-bromouracil. Despite its name, this is an analogue of thymine and adenine. 5-BU causes mutations when it is incorporated in one form and then shifts to another form (Figure 8). In its normal keto state, 5-BU pairs like thymine (5-BU<sub>T</sub>). Thus, 5-BU is incorporated across from adenine and subsequently mispairs with guanine, resulting in AT → GC transitions, but in its enol form, 5-BU pairs like cytosine (5-BU<sub>C</sub>), so 5-BU is misincorporated across from guanine and subsequently pairs with adenine, resulting in GC → AT transitions (Figure 9).



**Figure 8 :** Enhanced tautomerism by the base analogue 5-bromouracil.



**Figure 9 :** The mechanism of 5-BU mutagenesis. (a) In its normal keto state, 5-BU pairs like thymine ( $5-BU_T$ ). Thus, 5-BU is incorporated across from adenine and subsequently mispairs with guanine, resulting in  $AT \rightarrow GC$  transitions. (b) In its ionized form, 5-BU pairs like cytosine ( $5-BU_C$ ). Thus, 5-BU is misincorporated across from guanine and subsequently pairs with adenine, resulting in  $GC \rightarrow AT$  transitions.

### Results of mutation

**Missense mutation:** Missense mutations are DNA mutations which lead to changes in the amino acid sequence (one wrong codon and one wrong amino acid) of the protein product [1,4,5].

**Nonsense mutation:** A mutation that leads to the formation of a stop codon is called a nonsense mutation. Since these codon cause the termination of protein synthesis, a nonsense mutation leads to incomplete protein products [1,4,5].

**Silent mutation:** Sometimes a single substitution mutation change in the DNA base sequence results in a new codon still coding for the same amino acid. Since there is no change in the product, such mutations are called silent [1,4,5] (Figur 10).

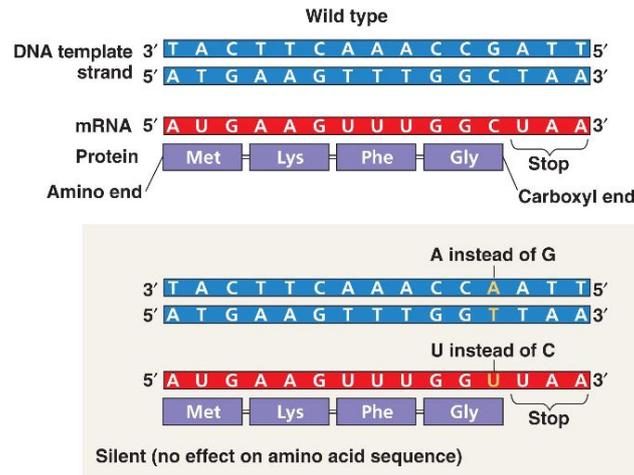


Figure 10 : Mechanism of silent mutation.

**Frameshift mutation:** Frameshift mutations involve the addition or deletion of base pairs causing a shift in the “reading frame” of the gene. This causes a reading frame shift and all of the codons and all of the amino acids after that mutation are usually wrong. Since the addition of amino acids to the protein chain is determined by the three base codons, when the overall sequence of the gene is altered, the amino acid sequence may be altered as well [1,4,5,6].

**Lethal mutation:** Sometimes some mutations affect vital functions and the bacterial cell become nonviable. Hence those mutations that can kill the cell are called lethal mutation [5,7].

**Suppressor mutation:** It is a reversal of a mutant phenotype by another mutation at a position on the DNA distinct from that of original mutation. True reversion or back mutation results in reversion of a mutant to original form, which occurs as a result of mutation occurring at the same spot once again [1,2,4,5,12] (Figur 11).

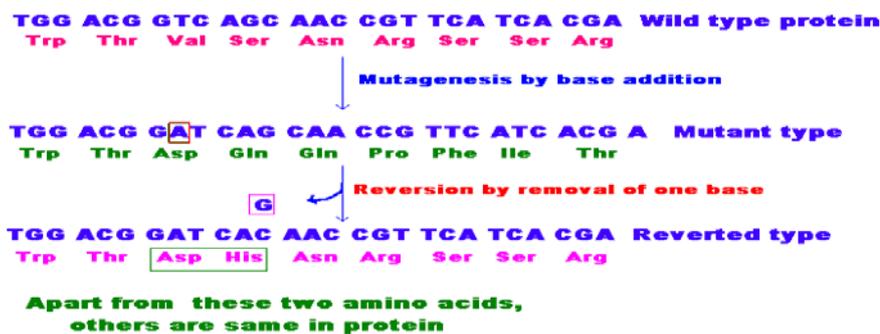


Figure 11 : Mechanism of suppressor mutation.

**Conditional lethal mutation:** Sometimes a mutation may affect an organism in such a way that the mutant can survive only in certain environmental condition. Example; a temperature sensitive mutant can survive at permissive temperature of 35°C but not at restrictive temperature of 39°C [1,5,7].

### Isolation and identification of mutants

In general, changes at the amino acid level in a protein will have a consequential effect on the protein's activity, usually detrimental. Thus, an important metabolic pathway

may be blocked by the lack of functional enzyme resulting in identifiable phenotypes [8]. This phenotypes can be classified in to three main groups:

- 1- mutants that are resistant to antibiotics, or to specific bacteriophages, toxic chemicals or any other agents that are usually lethal or inhibitory to the parent cell;
- 2- auxotrophs, i.e. mutants that require some additional growth factor, such as an amino acid;
- 3- mutants that are unable to use a particular growth substrate (usually a sugar)[13].

## Methods for mutant selection

### Replica plating

In this procedure, the mutagenized culture is plated out to obtain single colonies on a nutrient medium on which mutants and parents will grow. After incubation, the colonies are replicated, using a sterile velvet pad, onto a minimal agar plate and then a similar plate to which the appropriate supplement (in this case, histidine, since we are looking specifically for histidine auxotrophs) has been added. Histidine requiring auxotrophs will be unable to grow on the first plate, but will grow on the second one. Thus, mutant colonies can be identified with localization of colonies that have failed to grow in second plate in comparison with first one [1,5,14] (Figur 12).

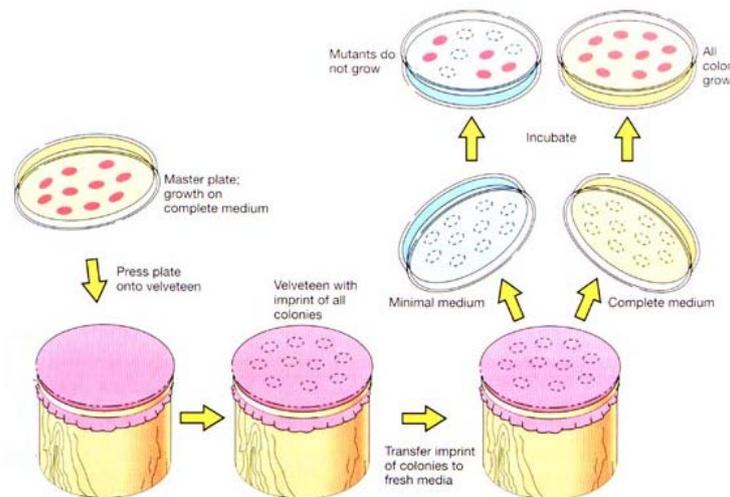


Figure 12 : Replica plating to isolate auxotrophic mutants.

### Penicillin enrichment

Some antibiotics (i.e penicillin) acts only against growing bacteria. Cells that are stopped their growth for any reason, relatively not sensitive. Resuspending the bacteria in a minimal medium and adding penicillin will kill the parental cells, which are able to grow, while allowing the non-growing mutants to survive [1,5,14,15,16] (Figur 13).

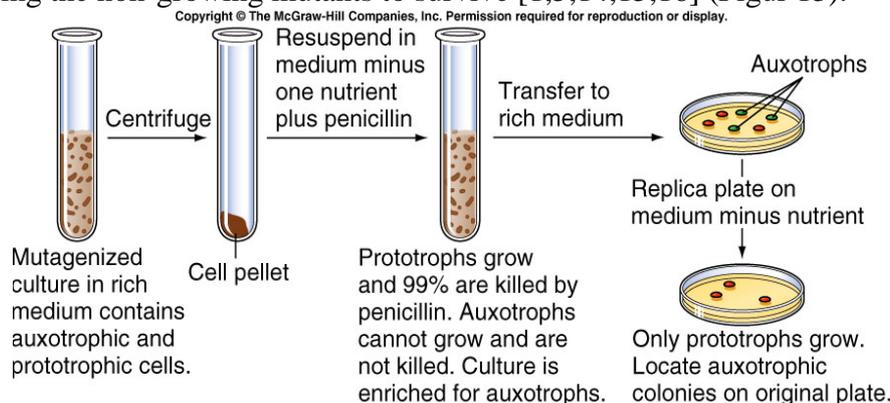


Figure 13 : Mutant screening using penicillin enrichment.

### Ames test

The Ames test uses several strains of the bacterium *Salmonella typhimurium* that carry mutations in genes involved in histidine synthesis i.e. it is an auxotrophic mutant, so that they require histidine for growth. The method tests the capability of mutagen in creating mutations that can result in a reversion back to a non-auxotrophic state so that the cells can grow on a histidine-free medium. The bacteria are spread on an agar plate with a small amount of histidine. This small amount of histidine in the growth medium allows the bacteria to grow for an initial time and have the opportunity to mutate. When the histidine is depleted, only bacteria that have mutated to gain the ability to produce their own histidine will survive. The plate is incubated for 48 hours. The mutagenicity of a substance is proportional to the number of colonies observed [7,14,17,18] (Figure 14).

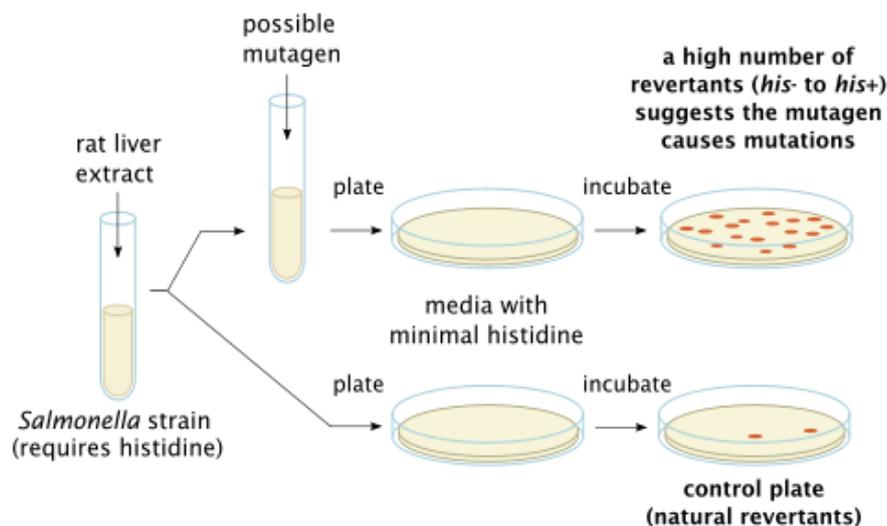


Figure 14 : Ames test procedure.

### Use of chromogenic substrate

Mutants that are not able to utilize a particular carbon source (lactose, for example) can be isolated with use a chromogenic substrate that shows an easily detectable color change when acted on by the enzyme concerned. In this case the enzyme is  $\beta$ -galactosidase, which catalyses the hydrolysis of lactose into its constituent sugars glucose and galactose. A commonly used chromogenic substrate for  $\beta$ -galactosidase is 5-bromo-4-chloro-3-indolyl- $\beta$ -D-galactoside, more popularly known as X-gal. This is a synthetic analogue of the natural substrate, containing a dye linked to galactose. X-gal itself is colorless; the color of the dye is only manifest when it is released by hydrolysis of the linkage by  $\beta$ -galactosidase. Lac<sup>+</sup> colonies will be blue on a medium containing X-gal and colonies that do not produce  $\beta$ -galactosidase will be white [1,19].

### Polymerase chain reaction (PCR) and Gel electrophoresis

In this method, target gen (mutant sequence in this case) can be increased exponentially. If the mutation has caused a significant change in the size of a specific gene (such as an insertion or a deletion) it will be detect by a change in the size of the PCR product, using gel electrophoresis [1,20,21,22,23].

### Gene probes and Southern blotting

This method involves separating fragments of DNA by electrophoresis in an agarose gel and transferring them to a filter which can then be hybridized with the labeled probe. By using highly specific probes, detection of difference in the sequence is possible [1,14,21,23].

**DNA sequencing**

DNA sequencing template is amplified using PCR and oligonucleotide primers flanking the region of interest. The amplified fragment is directly cycle sequenced using fluorescent sequencing primers, Sanger dideoxy sequencing chemistry and an enzyme mixture of a mutant Taq DNA polymerase and thermostable pyrophosphatase. The sequence ladders produced are analyzed on a real-time, automated four-color sequencing system. The method produces sequence ladders from unpurified PCR fragments of sufficiently high quality such that heterozygotes can be reproducibly detected and identified by software that recognizes signal-strength patterns indicative of mixed-base positions [1,24,25,26].

**DNA microarray**

Base-pairing or complementarity is the principle behind this emerging technology. The potential applications of microarray technology are gene expression profiling and identification of gene sequences (including sequences that bear mutations). In this method, a large number of DNA fragments are placed on a glass slide. The fragments are allowed to complement or bind with the labeled DNA (probes), which hybridize with the DNA on the glass slide. The amount of hybridization is then analyzed in each spot on the slide. The genes are given a color where the hybridized ones are colored red and the genes that are hybridized least are colored green. It has been reported that microarray technology could be used in monitoring chromosome gains and losses, tumor classification, drug discovery and development [27,28,29].

**Conclusion**

Mutations lead to variations in genes that are very important in evolution. A mutation is any heritable change in DNA sequence. Mutation can be beneficial or it can be detrimental. Mutations can be spontaneous due to cellular processes, or induced by a mutagen in the environment. Substitution of a nucleotide and Deletion or addition of them is two mechanisms of mutation. Mutation in bacteria has some results that may, or may not; affect the phenotype of the organism. Several methods have been developed for the mutant detection, of these methods molecular methods Due to the high sensitivity and specificity, and also more time saving than the classical methods is recommended.

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# FROM OBSERVED VISIBLE HUMAN BEHAVIOR TO ANIMATED HUMANOID 3D COMPUTER MODELS - BIVARIATE NOTATIONS AS A PSYCHOLOGICAL METHOD FOR SYSTEMATIC OBSERVATION

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## Abstract

Systematic observation of visible phenomena is especially in the exact sciences, e.g. Physics or Chemistry, without doubt one of the most important sources of knowledge and regarded as a prerequisite in those disciplines. For the comparatively young discipline of Psychology, which itself has been counted to the exact sciences since 1982 (ISCU, 1982) precisely detailed, high-resolution and unbiased observation of visible human behavior still remains a challenge. Mere recordings -whether photographic, on film or video- provide no directly measurable or calculable data about complex temporal or spatial human movement sequences, which is absolutely vital for scientific analysis. Finding a method by which visible human behavior can be notated in such a way so as to provide a most accurate true reflection of the observed behavior in the notation itself, has therefore, especially in Psychology, been a problem of the first order for decades.

The method of *bivariate notation* of temporal and spatial visible human movement behavior appears to have proven itself useful, particularly in the context of current work done in solving these problems. With the aid of a comparison between five trend-setting research efforts, this contribution thus aims to provide an overview of how this method has gained efficiency over time, from its early beginnings up to the most current stage of development.

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**Keywords:** Systematic observation of visible human behavior, method of bivariate Notation

## Introduction

After the Second World War, academic Psychology lapsed into the “worst provincialism” (Hofstätter, 1957), in the country of its founders, Germany, as shown in the context of the observation of visible human behavior in particular. Under the heading of “Expression-Psychology” (german: Ausdruckspsychologie), scientific observers “analysed” and “diagnosed” the movement behavior of persons in that they forced their own visual *impressions* onto the observed persons as so-called *expressions* of the latter's inner attitudes, personality traits, etc. Publications emerging from this viewpoint, became the breeding ground for views which led to the foundation of national-socialist race doctrines. After the Second World War in Germany almost thirty years passed before in the year 1973 Expression Psychology was removed from the academic curriculum and cut from the examination regulations for graduates in Psychology (Michaelis, 1986). Yet, intensive discussion and analyses of the causes for the at least intellectual disaster- if nothing else- and the role of Expression Psychology and its methods of observation in this respect, did not ensue. As a result of the unresolved history, the further development of the systematic observation of visible behavior so evidently and enduringly stepped into the fringe, that even in the late 1960s, it was stated that “observation methods are ignored or underestimated by many social scientists” (Cranach et.al, 1969).

The US- American psychological community already distanced itself from the theses of Expression Psychology in the late 1930s, because it had not proven itself useful in psychological diagnostics, so that “the study of facial expressions and their interpretation died out by the 1940s” (Davis, 1979). Instead, attention in the USA was turned to the more easily controllable human *speech behavior*, concentrating primarily on the development of questionnaires and tests, thus abandoning the interest in the systematic observation of visible human behavior. After no new, visionary theoretical impulse which could rekindle the subject of the systematic observation of visible behavior emerged in the USA for roughly one decade, a new research movement formed itself at the end of the 1940s under a heading which had previously found little attention: Communication. This development was initiated by the powerful American science manager, Warren Weaver. In 1949, he popularized a model for a *mathematical* communication theory of engineer Claude Shannon (Shannon, 1948) through a successful media campaign in which he suggested that this model could serve as a means to completely describe *human* communication (Weaver, 1949). Weaver's assertions found their way into the realm of academic Psychology through an influential Harvard University psychologist, George Miller, who as early as 1949 and in his lectures in the course of 1951, warmly recommended it to lecturers and students in his book “Language and Communication” (Miller, 1951). From that point on, visible human behavior in the context of the new theme of Communication, came to be described as “visible non-verbal behavior.” Apart from the psychologist George Miller (Miller, 1951), the introduction of the description non-verbal can especially be attributed to the American psychiatrist Jurgen Ruesch, who published the noteworthy book “Communication” in co-authorship with the anthropologist Gregory Bateson in 1951 (Ruesch & Bateson, 1951).

### **The bivariate notation of visible human behavior**

#### **Ray Birdwhistell's trailblazing work on methodology**

Also the anthropologist Birdwhistell (1918-1994) published his work, *Introduction to Kinesics* (Birdwhistell, 1952), under the new, larger field of Human Communication. The thematic emphasis of his publication was the notation and the analysis of movement behavior of humans in face-to-face communication. For him an important requirement had to be met if the method was to be successful: the notation of human movement behavior had to be purely descriptive. In his view, movement behavior had to be notated in such a way that “motion should be regarded as data rather than explanation“ (pp.10). He thus calls for caution, especially to Psychologists (pp.24), to avoid the contamination of motion data by interpreting it. To point to the dangers attached to such contamination, he refers to the disastrous German history of Expression Psychology and states: “Much of the earlier material is frankly racist” (pp.13).

A central methodological aim of Birdwhistell's work was to connect this purely descriptive notation of *spatial* human movement behavior with the *time* it takes to perform these movements in a *bivariate* notation system. To reach this goal, he came up with a brilliantly simple idea to connect the notation of communicative events during motion behavior with notation of the alphabetic language, which inherently contains a temporal component (Fig. 1).

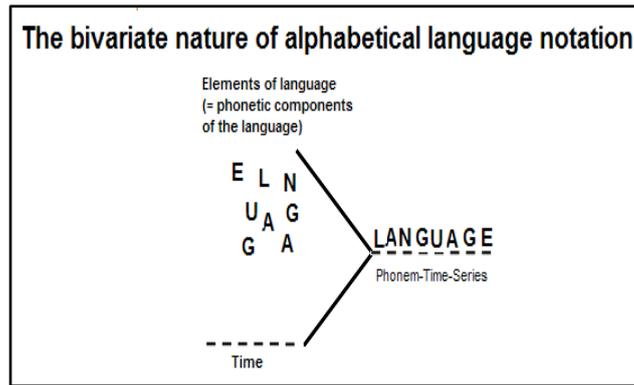


Fig. 1: The bivariate (Phonem-Time) notation of alphabetic language. In writing down words, spoken language is broken down into the phonetic (grc. elements) and temporal components. By the same token, it is possible to reproduce elements, phonemes or letters of the language in their correct or original temporal sequence in the process of reading from left to right.

This means that for Birdwhistell the transcribed speech behavior of observed persons also forms- apart from information about the verbal content- a *temporal* reference for the entire time lapsed during the communication process. To analyse the communicative events, Birdwhistell filmed the various situations. In the first step, the produced film material was used to transcribe the words spoken by the persons. With this speech transcription, Birdwhistell created the first part of his behavior notation. Now a notation, describing the motion behavior of the actors, was still lacking. For this purpose, he drew a series of pictogram-like symbols, whose meanings he wrote down into a code or meaning index. These symbols, which he called “Kineme,” for him presented the smallest descriptive movement units (Fig.2).

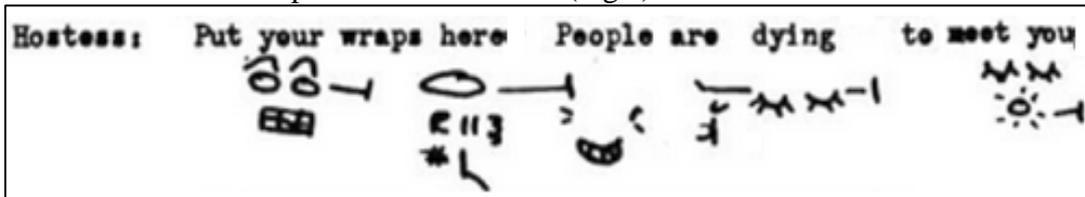


Fig. 2: Section from Birdwhistell's code, in which the symbols he used (“Kineme”) and their descriptive meanings were listed in the fashion of a lexicon.

During a complete or partial review of the film material, he now draws the appropriate symbols for the different observed movements under the various places in the transcribed text where the movements occur and has thus additionally marked the point in time or time space in which movements were performed (Fig.3).

Code (Key)			
^ ^	Raised brows	∨	Droopy mouth
o o	Wide eyed	☺	Tongue in cheek
- o	Wink	☺	Pout
> <	Lateral squint	☺	Clenched teeth
>> <<	Full squint	☺	Toothy smile
☹☹ A	Shut eyes (closed pause 2 count blink)	☺	Square smile
☹☹ B	Shut eyes (closed pause 5 plus count)	☺	Open mouth
⊙ ⊙	Sidewise look	☺	Slow lick of lips
☺☺	Focus on auditor	☺	Quick lick of lips

Fig. 3: Birdwhistell's bivariate Notation(Speech-Time and Positions of Human Bodyparts) of visible human behavior at the hand of an extract from a “hostess-guest-event.“ Description of hostess motion-behavior: She smiled at him, lips pulled back from clenched teeth. Then, as she indicated where he should put his coat, she dropped her face momentarily into an expressionless pose. She smiled toothily again, opened, and shut her eyes again as she pointed to the guest with her lips. (pp.29-30)

Birdwhistell, who expanded the description of motion behavior to include the whole human body, also expanded his bivariate notation with additional signs which made the description of motion behavior significantly more precise. Above the speech notation, he added numbers, arches, arrows, angles, etc. to a) indicate at which angle- noted in approximated 15 degree steps - various body parts are positioned (pp. 50) and b) in which of the three spatial dimensions- indicated in anatomical direction descriptions (e.g. pp.37) - this positioning accrued (e.g. pp.50-51). Below the same example as above, with the complete set of symbols (Fig.4).

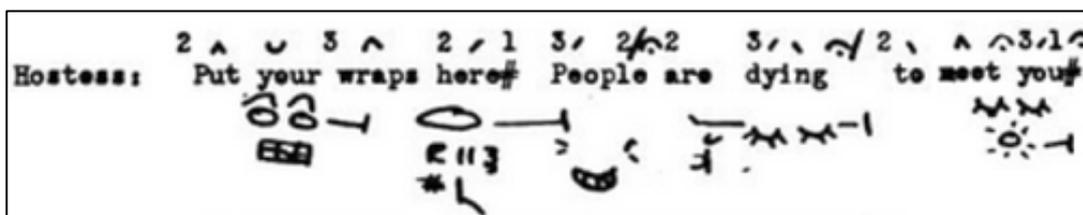


Fig. 4: Birdwhistell's behavior notation (see example above in Fig.3) with the complete set of symbols

#### Summary:

1. The movement description by means of a phonem-time notation is based on a code system in which the signs used (symbols or "kineme") are made explicit.
2. Information of movement behavior is not gathered at the time of direct observation, but is later transcribed frame by frame with the aid of film recordings.
3. Great care was taken to make sure that the notation was purely descriptive and it was warned against the possible danger of bias associated with diffusing description with interpretation.
4. All visible body parts were incorporated into the behavior notation.
5. Approximate angles for body part positioning were notated.
6. All three spatial dimensions were named in the description.
7. The scale or calculation level of notated data: Ordinally scaled.

Conclusion: Without a doubt, the quality of a descriptive behavior notation is primarily recognizable by a) how high-resoluted, precise and detailed the original observation can be reconstructed by the notated data b) how, or to which extent, the notation is contaminated by (mostly biased) interpretation. In this respect, Birdwhistell presented no objective tests for the effectiveness of his method. The meticulously constructed and well thought-through symbols ("kineme") could also have an alienating effect on contemporary observers. However, the combined connection between the approximated angles and information on the three spatial dimensions do allow significant possibilities for description of human movements with which a great number of human movements could be generally represented on the level of an ordinal scale. Yet, two points of criticism against Birdwhistell's method from the perspective of later developments are to be emphasized:

1. Birdwhistell's attempt to create a purely descriptive system of notation with these symbols was not entirely successful. The descriptions of the meanings of the symbols contained in the code were often unclear and to a great extent open for interpretation by the user of the code. What is meant by a "normal" mouth position or "shaking of the head," when is a mouth position "droopy," are "feet" indeed been "scraped," etc. remain open to the free- and thus: biased- interpretation of the observer.

2. Furthermore, the time information as notated over the alphabetical speech notation as a temporal component, which is meant to record when the motion behavior took place, is imprecise in Birdwhistell's original notation. This is caused by the fact that words and single syllables are spoken at different lengths by different persons. This also applies for speech pauses, for example, the duration of which could variate significantly from speaker to speaker. These example in themselves illustrate that an event, in itself temporally dependent, like the spoken word or its alphabetic notation, can by no means serve as an objective time reference or

a tool for timing in a notation of other events and must thus always remain imprecise. In short: The time reference or time indicator itself cannot be open to variation. Only time itself or its objective measurement does not vary and therefore has the ability to be used as a reference for precisely indicating the duration of events.

**Adam Kendon's methodological progress**

The Psychologist Adam Kendon, who had studied at the universities of Oxford and Cambridge(b. London 1934), in 1967 published his research in his work, "Some Functions of Gaze-Direction in Social Interaction" (Kendon, 1967), which also dealt with visible human behavior under the larger theme of Human Communication. With his own bivariate space-time notation of human movement behavior, in which he enhanced the method with two innovations, he introduced sustainable progress. The first innovation deals with the appearance of his notation and the second with the way in which movement behavior is temporally captured.

The new appearance of the bivariate behavior notation: For centuries, probably even since the Babylonian advanced culture, where it was used for creating the calender (2000 B.C.), mathematical figures and other symbols has been noted in *tables*, consisting of rows and columns. This order-giving tabulation was also utilized by Kendon in his bivariate notation.

The new way of measuring time: Kendon did not use the imprecise alphabetical speech notation as a time reference, but introduced objective time measurement, in that he divided the lapse of time during his observations into equal time intervals. The result, in combination with his use of a new appearance of the bivariate notation, was a *spatial-temporal table*. Each new row in the table represented a new time interval, whereas each column represented the spatial positioning of the body parts of the observed person. For describing the spatial position of body parts, Kendon- just as was the case with Birdwhistell- used pictogram-like symbols (Fig.5).

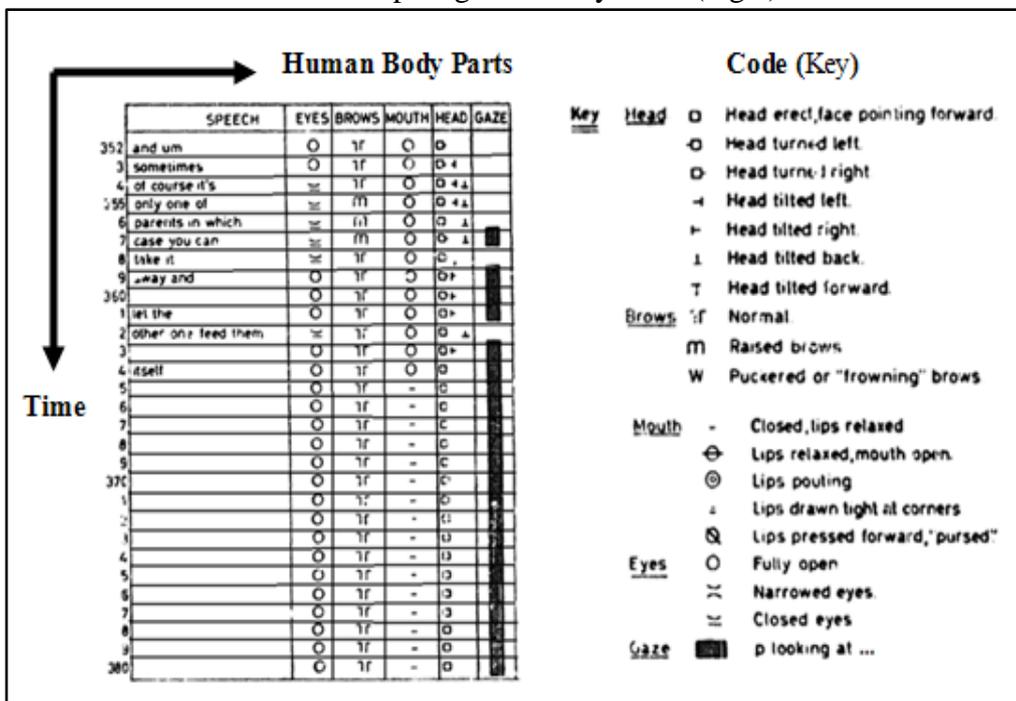


Fig. 5: Left-hand side of the diagram: Kendon's bivariate notation (Time: half-second step each row - Positions of human body parts in columns: Eyes, eyebrows, mouth, head) of visible human behavior as a sample from a conversation setting. On the left-hand edge of each row, numbers can be seen, which indicate intervals of half-a-second each.(Note: The vertical lines in the table are not original, but added by this author so as to clearly explain the rows). Right-hand side of the diagram: Extract for the Code (Key) used by Kendon, containing the symbols and explanations of its meanings (pp.30-32).

## Conclusion

1. Kendon was one of the first to develop a bivariate notation (time positions of human body parts) of visible human behavior in which the objective time measurement is used as a reference for the temporal demarcation of spatial movement behavior. This allowed the precise temporal description of the observed behavior. 2. He gave his notation the organized and structured appearance of a table, according to rows (time intervals) and columns (individual human body parts). 3. The position or movement descriptions are- as is the case with Birdwhistell- based upon a code system, in which the signs (symbols) used are explicated. 4. Observed behavior is not- as is also the case with Birdwhistell- noted during direct observation, but later transcribed, frame by frame, with the aid of film recordings. 5. Care was taken that the transcription was purely descriptive. 6. The scale or measurement level of the noted data: Ordinally scaled.

Conclusion: The new table format and the use of objective time measurement present sustainable progress for the bivariate spatial-temporal notation of visible human behavior. Apart from the clear arrangement of such notations in a table format, time periods of observation could now be precisely defined at will, with the aid of the used time intervals. Forthwith, observed movement behavior could be described in high definition as regards to its temporal progression. On the other hand, Kendal's notation is not free of bias, because it is also here not possible to work purely descriptive. In the notation code, specific explanations of symbols are also open to free interpretation to a large degree, because what "relaxed" lips, "raised" eyebrows or "sunken" head, etc., look like, are left to the interpretation of the observer. The latter problem- that the symbols along with the explanations of their meanings, or the code system itself, present the decisive weakness of the bivariate spatial-temporal notation of movement behavior- could have become clearly recognizable in 1967. On this basis, and the emergence of video recorders and computers in research laboratories, it could realistically have been expected that further methodological advances would follow, which would have solved the "weak point of the code"- dilemma in the decades following: the 1970s and the 1980s. That this was however not achieved, is clearly illustrated at the hand of the following brief description of a project which launched a last attempt to salvage the code system by way of a spurious solution.

## The last code system

In 1981, under the theme of Human Communication, a bivariate spatial-temporal notation of visible human movement behavior was published, which the authors titled the "Berner System" (Frey et.al, 1981). In introducing the "new methodological basis" (pp.203) and the basic function principles for the "Berner System," the principle of the bivariate phonem-time notation of the alphabetical speech notation is explained. Though the self-same method had already been used by Ray Birdwhistell 30 years prior for the notation of movement behavior, the authors made no mention to the trailblazing work of the said pioneer, neither by name, nor in reference (pp.210-212). Instead- as if the work of Birdwhistell had never existed- it is further noted that "Although the application of the principles of timeline notation for coding speech behavior has long been a given, literature in no way seems to be clear on whether this principle can also be made useful for the transcription of complex movement events." (pp.212). The authors- as we will see below- go on to construct their spatial-temporal notation for the "Berner System," by organizing it in rows (time intervals) and columns (body parts), thereby using objective time measurement for giving the time, just as Kendon had done some 14 years prior (see above), again without quoting his works or giving him personal credit (pp.224). Notwithstanding how the authors deem fit to honour the achievements of peer researchers in a way unusual in scientific circles, a statement can be read in a later publication of one of the main authors, the Psychologist Frey, that "with the Berner System in the early

1980s, a non-semantic notation method could be utilized for the first time”(Frey, 1999). “Non-semantic” is supposed to mean “without any relation to meaning on a level of content”(Frey, 1999). For methodology, this means that the “Berner System” lays claim to allowing purely descriptive notations. Should this claim hold true, the above-mentioned “weak point of the code,” which also presents itself in the notations of Birdwhistell and Kendon, would have been solved. In looking at the spatial-time notation of the “Berner System,” one notices that the symbols, as used by Birdwhistell and Kendon, were replaced by numbers (Fig.6, left side of the diagram).

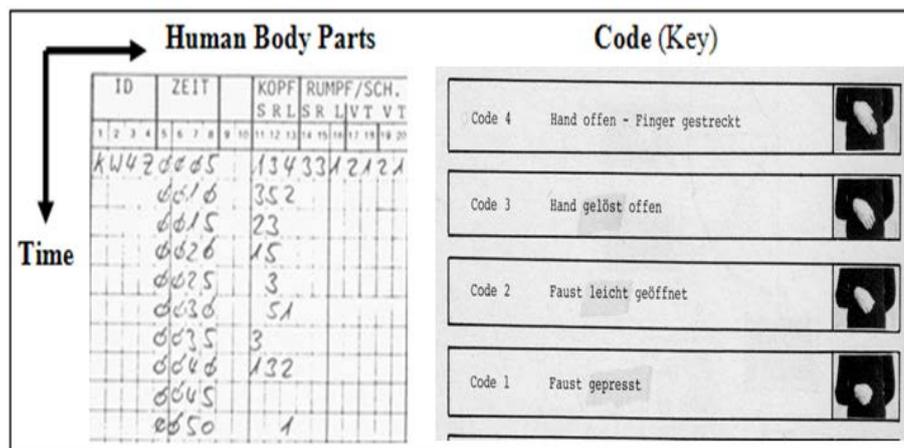


Fig. 6: Left side of the diagram: The bivariate notation(Time: half-second steps each row; Positions of Human Body Parts in columns: Kopf = Head, Rumpf = Trunk) of visible human behavior according to the “Berner System,” as a sample from a conversation setting.

Right side of the diagram: Here a sample of the utilized, so-called non-semantic Code (Key) for the explanation of the notation of the numbers used can be seen, as explained by the example of hand positions: Code 4 = hand open/fingers stretched/ Code 3 = hand relaxed open/ Code 2 = fist slightly open/Code 1 = fist clenched (pp.224, 230).

At the first glance, these numbers suggest mathematical precision, as if we are dealing with metric values. Further investigation reveals that the numbers written into the columns for body parts (e.g. Head, Trunk), are nothing but *code numbers*. These code numbers, which the authors borrowed from the previously developed facial coding system by Ekman et al., FAC (Ekman et.al., 1976), now refer to the code of the “Berner System.” In this code, code numbers can be found, with explanations and small photos, on which mostly quite unclear body positions are shown (Fig.6, right side of the diagram). The code numbers thus represent that which is listed in the code. This means, that, instead of using the “Berner System” for spatial-temporal notation, one could just as well add in a description and photo, when an observer who works with this code believes to have recognised the body position of the observed person that matches the position described therein. Yet, how should an observer decide, if he or she reads “hand relaxed open,” “fist slightly open,” “fist clenched,” “head sharply turned,” “trunk strongly reclined,” “the upper arm touches the upper body perhaps,” in the descriptions? What do “clenched,” “slightly,” “sharply”, “strongly”, “reclined,” or even “perhaps,” look like and from which point in time and which not this situation has existed? It follows that the observer working with this code is expected to perform significant independent interpretative tasks, which renders it in no way “non-semantic,” and as a consequence offers no description free of bias. The weakness of the code, as described above in the context of the works of Birdwhistell and Kendon, thus also remained unsolved by the “Berner System.”

Conclusion: Regardless of the research effort laid claim to by the authors, another question arises: Which *innovative methodological own achievement*, apostrophized as a “new methodological basis” (pp.203) can be drawn from the “Berner System?” One detail of the

“Berner System” comes to light for the first time: There is a separate column entry in the three spatial dimensions for each of the notated body parts. Thus it can be seen on the left side of the diagram in Fig. 6 above, that under “Head,” lateral, rotational and sagittal spheres have each been added with a separate column, denoted with “S,” “L,” and “R” in the notation. This new methodological detail introduced by the “Berner System,” could however barely be regarded as a “new methodological basis,” (pp. 203) on an objective level.

The decisive methodological further development in the bivariate notation of movement behavior was heralded at the end of the 1990s, when a disconnection to the code system accrued.

### Angle Measurement instead of Code Numbers: The *Scriptanimation*

The Psychologist, Guido Kempter, developed his own method called *Scriptanimation* and introduced it in 1999 (Kempter, 1999). The method in question is a 2D/3D computer-assisted animation process, which is first and foremost aimed at allowing observers to capture the movement behavior of persons in a purely descriptive fashion. The starting point of this process is a 2D video recording of the movement behavior of persons from the frontal perspective. The visible behavior of the persons as seen on the video (25 FPS), is then transferred, image by image, onto a computer-steerable, sixteen-part 3D computer model with the appearance of a stick figure. Each of the sixteen parts of this 3D model is steerable in all three spatial dimensions over the user interface (GUI) of the software (Fig. 7).

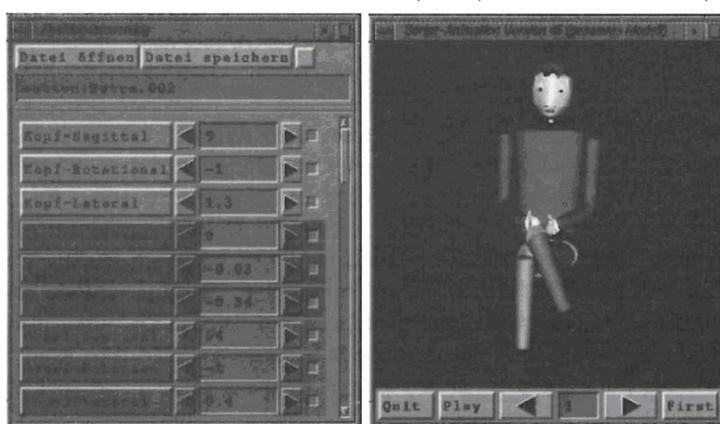


Fig. 7: The user interface (GUI), visible on the computer screen, for steering the sixteen part 3D stick figure in all three spatial dimensions (pp.108)

The positions generated with the 3D stick figure are entered into a program-internal, table format, which is arranged according to time intervals (rows) and the spatial position of each of the sixteen stick figure parts (columns) as angle measurements and angle values (Fig.8). With the use of this spatial-temporal table, or position-time notation (= script), the same 3D figure with which the angle values were generated and written into the notation, is reanimated.

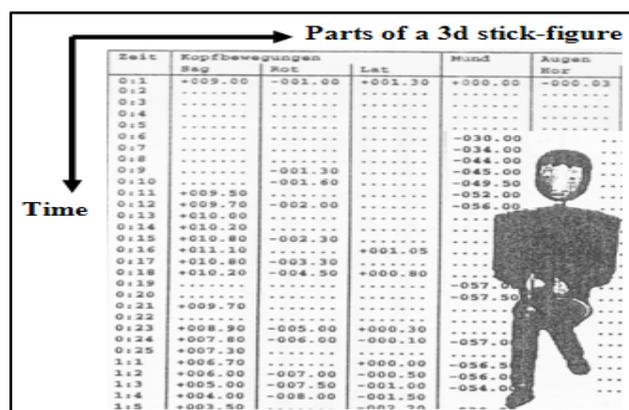


Fig. 8: The bivariate notation (Time: 25 FPS / Positions of 3D Stick-Figure Parts) of human movement behavior, using a 3D computer model in the shape of a stick figure, calculated in angle values. Each figure part is represented in the three spacial dimensions and shown in separate columns (pp.104).

With this method of notation, the “weak point of the code” has been eliminated. There is no code, and therefore also no open interpretation of “explanations and circumscriptions,” as not only found in Birdwhistell and Kendon, but also the “Berner System” and Ekman et al. This notation is purely descriptive and thus free of bias. Here the observer, or the person positioning the 3D stick figure, is only expected to be visually discerning. Further advantages of this method: The movements are temporally as well as spatially dated in high definition and precise detail. Through image to image captured values, negative and positive movement acceleration can be precisely recorded and reanimated. The latter presents an additional achievement, which has not been possible for other animation procedures (motion capture, keyframe animation, etc.) to achieve up to that point in time. The date is interval-scaled and opens a multitude of possibilities for mathematical analysis, which ordinarily scaled data obtained in the past could not provide.

The important progress presented by *Scriptanimation* formed a basis for new possibilities for development and contributed towards further improvements in the bivariate notation of movement behavior. In this respect, the first question poses itself: What is the *quality* of the angle values generated with the use of *Scriptanimation*? To what degree is it possible to create angle values with the 3D stick figure, which realistically reflect *human* movement? High consistency with human movements can only be achieved in the head movements of the stick figure. In the case of all other movements made by the figure, the observer could possibly create the illusion of close similarities with human movements, but viewed objectively, these movements have only little in common with real human movements. The reason for this lies in the construction of the 3D figure. It is plain to see that the figure has no shoulders, its torso is a lacklustre cone, its hands are incomplete, etc. From this follows that figures constructed in such a way are on the one hand not able to a) produce realistic human movement, and, on the other hand, produce movement which humans b) do not make at all. From these two facts it necessarily follows that the angle values cannot reflect that of the movements of the observed persons. Moreover, it follows that a majority of the measured values needed for psychological analyses and problem-solving cannot be obtained from these stick figures. The solution to this problem is obvious: Instead of the stick figure, the observer should be able to position a computer model in such a way as to reconstruct realistic movement possibilities of humans, and with it reproduce the real angle values in the notation.

Since the observer uses a computer programme for the notation of visual behavior, the next question as to the user-friendliness of such a notation software arises. This largely determines whether and to which extent a user would be willing and able to perform the task of observation. Learning how to use *Scriptanimation* demands a long period of training, the

software is quite bulky and, more often than not, leads to frustration on the part of the observer working with it.

### Human anatomy and user friendliness: *ScanimFBX*

Building upon the basic idea of *Scriptanimation*, Zysk, Filkov und Feldmann published significant improvements of bivariate notation in the form of their own developed software, *ScanimFBX* (Zysk et.al., 2013). It presents, as is the case with *Scriptanimation*, a 2D/3D computer-supported animation process aimed primarily at enabling observers to capture the movement behavior of persons in a purely descriptive way. The starting point of this procedure are two video recordings on which the movement behavior of persons are filmed from both the frontal and lateral perspectives and presented on the user interface of the *ScanimFBX*. The observed movement on the video is transferred by the observer on to a 3D humanoid computer character- specially designed for this purpose- which has the appearance, proportions and the realistic functional-anatomical movement possibilities of humans. The observer positions each body part of the character in exactly the way he or she sees the person on the video, frame for frame (1-100 FPS). Each body part of the 3D character is steerable in all three spatial dimensions over the user interface (GUI) of the software (Fig.9).

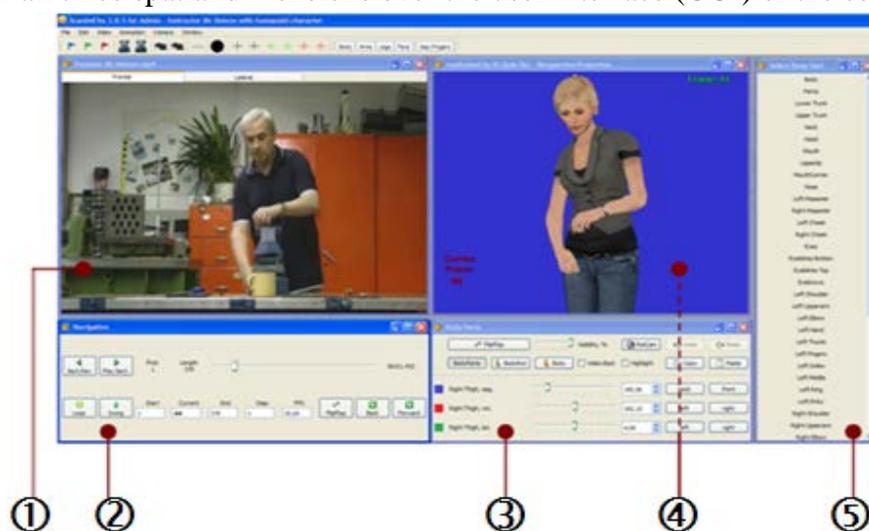


Fig. 9: Screenshot of *ScanimFBX* GUI (Windows-Platform): 1. Video-Window with frontal view of the original behavior (video-window for the lateral view is behind this window and can be activated by mouse-click) 2. Window for steering the video and start/stop playing animation. 3. Window for anatomical limited steering positions of the whole body and bodyparts. 4. Character-Window with female 3D humanoid character. 5. Body parts window with body parts list for selecting and activating body parts by mouse-click. (pp.57)

The positions generated with the 3D humanoid character are written with limited angle values into a program-internal, executable, table-format notation, ordered by time intervals (rows) and spatial positioning of the individual body parts (columns). *Limited* means that the body parts of the character can only move within the restrictive framework of angles which also apply for humans. For example, the head of the character can only be moved to the right or to the left as far as it is possible for humans to do the same. Thus it is also impossible for the operator to make the mistake of positioning the body parts of the character beyond the realistic movement angle. As a safeguard of the angle limitation, the operability of the control elements visible on the user interface has been designed in such a way as to make oversteering impossible. (Fig.9, 3). Through this limitation, the generated angle values have an absolute zero point, so that the measurement level of the data is ratio-scaled, and as such allows all mathematical operations with the data. Thanks to this user-friendly software, it is possible for computer laypersons (n=50) to, without exception and after a short period of

introduction, be able to write down a program-internal bivariate spatial-temporal notation with correct functional-anatomical angle values of the movements of observed persons, in high resolution, with precision and virtually without mistakes (Fig. 10).

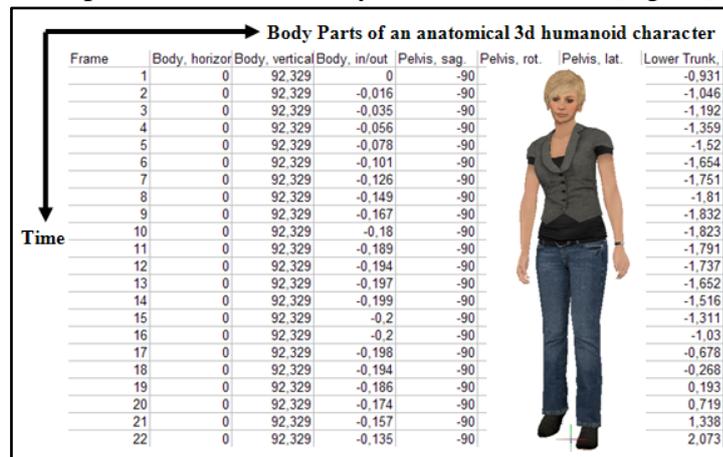


Fig. 10: The bivariate notation (Time: 1-100 FPS; Positions of Body Parts of an anatomical 3D humanoid character) visible human behavior by using an anatomical 3D humanoid computer model, entered with functional-anatomical limited angle degrees.

With this spatial-temporal notation, both the 3D character with which the angle values where created, or another 3D humanoid character with a different appearance can be reanimated by retargeting the same values. The movements remain absolutely natural.

## Conclusion

That it is also possible for the field of Psychology to today acquire imperial knowledge about visible human behavior on the level of the methodology of the Natural Sciences with regards to precise details, high resolution and pure description, is here presented at the hand of a brief overview of five research efforts, which shows the progress made in the development of the *bivariate notation* of visible human behavior from its early pioneering stages up to the current state of affairs. The examined historical timespan of this methodological development reaches back to the irresponsible imputation of Expression Psychology and leads up to the unbiased descriptive metrical behavior measurement with 3D humanoid computer characters. A decades-long persistence of weaknesses in *data mining* must be conceded to in such an essential field of Psychology. It has however gradually gathered strength, which has long become a trademark in the field of data analysis and its experimental methodology. These developments have only been made possible with the help of modern computer technology, fortunately enabling also computer laypersons to work in this field and making exciting future progress all the more probable.

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# SELF-PACED LEARNING WITH 3D HUMANOID VIRTUAL TUTORS

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## Abstract

For acquiring specific vocational skills, it is essential that trainees are able to observe their trainers closely while these demonstrate particular working movement processes in an exemplary fashion. It would further be desirable if each trainee was able to absorb these observations in accordance to his or her own, individual learning habits and capabilities. Yet circumstances in real-life classroom situations often make individual supervision of each trainee to a large extent impossible. Therefore computer-animated 3D humanoid characters, precisely emulating the correct, realistic behavior of trainers, with a computer program which can be operated by the trainee in a self-paced mode, could present a viable training aid. Our work has consequently been focused on the conceptualization and creation of tools to realize visible aspects of the training process for the purpose of self-paced learning through 3D humanoid characters. After a short introduction to the didactical concept, this paper presents the creation and the preceding development of such a self-paced learning tool.

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**Keywords:** Selfpaced-learning, vicarious learning, 3D humanoid virtual tutors, ScanimFBX-AnimationPlayer

## Introduction

Inspired by the trend-setting preliminary work of renowned researchers (Benjamin, 1988), the famous psychologist B.F. Skinner constructed and presented his mechanical Teaching Machines in the 1950s (Skinner, 1958). Notwithstanding broad criticism of his views on learning theory (e.g. Chomsky, 1959; Staddon, 2001), which is not central to the deliberations here, Skinner was the first to establish a thematic connection between the positive effect of the didactical concept of selfpaced learning and useful technical aids for application in this type of learning (<http://www.youtube.com/watch?v=jTH3ob1IRFo>). In accordance to Skinner, the concepts of self-paced or un-paced refer to a process of preparing and presenting information which allows the user to completely independently decide when, at which speed, in which order and intensity he or she wishes to absorb the given information, taking their individual levels of competency into consideration. The opposite to this self-determined learning is extraneously determined learning (paced or other-directed). In the latter, prepared and presented information can only be absorbed in the way dictated by others. In this way, one is forced to, for example, listen to an entire speech as dictated by the speaker to avoid missing some important information. An example of self-determined learning would be reading a book. Here the reader is able to decide for himself, when and where he or she starts, stops, continues reading, takes a break, etc.

Though it had been customary to primarily employ learning material in *written form*, a change accrued when the the psychologist, Albert Bandura, showed that *vicarious learning*- meaning the observation and emulation of visible behavior of other people- offers a

highly significant source for acquiring new skills (Bandura et.al., 1961). Henceforth the application of *visual material* for self-paced learning became an obvious choice. Enthusiastically proclaimed learning film productions of the early twentieth century proved to be less effective for the learning process as anticipated (Edison, 1913). On the one hand, these films were frequently only consumed passively and could thus reach limited learning effects. On the other hand, trainees were less motivated or unable to independently analyze the film material, or search for relevant information. Although films clearly offer the user the possibility of deciding where to start, stop, go forward and back, pause, use slow motion or fast forward- similar to reading a book- creating and presenting films for learning purposes remain extraneously determined to a large extent, Figure 1. This is because the temporal sequence, perspectives, dimensions and focus, meaning the focus on specific and relevant optical details, are predetermined by the film- to name a few examples. Should one succeed in eliminating these limitations, allowing trainees to make their own decisions on what they wish to see, how long, how often, from which perspectives, from which distance, in which sequence and speed at any given time, the visual portrayal of movement sequences in specific fields of work could provide them with extraordinarily useful training sources.



Fig.1 Film = other-directed acquisition of knowledge

To incorporate the Selfpaced concept and the deliberations of Banduras regarding *vicarious learning* into the creation of a user-friendly computer program for self-paced learning with the aid of visible movement sequences in specific fields of study, intensive preliminary work had to be done. This is outlined step-by-step below.

### **Videotaped Critical incidents**

During our extensive field studies in a wide range of training areas (metal processing and nursing) both trainers and trainees were filmed from the frontal as well as the lateral perspectives while conducting activities typical for their lines of work, e.g. sawing, filing, repositioning patients. Then trainers and persons with longstanding experience in their specific professions, carefully selected clips from the filmed material. A large number of individual movement sequences in specific vocational fields, which are vital for determining whether the actions were executed optimally or less optimally, could be observed in numerous short clips selected, so-called *Critical Incidents* (Flanagan, 1954). Since an adequate tool for such complex video analyses, which is at the same time user-friendly and suitable for use in a self-paced mode by computer laypersons, was not as yet available on the market, we designed and produced a new tool for video analysis, the *AYP-MoviePlayer* (Zysk & Filkov, 2013).

### **Lifelike reproduction of activities with 3D humanoid characters**

The critical incidents in movement sequences in the clips as described above, are to be reproduced with the goal of reanimation through 3D humanoid characters. The movements of the humanoid characters must be highly precise and natural, so as to reproduce the original vocational activities exactly. The demand for this high degree of realism posed the threat of falling into the *uncanny valley* (Mori, 1970). Therefore, a decision had to be made from the

outset as to which animation procedure was best suited for the precise and lifelike capturing of human movement. Performance animation as well as motion capturing were at that time not suitable for capturing these finely differentiated movements. Why is this? In addition to restrictions put on the movements of the wearer of sensor fitted suits, particularly complex and concurrent harmonious shifts between slow non-linear accelerated movements and faster non-linear accelerated movements of various human limbs can evidently not be sufficiently portrayed. Motion Capturing by way of optical systems (e.g. VICON), also present major problems. Markers are attached to the skin in order to record locations within a space, which are recorded by special cameras to steer a computer model. These markers are often covered during movements (Wu et.al., 2011) or slip back and forth between the skin and bones of the wearer (soft tissue artifacts) (Kuo et.al., 2011). Both problems produce numerous motion artifacts. Systems without markers (e.g. MS KINECT) frequently suffer from interferences (Dutta, 2012) or covering of body parts resulting in a loss of trackings (Stoyanov et.al., 2011), notwithstanding a very low number of body parts captured (Obdrzalek et.al., 2012). Thus the possibilities offered by these techniques are at present very limited for the purpose of vividly capturing natural human movement. As a basis for the development work presented below, as lesser known procedure was selected: The *Scriptanimation* Method (Kempter, 1999): The startingpoint of this technique is a 2D video. The observed behavior of the persons in the video is transferred by an operator onto a 3D stick figure consisting of 16 parts, remotely resembling a human. Each part of this 3D figure is steerable. The operator then positions each part of the 3D figure exactly like the observed movements of a person on the video (25 fps), frame by frame. The positions generated with the 3D figure are written into a program-internal executable script, arranged according to time (columns) and spatial position of individual stick figure parts (rows). Through this position-time notation (script), the same figure can be reanimated by the values entered into the script. Advantages: All individual parts of the 3D computergenerated model (stick figure) can be precisely positioned. Since these positions are captured frame by frame and exactly replicated in the temporal resolution of movements eventually reanimated, both negative and positive accelerations in movement behavior can be recorded and reconstructed accurately. However, this procedure has three major disadvantages. 1. The character used has very little in common with the realistic possibilities of human movements. This consequently also applies for its operation. 2. It was not possible to manipulate objects with the character and it was not possible to insert the character into the setting of the video. No interface (e.g. FBX-Data Format) for the purpose of commercial animation programs existed (e.g. 3DsMax Autodesk). 3. The graphic user interfaces (GUI) and the control and feature elements were not particularly user-friendly. Operating the software demanded a long training phase, proved to be quite bulky and often led to frustration on the part of the operator. These disadvantages needed to be eliminated.

Since no anatomically correctly constructed 3D humanoid character had been available on the open market, we first had to create a bone structure which matched the functional anatomy and the average proportions of an adult human. This constructed character consists of 160 elements, connected to 29 functional bodyparts in a parent-child relation and can be moved in 80 dimensions. The skin of the character is adapted to this bone structure and the body parts are *limited* in regards to their angles of movement to realistically resemble that of natural human movement and saved in FBX format. As a result of using this format, the settings reconstructed in 3DsMax (Autodesk) can be connected with the 3D humanoid characters. The 3D humanoid characters, which are movable entirely in accordance with the natural human anatomy, could then be incorporated into our newly constructed tool-*ScanimFBX* (Zysk, Filkov, Feldmann, 2013).

The *ScanimFBX* is a software package with two separate tools, with separate functions:

- The tool 1 *ScanimFBX* serves for the user-friendly production of natural 3D movement data for 3D humanoid characters [described in detail in (Zysk, Filkov, Feldman, 2013)] and
- The tool 2 *ScanimFBX-AnimationPlayer*, which serves as a user-friendly, in selfpaced mode operable animation player.

Briefly to Tool 1, *ScanimFBX*: The user interface and control and feature elements are designed in such a user-friendly way, as to allow computer laypersons to produce between 10 and 30 images per day in a frame-to-frame procedure, after a short introductory training (2 to 3 times, 2 hours per person, individual or group sessions with 2 to 3 participants). In the process, the operator adjusts the 29 bodyparts of the character in correspondence with the positions of the bodyparts of the person observed in the video clips (see above: videotaped critical incidents). The deviation of the humanoid character from the movements of the person observed in the video is minimal- less than 5%- in all angles. The entire production process is illustrated in Figure 2.

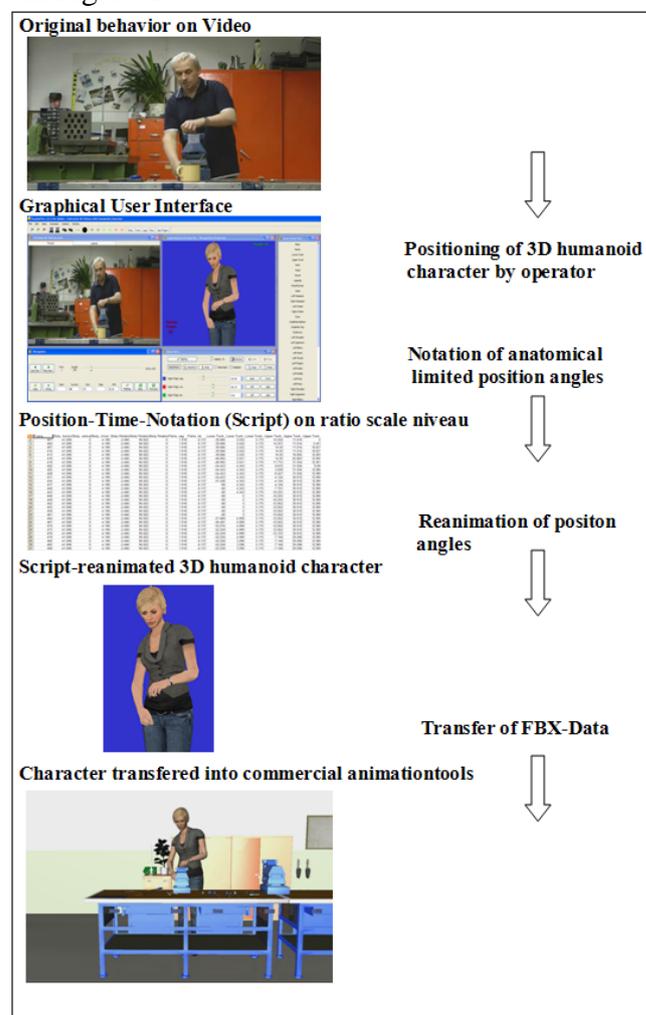


Fig. 2 Reproduction and reanimation of visible human behavior with *ScanimFBX*

### **Tool 2: *ScanimFBX-AnimationPlayer* - A new Tool for selfpaced learning**

The *ScanimFBX-AnimationPlayer* is a programmable animation tool by way of FBX-SDK 2010.2 (Autodesk). It allows for stored movements of the 3D humanoid character from *ScanimFBX* in FBX-Data Format to be studied, with or without an animated setting,

from all perspectives, at any desirable speed (1-100 fps) or image step width, at random close-up (zoom function), frame precise and in loop and swing (see Figure 3).



Fig. 3a Original 2D videotaped critical incident scene. (Here an instructor demonstrates the optimal movement sequences during filing).

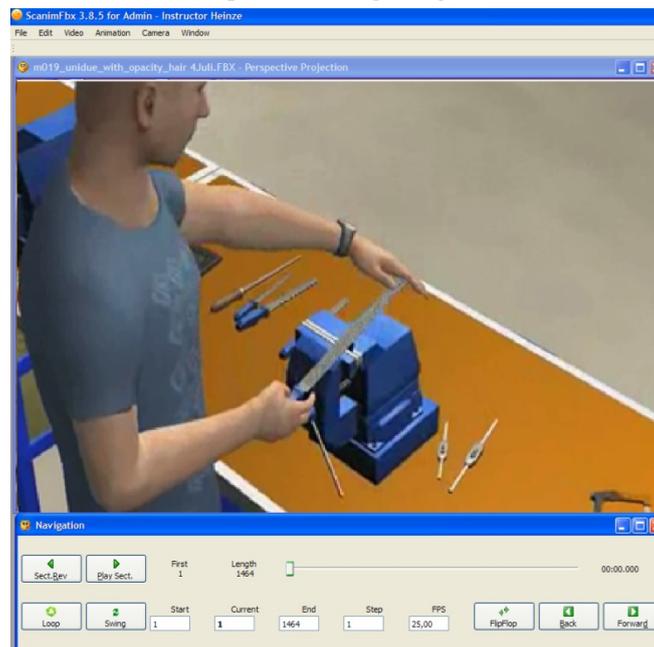


Fig. 3b The exact same movement sequences from Figure 3a can be studied with the *ScanimFBX-AnimationPlayer* from all perspectives, etc., by using the 3D humanoid characters.

Thus the user is able to freely decide what he or she wants to see, for how long, how often, from which perspective, which proximity, sequence and speed. Furthermore, the user can view both optimal and less-optimal movement sequences movements to be studied in isolated movement phases, as selected by experts on the grounds of which of these movements are decisive for optimal movement. Filing serves as an example: 1. What is the optimal leg position, 2. what is the optimal corresponding leg movement. 3. what is the optimal handle movement during filing? and so forth.

Virtually all functions of the *ScanimFBX-AnimationsPlayer* are controllable by a mouse as well as buttons in a navigation window. In the process, the humanoid characters can be manipulated by pointing the mouse directly over the animation window of the *AnimationPlayer*, in all movement directions. The function and operation features in the navigation window have proven superior in terms off user-friendliness for learning purposes in the first usability screening (20 test persons) in comparison to the *QUICK-TIME-PLAYER* (Apple) and *FBX-REVIEW* (Autodesk), the former off which has an installed *FBX-Plugin* (see Figure 4).

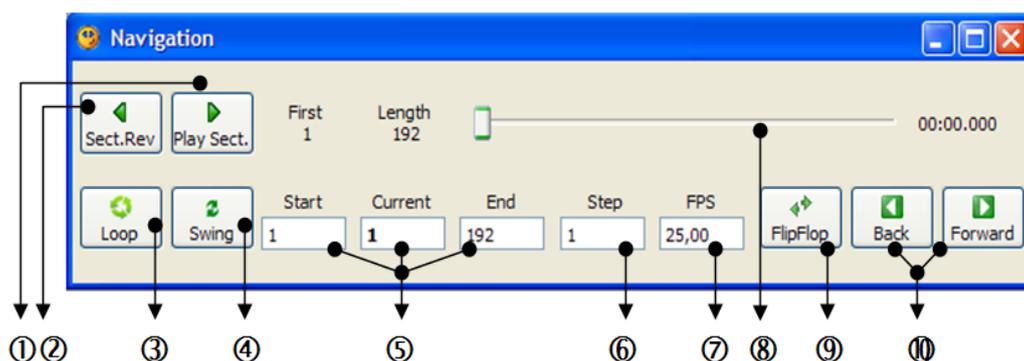


Fig.4 Screenshot section ScanimFBX AnimationPlayer Navigation-Window (Windows-Platform): Function buttons: 1. “Sect.Rev.” A defined section of the animation in reverse start/stop resume; 2. “Play Sect.”: A defined section of the animation in forward start/stop resume; 3. “Loop”; 4. “Swing”; Fields: All contents or figures can be randomly defined. It is possible to script directly onto the fields. 5. Definition of Start-Current-End. 6. Step width 7. Speed („FPS“ 1-100 fps). 8. Timeline with date information and flexible slider. 9. “FlipFlop“: Flipping back and forth between two defined pictures. 10. “Back” and “Forward”.

The following results of usability screenings should be emphasized:

- The absence of a “start/stop button” was greeted by test persons as an advancement
- When the animation is played to the end, the last frame remains visible. If the “Play Sect.” button (Fig. 2,4), is pressed again, the first frame is displayed, without the sequence immediately starting again. The button must be pressed again for the sequence to start playing. Also this function contributed to giving test persons the feeling of safe acting control over the Player.
- The possibility of viewing the animation in reverse play, frame accurate and at any desired speed by using the “Sect.Rev” button, was described by all test persons as “very interesting.”
- Both the “loop” and the “swing” functions were described as “very helpful.” This can only be attributed to the fact that the speed, frame accuracy and the section of the sequence were randomly definable, which made it possible for each test person to study different relevant positions in detail, at any speed and as often as necessary.
- The “FlipFlop” function was rated by all test persons as “very informative.” This was especially the case when a frame-accurate study of transitions or changes in movement sequences became possible.
- Addition: Fourteen of the test persons reported that they found this type of observation and working processes “enjoyable” causing them them to be more interested in the theme itself. One was now also able to notice the clear difference between doing it “correctly” and “completely wrong,” and thereby learn to avoid mistakes.

## Challenges

The *ScanimFBX-AnimationPlayer* should in the very near future become a standalone device with the use of the newest FBX-SDK programming. The independence of this self-contained tool from the *ScanimFBX* should thereby be underlined and the should be usable detached from it. Numerous additional didactical features should be demonstrated, e.g. the simultaneous comparison of optimal versus sub-optimal and vice versa, through step-by-step changes in movement. Notwithstanding, ongoing experiments are focused on examining possibilities to improve Motion-Capture techniques in recording certain movements (coarse, highly repetitive), so as to incorporate these into the animation of humanoid characters. Further field of application, such as capturing movement for use in operating instructions or first aid manuals are being considered.

## Conclusion

This paper presents an overview of preliminary research, results and ongoing work on a new user-friendly FBX AnimationPlayer. This tool, as an additional autodidactical learning aid, should serve trainees as a means to study 3D humanoid characters, which move in a precise and natural fashion, in selfpaced mode, at the hand of expertly controlled and optimized subject- and profession-specific movement sequences performed by the 3D humanoid characters. The first usability screenings suggest that through the implementation of new steering and functional components, a higher usability and thus, acceptance, exists in comparison to animation players commercially available at this time. The additional motivational aspect could suggest that persons who are less motivated when faced with learning from training manuals, find more fitting access to vocationally relevant study content or feel more motivated through such a tool to carry through with their study objectives.

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# SOLUCIÓN AL PROBLEMA COMBINATORIO USANDO UNA FUNCIÓN DE CLASE HÖLDER

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## Abstract

A combinatorial problem on the distribution and common area of inscribed squares is considered. In this paper we propose to investigate this problem based on the properties of Hölder functions. Peano curve gives us an example of a continuous curve that has the measure of the set of its graphic points greater than zero. All differentiable curves have the measure zero. Hölder curves are "better" than the continuous curves and "worse" than differentiable curves, they occupy intermediate positions. All the Hölder curves with the exponent greater than  $\frac{1}{2}$  have the measure zero. In this work, based on the Sierpinski carpet, we constructed a Hölder curve with the exponent  $\frac{1}{2}$ , and the measure greater than zero. The considered combinatorial problem is solved through the properties of this curve.

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**Keywords:** Hölder function, Hölder curves, Measure, Graphic point

## Introducción

Las funciones de clase Hölder y relacionados con ellos los espacios de Hölder con peso tienen aprovechamiento amplio en problemas teóricos tales como problemas de contorno de funciones analíticas, ecuaciones integrales singulares (Muskhelishvili 2008), (Gakhov 1990), (Duduchava 70) y en diferentes aplicaciones (Muskhelishvili 75), (Duduchava 79). En este artículo se presenta una propiedad conectada con la medida del conjunto de puntos de la gráfica de curvas de clase Hölder.

Planteamiento del problema combinatorio

Sea  $K(a)$  un cuadrado con lado de longitud  $a$  y sean dos cuadrados con lados  $a\lambda$ ,  $0 < \lambda < 1$ , es decir  $K(\lambda a, 1), K(\lambda a, 2)$  inscritos en el cuadrado  $K(a)$ . El área de la figura común está dada por

$$K(\lambda a) = \bigcup_{n(1)=1}^2 K(\lambda a, n(1)).$$

Designamos por  $S\{K(\lambda a)\}$  o  $S(\lambda a)$  su área. Posteriormente se inscriben en el cuadrado  $K(\lambda a, 1)$  dos cuadrados  $K(\lambda^2 a, 1, 1), K(\lambda^2 a, 1, 2)$  con los lados  $\lambda^2 a$  y en el cuadrado  $K(\lambda a, 2)$  se inscriben dos cuadrados  $K(\lambda^2 a, 2, 1), K(\lambda^2 a, 2, 2)$  con los lados  $\lambda^2 a$ . El área de la figura común ahora es:

$$K(\lambda^2 a) = \bigcup_{n(1), n(2)=1}^2 K(\lambda^2 a, n(1), n(2)).$$

Designamos por  $\alpha = -1$ ,  $\beta = 1$ ,  $\mu = 1$ , o  $S(\lambda^2 a)$  su área. Con cada cuadrado  $K(\lambda^2 a, n(1), n(2))$ ,  $K(\lambda^2 a, n(1), n(2))$  se procede analógicamente, y de esta forma se obtienen  $2^3$  cuadraditos  $K(\lambda^2 a, n(1), n(2), n(3))$ ;  $n(1) = 1, 2$ ,  $n(2) = 1, 2$ ,  $n(3) = 1, 2$ , obteniéndose la figura de cuadrados por:

$$K(\lambda^3 a) = \bigcup_{n(1), n(2), n(3)=1}^2 K(\lambda^3 a, n(1), n(2), n(3))$$

con área  $S\{K(\lambda^3 a)\}$  o  $S(\lambda^3 a)$ .

De esta forma se continúa con el proceso y en el paso de número  $i$  se obtienen  $2^i$  cuadraditos  $K(\lambda^2 a, n(1), n(2), \dots, n(i))$ ,  $n(j) = 1, 2$ ;  $j = 1, \dots, i$ ; por lo tanto la figura resulta es:

$$K(\lambda^i a) = \bigcup_{n(1)=1, \dots, n(i)=1}^2 K(\lambda^i a, n(1), n(2), \dots, n(i))$$

y su área es entonces  $S\{K(\lambda^i a)\}$  o  $S(\lambda^i a)$ . Este proceso se sigue infinitamente.

Entonces nos preguntamos ¿Se pueden escoger tales disposiciones de los cuadrados en cada paso, y que el área común de los cuadraditos sea mayor que un número positivo  $q$ ,  $S(\lambda^i a) \geq q > 0$ ?, es decir  $\lim_{i \rightarrow \infty} S(\lambda^i a) > 0$ .

### Exponente de la condición de Hölder mayor que $\frac{1}{2}$

Con la idea de responder a la pregunta sobre el área común de los cuadrados, se propone la una curva  $L$  definida en forma paramétrica dada como:

$$\begin{cases} x = x(t) \\ y = y(t) \end{cases}, t \in [\alpha, \beta]$$

Si las funciones  $x(t)$ ,  $y(t)$  son continuas, entonces el sistema define la curva  $L$  continua, es decir,  $L \in C([\alpha, \beta])$ . Y si las funciones  $x(t)$ ,  $y(t)$  son diferenciales, entonces el sistema define la curva diferenciable  $L$ , esto es,  $L^1 \in C([\alpha, \beta])$ .

Una función  $f(t)$  que satisface la condición:

$$|f(t_1) - f(t_2)| \leq C_\mu |t_1 - t_2|^\mu, \quad t_1 \in [\alpha, \beta], \quad t_2 \in [\alpha, \beta], \quad \mu \in (0, 1]$$

se llama función de clase Hölder con exponente  $\mu$  y constante  $C$ . Cuando las funciones  $x(t)$ , y  $y(t)$  son de clase Hölder con exponente  $\mu$ , entonces el sistema define la curva  $L$  de clase de Hölder. La clase de curvas de Hölder con exponente  $\mu$  se designan por  $H_\mu([\alpha, \beta])$ , y mantienen la inclusión

$$C^1([a, b]) \subset H_\mu([a, b]) \subset C([a, b]).$$

Ejemplo. La función  $f(t) = |t|^\mu$ ,  $t \in [-1, +1]$ ,  $\mu \in (0, 1]$  es una función de Hölder con exponente  $\mu$ . Su derivada  $f'(t)$  es igual a  $-\mu t^{\mu-1}$  con  $t \in [-1, 0)$ . Dicha función es continua. La derivada de la función  $f(t)$  con  $t \in [-1, +1]$  no existe en el punto. Cualquier función diferenciable es función de Hölder con exponente  $\mu = 1$  o de Lipschitz.

**La curva de Peano (Gelbaum, 90) nos da un ejemplo de una curva continua que tiene la medida de conjunto de sus puntos de gráfica mayores que cero. Las curvas diferenciables tienen medida igual a cero. ¿Qué medida tiene las curvas clase Hölder?**

Iniciaremos primero con el simple hecho: si  $L \in C^1([\alpha, \beta])$ , entonces  $mes(L) = 0$ , la medida del conjunto de los puntos de su grafica es igual a cero. Por simplicidad suponemos las constantes de Hölder para las funciones  $x(t)$  y  $y(t)$  son iguales a 1,  $a = -1$  y  $b = 1$ :

$$|x(t_1) - x(t_2)| < |t_1 - t_2|, |y(t_1) - y(t_2)| < |t_1 - t_2|, t_1 \in [-1, +1], t_2 \in [-1, +1].$$

1. La gráfica de  $L$  pertenece el cuadrado con el lado de longitud 2 y área 4, realmente:  $|x(t_1) - x(t_2)| < 1 + 1, |y(t_1) - y(t_2)| < 1 + 1.$

2. Partimos el segmento  $[-1, +1]$  en dos intervalos  $[-1, 0]$  y  $[0, 1]$ .

Cuando  $t \in [-1, 0]$  la curva  $L$  está ubicada en un cuadrado con el lado de longitud 1 y área uno. Lo mismo tenemos para  $t \in [0, 1]$ . La gráfica de  $L$  pertenece a la unión de los dos cuadrados con la área común de dos.

3. Partimos en cuatro los cuadrados  $[-1, -1/2], [-1/2, 0], [0, 1/2], [1/2, 1]$ .

Cuando  $t \in [-1, -1/2]$  la curva  $L$  está ubicada en un cuadrado con el lado de longitud  $1/2$  y área  $1/4$ . Lo mismo tenemos para otros segmentos parciales. La grafica de  $L$  pertenece a la unión de los cuatros cuadrados con la área común igual uno.

Este proceso se sigue en la forma mencionada. En cada paso posterior el área ocupada de  $L$  será disminuida al doble, y por supuesto  $mes(L) = 0$ .

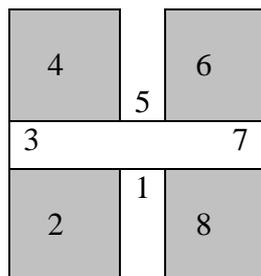
No es difícil mostrar, que si  $L \in H_\mu([\alpha, \beta]), \mu \in (1/2, 1]$ , entonces  $mes(L) = 0$ , la medida del conjunto de los puntos de su grafica es igual a cero.

**Exponente de Hölder menor que 1/2**

Para construir una curva clase Hölder que tiene medida del conjunto de sus puntos de la gráfica mayores que cero se requiere de la alfombra de Sierpinski (Sierpinski 1916). Esto es:

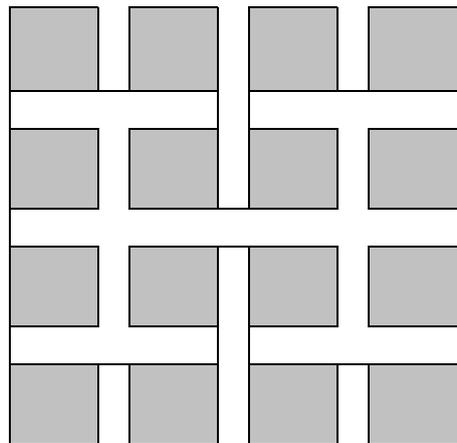
Sea  $q$  una serie de números que converge a  $q < 1$ ,  $a_1 + a_2 + a_3 + \dots = q < 1, a_1 > 0$ , además la serie debe ser estrictamente monótona creciente.

1<sup>er</sup> paso. Del cuadrado unitario cortamos un cruce de grueso  $\theta < a_1 / 4$ . El área de cruce es  $S_1 < a_1 / 2$ . Conectamos los cuadrados entre sí.



Sea  $J$  una unidad que se divide en 8 partes  $J_k, k = 1, 2, \dots, 8$ , impares iguales  $\theta_1$  y tomamos partes pares iguales  $(1 - 4\theta_1)/4$ . Los segmentos  $J_{2k-1}$  los aplicamos a líneas conectadas  $2k-1$ . Esta transformación representa la función buscada en los segmentos  $J_{2k-1}$ .  
 $2^0$  paso.

De cada cuadrado  $2k, k = 1, 2, 3, 4$  se corta en el cruce de área  $S_2 < a_2/4$  y de grosor  $\theta_2 < a_2/3 \times 4$ . Se conectan los cuadrados entre sí. Se enumeran los cuadrados y líneas determinadas.



Nuevamente se divide cada uno de los segmentos  $J_{2k}, k = 1, 2, 3, 4$  en 8 partes,  $J_k, k = 1, 2, \dots, 8$ . Las partes impares se toman iguales a  $\theta_2$  y las pares se toman iguales a  $(1 - 4\theta_1)/4^2 - \theta_2$ . Las correspondencias se introducen como en el primer paso. Este proceso se sigue. La transformación construida representa la función buscada en los segmentos impares.

Representamos la función buscada en los segmentos pares de  $J$ . Para  $t$  que no se encuentra en partes impares, el valor de la función buscada de este punto la damos como punto de la intersección de los cuadrados encajados, los cuales corresponden a partes pares encajadas en el segmento  $J$  en cada paso.

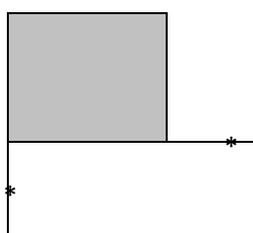
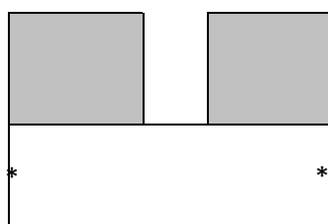
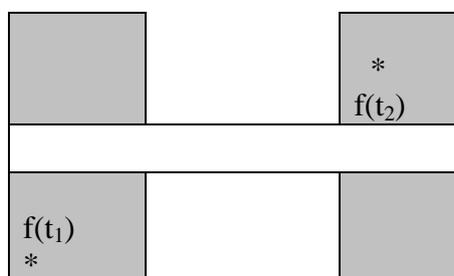
De la convergencia de la serie  $a_1 + a_2 + a_3 + \dots$  se tiene  $r = \text{mes}R$ , la medida de  $R$ , donde  $R$  es la unión de todos segmentos colectados en todos los pasos,  $r < 1$ . En realidad este subconjunto  $R$  del conjunto  $J$  se aplica para  $f(t)$  al conjunto (segmentos verticales y horizontales) con la medida cero. Solamente puntos de  $J \setminus R$  se aplican al conjunto con la medida plano positiva  $\text{mes}(J \setminus R) = 1 - r$ .

Ahora demostramos que la curva construida  $L$  satisface a la condición de Hölder con exponente  $\mu = 1/2$ .

Si después de algunos pasos  $f(t_1)$  y  $f(t_2)$  pertenecen a un mismo segmento conectado de los dos cuadrados, entonces:

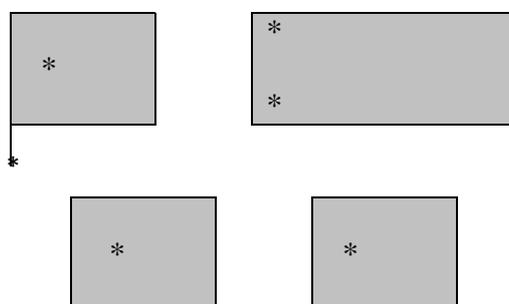
$$|f(t_1) - f(t_2)| = |t_1 - t_2|$$

Investigamos los casos cuando después del primer paso los puntos  $f(t_1)$  y  $f(t_2)$ ,  $t_1 < t_2$  tienen la siguiente posición de un punto respecto a otro, para llegar de  $f(t_1)$  a  $f(t_2)$  es necesario pasar por un cuadrado que no tiene puntos  $f(t_1)$  y  $f(t_2)$ . Esto es :

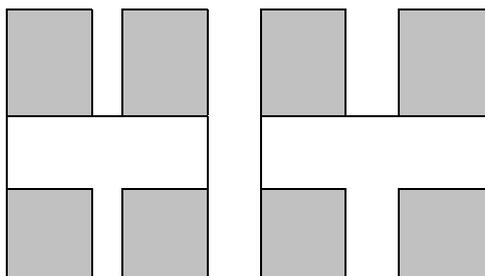


$$|f(t_1) - f(t_2)| = |t_1 - t_2|^{1/2}$$

**Los casos restantes se reducen a los siguientes, o casos análogos.**



Por fin para la estimación de las diferencias  $|f(t_1) - f(t_2)|$  y  $|t_1 - t_2|$  se usan las situaciones de los puntos en la figura



Afirmación Principal I: La curva construida  $L$  tiene la medida mayor que cero y pertenece a la clase de Hölder con el exponente  $\mu = 1/2$ .

**Solución al problema combinatorio.**

Sea  $L$  una curva clase Hölder

$$\begin{cases} x = x(t) \\ y = y(t) \end{cases} \quad t \in [\alpha, \beta],$$

$$|x(t_1) - x(t_2)| < C_1 |t_1 - t_2|^\mu, |y(t_1) - y(t_2)| < C_2 |t_1 - t_2|^\mu, \quad \mu \in (0, \frac{1}{2}]. \quad (*)$$

Un ejemplo de tal curva  $L$  nos da la alfombra de Sierpinski. Sea  $S(L)$  el área que ocupa esta curva que es igual a  $q \neq 0$ ,  $mes L = q$ . Suponemos  $\alpha = 0, \beta = 1, \mu = \frac{1}{2}, C_1 = C_2$ .

Cuando  $t \in [0,1]$  la curva  $L$  está ubicada en el cuadrado  $K$  con lado  $a = 2C$ , esto se sigue de (\*).

Cuando  $t \in [0, \frac{1}{2}]$ , tenemos la parte  $L(\lambda a, 1)$  de  $L$ . La curva  $L(\lambda a, 1)$  pertenece al cuadrado  $K(\lambda a, 1)$  con el lado  $\lambda a$ , donde

$$\lambda = \sqrt{\frac{1}{2}},$$

$L(\lambda a, 1) \subset K(\lambda a, 1)$ , esto sigue de (\*).

Cuando  $t \in [\frac{1}{2}, 1]$ , la parte  $L(\lambda a, 2)$  de  $L$  pertenece al cuadrado  $K(\lambda a, 2)$  con el lado  $\lambda a$ . Las partes  $L(\lambda a, 1)$  y  $L(\lambda a, 2)$  componen toda curva  $L$ ,  $L = L(\lambda a, 1) \cup L(\lambda a, 2)$ .

De esta manera la curva  $L$  pertenece al área común  $F(\lambda a)$  de cuadrados  $K(\lambda a, 1)$  y  $K(\lambda a, 2)$ , así  $L \subset F(\lambda a)$ ,  $F(\lambda a) = K(\lambda a, 1) \cap K(\lambda a, 2)$ .

De los segmentos  $[0, \frac{1}{4}]$ ,  $[\frac{1}{4}, \frac{1}{2}]$ ,  $[\frac{1}{2}, \frac{3}{4}]$ ,  $[\frac{3}{4}, 1]$

se generan curvas  $L(\lambda^2 a, 1, 1)$ ,  $L(\lambda^2 a, 1, 2)$ ,  $L(\lambda^2 a, 2, 1)$ ,  $L(\lambda^2 a, 2, 2)$ , con lo cual  $L(\lambda a, 1) = L(\lambda^2 a, 1, 1) \cup L(\lambda^2 a, 1, 2)$ ,  $L(\lambda a, 2) = L(\lambda^2 a, 2, 1) \cup L(\lambda^2 a, 2, 2)$ , por supuesto la curva  $L = L(\lambda^2 a, 1, 1) \cup L(\lambda^2 a, 1, 2) \cup L(\lambda^2 a, 2, 1) \cup L(\lambda^2 a, 2, 2)$  y se reproducen cuadraditos  $K(\lambda^2 a, 1, 1)$ ,  $K(\lambda^2 a, 1, 2)$ ,  $K(\lambda^2 a, 2, 1)$ ,  $K(\lambda^2 a, 2, 2)$  con todo eso  $K(\lambda^2 a, 1, 1) \supset L(\lambda^2 a, 1, 1)$ ,  $K(\lambda^2 a, 1, 2) \supset L(\lambda^2 a, 1, 2)$ ,  $K(\lambda^2 a, 2, 1) \supset L(\lambda^2 a, 2, 1)$ ,  $K(\lambda^2 a, 2, 2) \supset L(\lambda^2 a, 2, 2)$ .

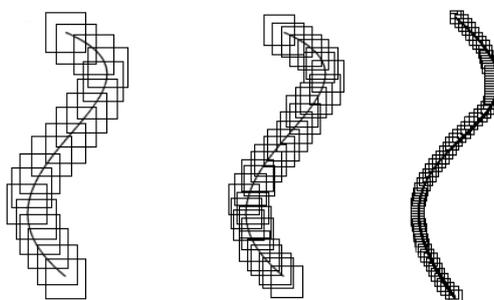
Por consiguiente  $L \subset F(\lambda^2 a)$ , donde  $F(\lambda^2 a)$  es el área común de los cuadraditos  $F(\lambda^2 a) = K(\lambda^2 a, 1, 1) \cup K(\lambda^2 a, 1, 2) \cup K(\lambda^2 a, 2, 1) \cup K(\lambda^2 a, 2, 2)$ . Estas consideraciones se hacen posteriormente. En el paso número  $i$  se tendrán los segmentos  $[0, \frac{1}{2^i}], [\frac{1}{2^i}, \frac{2}{2^i}], [\frac{2}{2^i}, \frac{3}{2^i}], \dots, [\frac{2^i-1}{2^i}, 1]$ ; las curvas  $L(a, n(1), n(2), \dots, n(i))$ ,  $n(j) = 1, 2; j = 1, \dots, i$  forman

$$L = \bigcup_{n(1)=1, \dots, n(i)=1}^2 L(\lambda^i a, n(1), n(2), \dots, n(i))$$

y los cuadraditos  $K(\lambda^i a, n(1), n(2), \dots, n(i))$ ,  $n(j) = 1, 2; j = 1, \dots, i$ , con lados  $\lambda^i a$  y área común

$$F(\lambda^i a) = \bigcup_{n(1)=1, \dots, n(i)=1}^2 K(\lambda^i a, n(1), n(2), \dots, n(i)).$$

Se cumplen las propiedades  $L(a, n(1), \dots, n(i)) \subset K(a\lambda^i, n(1), \dots, n(i))$ ,  $L \subset F(\lambda^i a)$ .



De aquí se puede deducir que  $mesL \leq mesF(\lambda^i a)$  y esto significa  $0 < q \leq mesF(\lambda^i a)$ , para cualquiera  $i$ ;  $q \leq \lim_{i \rightarrow \infty} mesF(\lambda^i a) \leq mes \lim_{i \rightarrow \infty} F(\lambda^i a)$ .

Hemos demostrado el siguiente.

Afirmación Principal II:

Existen disposiciones de los cuadrados en cada paso, tal que el área común de ellos sea mayor que un número positivo  $q$ ,  $q > 0$ .

Desigualdades que definen una curva de clase de Hölder permiten encontrar la longitud de lados del cuadrado  $K(\lambda^i a, n(1), n(2), \dots, n(i))$  en el cual se encuentra la curva

$$L = L(\lambda^i a, n(1), n(2), \dots, n(i)),$$

donde

$$n(j) = 1, 2; j = 1, \dots, i; t \in [\frac{s-1}{2^i}, \frac{s}{2^i}].$$

Para localizar el cuadrado en el plano, hay que encontrar valores mínimo y máximo de las funciones  $x(t), y(t)$ ,  $t \in [\frac{s-1}{2^i}, \frac{s}{2^i}]$ . Como las funciones  $x(t), y(t)$  son continuas, entonces tienen valores máximos y mínimos, los cuales se obtienen en este

segmento  $[\frac{s-1}{2^i}, \frac{s}{2^i}]$ . Así hemos encontrado la posición del cuadrado en el que se encuentra  $L(\lambda^i a, n(1), n(2), \dots, n(i))$ . Por lo tanto se ha resuelto un problema combinatorio.

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## THE PROVISION ECOLOGICAL FAVOURABLE ENERGY, NOT REQUIRING RAW MATERIAL

*Mashkov V.V*

CHAOS and Individual Events, Theoretical physics, Individual researcher, Russia

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### Abstract

Chaos is formed from uncountable ensemble of( Individual Event. The Statistical Physics and discrete mathematics do not provide most full study characteristic natures and, as effect, do not allow the mankind to find and create ecological clean, very much cheap sources to energy. The Physics microworld, physics whirlwind phenomenas must be considered with use: 1) as acceptance and result Statistical Physicists and Thermodynamics, giving immeasurable effect of the generalizations, 2) so and with use Physicists Individual processes in microworld and macroworld, considering events in microworld and macroworld with position real, not abstract essence of the material world.

Decision of the problems of the provision mankind ecological clean and cheap energy can be provided by creation of Whirlwind ElektroField Electric Station (WEFES). In article appears, as in nature occurs natural transition a material in energy under Itself-free disinteration uranium element and at whirlwind phenomenas type hurricane "Katrin". The Scientist, copying nature, can create the whirlwind energy installation and get the additional energy, using fundamental characteristic of the nature to translate the material in energy.

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**Keywords:** Statistics, individual events,"pulses of the torsion",fundamental sources of energy

### Introduction

The Modern theoretical physics reached very greater heights and has practically defined that gigantic horse race of the progress, which was perfect in 20 century. However, many prominent theoretical discoveries, installed at study multiple concrete experiment, become why that is raised in absolute degree (that is to say taken out regularities spread on boundless "sizes of" nature) while experiments themselves were executed for limited zones of the nature.

But probably that nature on different their own (the zone) area uses different their own property, characteristic and regularities.

When appeared the problem of the studies more deep microworld, that scientist (not having found important transition in nature from discrete to continuity) continued to research deeper microworld discrete methods, but appearing slip-ups and difficulties started to try over-come entering the abstract values, abstract analogy and design mental creative activity, very distant from real characteristic, event and object deep microworld. As a result theory became to change in complex of the gigantic pyramids of the abstract conventionalities. This gradually became to reduce efficiency of the scientific studies.

For leaving from appeared not constructive to situations necessary in physicist microworld over-come outdated, conservative approaches and find other, not trivial methods of the studies. One of possible such directions of the studies and is dedicated to attached hereto article.

**Main Text:**

The CHAOS in material world characterizes the natural condition of the behaviour such two forming material world, as material and radiation. Reveals itself the Chaos nearly in all range of the sizes space from endless cosmos before microworld, exclusive of sizes of the elementary particles and quantum of the radiations. So if researcher at a rate of microworld will consider the behaviour of the concrete elementary particles, or concrete quantum of the radiations, that such study will not be a study of the Chaos, but will be a study Individual Event at a rate of microworld.

The Chaos is formed from uncountable ensemble Individual Event.

Whereas, in real world of the Nature Chaos (all ensemble Individual Event) is formed two alternating ensemble (the ensemble of the particles and ensemble of the radiations), that and study the Chaos it is necessary combination two different methods, inherent this different ensemble if is it certainly realized that theoretical descriptions for particles and descriptions different method yield to for radiations: that discrete method, that wave, not discrete method.

The Basic researches of the author given subject, run for base elaborated by him electrodynamics and analysis experimental given nucleus physicists, have shown that device of the elementary particles and quantum of the radiations can it is enough be realistically described only wave, unceasing notion and methods trigonometric mathematicians. Got theoretical results wholly satisfactorily explain all known experimental given modern physicists and reveal physical essence, which escapes for multiple, entered by statistical physics, quantum number and quantum notion for microworld and moreover allow to explain that, what can not explain the statistical physics.

As follows, approach of the author, in base which lies consideration of the Individual physical processes at a rate of microworld with use wave mathematicians and elaborated laws electrodynamics, has allowed to understand the physical essence of such phenomenas, as tunnel effect, as spontaneous radioactivity uranium element, as backs, revealed through Pulse of the Torsion and microwhirlwind, what can not explain the statistical physics, equipped by discrete mathematics. The Theoretical discoveries of the author reveal the device of the elementary particles, which present itself nor that other as convolved in special itself closed condition length quantum of the waves of the outraged vacuum. Inwardly "itself lock (short) conditions" length of the wave of the quantum presents itself unceasing, indissoluble running wave, infinitely at time running alternately distance from one end of the reflection to another and back and presenting itself this "itself lock (short) conditions" that physicists name the particle. That is to say rolling up of the quantum of the wave in "itself lock (short) conditions" demonstrates turning the wave in particle, demonstrates transition not fraction in fraction, not discrete in discrete.

That fact that Chaos is present and defines practically whole range interaction material world (exclusive of Microworld) has imposed the certain stereotype for methods and approach scientist to studies of the Nature. The Phenomenas in Cosmos, weather on the Land are defined by Chaos. For scientific study of the Chaos scientist was an applying Statistical Physics and science thermodynamics, which have allowed the methods of the generalizations to reveal plenty of regularities of the nature.

Necessary to pay tribute that that modern Statistical Physics, using device and methods discrete (fraction) mathematicians, has allowed in very big degree to enrich the theory and Knowledges of the laws of the nature and on this base to get the prominent technical achievements such as atomic energy and use to radioactivity in medicine, in metrologies, in the defence and in the other sphere of activity of the person.

However, the most enormous successes modern theoretical physicists, regrettably, have served that that some findings to its theories by steels absolute, ossify and change in forbid for development of the studies of the adjacent sections, for development of the

Science.

So, Statistical Physics became in principle to ignore and forbid the studies of the Individual physical processes at a rate of Microworld. But Quantizing Mechanics, constructed on abstract, discrete (fraction) mathematician, instead of physical essence real object natures became to use, coming from statistical processing, subjective constructed, conditional mathematical notions of the type matrix element, operator of the birth, vector of the conditions, function of probability and other like.

The Generalising ensemble Individual Event and getting result certain averaging (averaged notions), Statistical Physics have to leave from studies concrete Individual Event and ignore them. This for many experimental check found the brilliant acknowledgement. But nature very polyhedral and in she meets the facts, when on microlevel anomalous of the influence Individual Event overturn the Statistical regularities for Chaos (this spontaneous radioactivity uranium elements, tunnel effect, whirlwind of the phenomena in atmosphere and other).

The all-embracing characteristic of the transition material exists In nature in energy.

But physicists, having found this characteristic and having met some barriers under its study, have limited for itself zone of his action by principle "defect of the masses" and stopped on creation of atomic industry.

The Physicists created for itself subjective prohibition "defect of the masses" for studies characteristic natures in more broad range.

The Development to theories Microworld must be realized with use: 1) as acceptance and result Statistical Physicists, giving immeasurable effect of the generalizations, 2) so and with use Physicists Individual processes in Microworld, considering events in Microworld with position real, not abstracted, not discrete essence of the material world.

The Modern physicists, using subjective created principle "defect of the masses", are limited in their own study on finding the sources to energy by that phenomenas in nature, which reveal itself in depths star, and exclude from consideration of the other phenomena of the nature, which happen daily in terrestrial condition.

For instance, they (equiped law of the thermodynamics, but thermodynamics presents itself statistical found out science, in principle not getting into zone of the action of the laws Microworld, and so can not realistically serve for fundamental studies) do not keep an eye on arising the sources to energy in whirlwind phenomenas.

In nature constantly and multiple appear different on powers whirlwind phenomenas of the type hurricane, whirlwind, tornado. These phenomenas appear occasionally unexpectedly, bring much troubles and literally beat the population, caught in unexpect. The Mankind introduce;make familiar with with hurricane with immemorial timeses, but hitherto can not understand and get these enigmatic phenomenas into essence.

The Studies whirlwind phenomenas and modern основ theoretical physicists, offered by author, prove that when arising whirlwind phenomenas under the action of different changing electromagnetic flap (under the action of appearing extreme point electric flap) on microlevel (i.e. deeper level, considered by thermodynamics) occurs the decomposition of the elementary particles. On microlevel exists not frequent decomposition material in energy i.e. occurs the decomposition of the individual elementary particles in gamma-quantums, which, sending their own "pulses of the torsion" counter particle, twist the air ambience and, multiplying, change in gigantic curl.

The Persons if will study more deeply whirlwind of the phenomena and develop wave (not discrete) sections to physical theory, can leave on creation whirlwind, electro-field of the sources to energy and get the energy in special device - an energy in any amount, very cheap, ecological favourable and not requiring raw material.

Mankind necessary to solve a problem receptions ecological clean and cheap energy in amount completely satisfying need of the consumers and not hanging from presence cheese. The Decision of this problem can be realized by Science by means of Whirlwind ElektroField Electric Station (WEFES).

However previously than speak of possibility of the creation acting predecessor (analogy) WEFES necessary to say several words about physical essence that is to say about that, whence can appear the additional energy at realization given project.

At first shall consider the explanations of the author, explaining physical essence of the natural radioactive disintegration overuranium elements. The Known that kernel heavy chemical element consist of big amount proton and neutron, each of which radiates in nearest space microworld electric and magnetic fields. Additionally these nuclear particle, being inwardly kernel, feel very complex and intensive rotations, displacement and change their mutual orientation. And here is these very multiple electric fields, radiated proton and neutron inwardly kernel and additionally constantly changing mutual orientation, feel very complex brackets friend on friend. From such bracket in that or other point microspace inwardly kernel the most varied on direction and in size (from minimum before maximum) resulting electric fields. But nature is made so that even such maximum electric fields do not reach (as a result bracket-adding) of extreme importances and can not destroy not a single nuclear particle in kernel chemical element nearly whole tables of the Mendeleev. But, in ditto time, nature gives the example of the exceptions. Inwardly nucleus uranium, plutonium, radium, thorium in natural condition in some separate point (and can so coincide that in these separate points gets some nucleon kernel) appear the extreme values by electric flap and exactly they cause the decomposition of the separate proton or neutron in package gamma-quantums, as gives the push for natural radioactive disintegration kernel. The Known that if amount (the mass) nucleus uranium will above critical level, that natural radioactivity moves over to avalanche radioactivity, and this use the scientist, when in artificial condition create the atomic sources to energy.

But except natural radioactivity, characteristic uranium, thorium, radium and plutonium, in nature can be also created multiple manifestations, when separate elementary particles (but not kernel that or other chemical element) can fall into points microspace, in which at person condition can appear extreme importances electric flap, capable to translate these elementary particles in gamma-quantums. In particular, such phenomenas occur often in surrounding person to air ambience.

So, shall consider on microlevel picture decompositions proton and electron in air ambience. The Atoms and molecules, forming mixture of the air (basically, this mixture of the oxygen and nitrogen), present itself the most complex unit of the condition proton and neutron (in kernel) and electron (on orbit) constantly much in a complicated way alternating its mutual location and herewith electric and magnetic fields, radiated these proton, neutron and electron, are too alternated, are superimposed, sum (addition). In miscellaneous point microspace as a result of brackets by flap appear the most varied values by electric flap and as rare event appear extreme (the overpowerful) of importance of the electric field. If in such point will get the proton (or for the other importance of the extreme field will get the electron), that he is distributed in package gamma-quantums (but electron is distributed in gamma-quantum), as register well known counter gammaradiation. But the known that kernel of the atom of the hydrogen - nor that other, as proton. So, residing in air ambience hydrogen (that atomic, that in composition of the molecules, containing hydrogen) - an exactly kernel atom of the hydrogen - under determined condition can change in package gamma-quantums and with this in microenvironment can appear the separation to additional energy.

But let's comprehend that measure the counter gammaradiation, when with he removes the evidences a level gammaradiation in one or another point on terrain. Speak that

at background gamma radiation so-and-so. But it is necessary to acknowledge counter gives measuring not background as such, but measure the snub i.e. measure that or other events "births" and passings through counter given birth gamma radiation. But background itself is found between snub of the functioning (working) the instrument. If counter registers "birth" and passing through counter given birth gamma radiation, that signifies in nature, in terrestrial atmosphere constantly occur the physical events of the transition material elementary particles in energy. But in comparison with powerful energy collision in air ambience such wretched additives to energy scientist are not registered and this remains unspied.

Possible establish that in nature are constantly made comparatively rare events of the transition material elementary particles in energy. But nature gives and examples that, when intensity such event sharply increases. So, at bracket on air whirlwind flows person of the electric field power whirlwind of the formation (the waterspout, tornado, hurricane) increases incredible. For instance, overpowerful typhoon "Katrin" generated in itself gigantic source of the energy, earlier not known in science and appeared at decomposition material (in the manner of elementary particles proton - an ion of the hydrogen) under influence varied and constantly changing electric flap of the Land. The Energy hurricane possible to understand. The Ungovernable power of the curl it is necessary to tame so as not to burn oil and gas facility of the Land. The Persons can learn to use the new unknown sources to energy.

Let's try define that influences, which can allow experimenter degrade the separate elementary particles in gamma-quantums. ( Especially we shall note, that the law of preservation of a charge is not broken also these properties pass to a level gamma-quantums.)

The Books of the author prove that any elementary particles material -, roughly speaking, itselflock gamma radiations waves of the indignation of the vacuum (that gamma-quantums electromagnetic waves). Itselflock gamma-quantums under the action of directed power Itselfinduction and at tension of the electric field providing closing itself in point of the reflection reaches the values of the order  $10^{12}$ -  $10^{14}$  volts on/ centimetre (10 in degree 12-14 volts on centimetre). Hereinafter if some image in point, providing Itselflock, create the opposite electric field such tension, that such opposite acting electric field will be able to neutralize "walls providing Itselflock" and Itselflock internal energy material is ed in the manner of freed running gamma-quantums, which can be converted that in heat, that in mechanical energy. But necessary to note that person in laboratory condition can not create the value a tension electric field  $10^{12}$  volts on/ centimetre (10 in degree 12 volts on centimetre), but maximum value, which he manages to use, forms only  $10^8$  volts on/ centimetre (10 in degree 8 volts on centimetre). I.e. stability electron and proton are provided by protection of the more high energy barrier.

But here is nature can do that, what can not reach the person. That is to say nature in some local point space can create required for "translation material in energy of" value tension electric field.

The Researcher executes their own experiences in scale macroworld, but nature realizes their own characteristic at a rate of microworld. So it is necessary to execute the experiments on way specified by nature, learn beside natures, copy the nature i.e. research that enigmatic phenomenons, which offers the nature. On this way will go and author of these lines, when has offered the principles of the creation whirlwind, elektrofield of the energy installation.

When making Vortical Electrofield sources to energy i.e. vortical electrofield generators of energy, Vortical Electrofield Electrical Stations necessary simultaneously to use three factors, which real work in nature. This such factors: 1) special constructive device, 2) influence on created curl special electric field and 3) using the adjustment of the surround. These particularities were a priority are protected in application for invention, which was published in Official bulletin Russian agency on patent and trade marks, t.32, Moscow 2002

It is not necessary to mix concepts: a wind power and wind of power station, at which the reserved kinetic energy of air weights is used, and the energy of the vortical whirlwind phenomena tornado hurricanes, in which the energy arises, is generated under the special conditions of transition of substance of some elementary particles of air weights in gamma-quantums.

In more detail presented questions open the author in his book "The Renovated Physics", 2010. 202 p. (or possible get acquainted with material in earlier written by him books "Unknown Physics", 1997. 72 p. and "The Renovated Physics". 2003. 124 p.)

### **Conclusion**

The Presented article opens the prospects (the possibility of the expansion) for new stage of the studies in fundamental physicist. Together with development of the theories appear real prospects of the creation not known sources to energy

The Author hopes that material of the article will interest the researchers fundamental characteristic natures and this will serve the profit for opening not known in theoretical physicist.

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## **РОЛЬ ЧАСТНЫХ УПРАВЛЯЮЩИХ КОМПАНИЙ В ФОРМИРОВАНИИ ПЕНСИОННОГО КАПИТАЛА В СХЕМЕ ОБЯЗАТЕЛЬНОГО ФОНДИРОВАННОГО ПЕНСИОННОГО СТРАХОВАНИЯ В ЛАТВИИ**

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### **Abstract**

Ten years have passed since the resources of the second tier- Mandatory State Funded Pension Scheme- have been transferred to the private fund managers. The second tier has started to pay accumulated capitals to the participants of pension schemes in 2013; therefore the aim of this paper is to assess the contribution of the private fund managers to the accumulation of the above-mentioned capitals.

The amount of money accumulated on the second tier account depends on the amount of shares and their value. The last factor is the most considerable and it depends on the performance of investments made by the private fund manager. Profitability is one of the main indices for assessing the gain derived from the participation in the Mandatory State Funded Pension Scheme. For the analysis of profitability 26 pension plans have been divided into different groups. Then the authors have analyzed the following indices: profitability of 26 pension plans in different years and during the whole existence period; profitability depending on the declared risk of pension plan, its assets value and operation duration; deviation of profitability for all plans and for different groups of plans with similar declared risks, assets value and operation duration.

The conclusions about the distinctions between the profitability of plans with different risks, assets and existence duration have been drawn. On the basis of conclusions the authors have estimated the contribution of the private fund managers to the accumulation of pension capital in the second tier of Latvian pension system.

In the concluding remarks of the paper the authors have made proposals for increasing the contribution of private fund managers to the accumulation of capital in the Mandatory State Funded Pension Scheme.

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**Keywords:** Mandatory state funded pension scheme, profitability of private fund managers

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### **Аннотация**

Десять лет прошло с момента передачи накоплений второго уровня- схемы обязательного фондированного пенсионного страхования - частным управляющим компаниям. В 2013 году начаты выплаты накопленного капитала участникам пенсионной схемы, поэтому целью данной статьи является оценка роли частных управляющих компаний в формировании вышеупомянутого капитала.

Величина капитала на счетах второго уровня зависит от количества долей и их стоимости. Последняя является наиболее значимым фактором и зависит от доходности

инвестиций, осуществляемых частной управляющей компанией. Доходность так же позволяет оценить выгоду от участия в обязательном фондируемом пенсионном страховании. Для проведения анализа доходности, 26 пенсионных планов были разделены на различные группы, затем был произведен расчет доходности по годам и за весь период деятельности; расчет доходности в зависимости от заявленного риска пенсионного плана, величины его активов и продолжительности существования; отклонения доходности для всех планов и для различных групп со схожими заявленными рисками, величиной активов и сроками существования.

В заключении сделаны выводы о различиях в показателях доходности планов с различными заявленными рисками, величиной активов и сроками существования. На основании выводов оценена роль частных управляющих компаний в формировании пенсионного капитала, а так же приведены предложения для увеличения вклада данных компаний в формирование капитала схемы обязательного фондируемого пенсионного страхования.

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**Ключевые слова:** Обязательное фондируемое пенсионное страхование, доходность частных управляющих компаний

### **Введение**

Система пенсионного страхования в Латвии была реформирована в соответствии с тенденциями социально-экономического развития государства. Неблагоприятная демографическая ситуация постепенно истощала ресурсы традиционного одноуровневого солидарного страхования, поэтому система пенсионного страхования в настоящий момент состоит из трех уровней, двух обязательных и одного добровольного, предоставляющих различные возможности накопления пенсионного капитала. С момента формирования системы на обязательное страхование пенсий отчисляется 20% от брутто заработной платы.

Первый уровень по-прежнему остается всеобщим обязательным и солидарным, налоговые поступления расходуются для обеспечения сегодняшних получателей пособий, однако происходит учет данных о величине уплачиваемых взносов, таким образом, формируется условный пенсионный капитал. На формирование условного капитала, а по сути, финансирование существующих получателей пенсий, отчисляется большая часть пенсионного взноса – 16 процентов из вышеупомянутых двадцати. В дальнейшем капитал индексируется в зависимости от прироста/уменьшения совокупной заработной платы в государстве.

Второй уровень обеспечивает формирование реальных накоплений, поскольку взносы участников инвестируются, т.е. передаются частным управляющим компаниям, которые принимают решения о направлениях инвестирования. Участие в данном уровне обязательно, однако на момент введения для участников были определены возрастные ограничения. С 2001 года, т.е. с момента основания уровня, и до 2003 года управление средствами преимущественно осуществляло государство, показатели доходности вложений достигали 7%. В результате лоббирования интересов частных кредитных учреждений, с 2003 года все накопления были переданы частным управляющим компаниям. Гарантий доходности инвестиций на втором уровне не существует, поэтому величина капитала может как увеличиваться, так и уменьшаться. Совокупные активы второго уровня в первом полугодии 2013 года достигли полутора миллиардов евро (Отчет Комиссии рынка финансов и капитала, 2013).

Третий уровень обеспечивает возможность добровольного формирования пенсионного капитала посредством участия в частных пенсионных фондах или в страховании жизни. Государство мотивирует добровольное страхование, предоставляя

налоговые льготы, однако популярность данного страхования невелика, например, в 2012 году среднестатистический житель расходовал на страхование жизни около 30 евро в год (Отчет Комиссии рынка финансов и капитала, 2013), поэтому можно сделать выводы о том, что основная доля пенсии обеспечивается и будет обеспечиваться первым и вторым уровнями системы. С 2013 года начаты выплаты пенсионного капитала второго уровня лицам, уходящим на пенсию в законом установленном возрасте 62 лет, поэтому появилась возможность оценить реальный вклад частных управляющих компаний в обеспечение уровня благосостояния латвийских пенсионеров.

### **Анализ показателей доходности частных управляющих компаний**

Основой для формирования пенсионного капитала второго уровня являются социальные взносы налогоплательщиков. В 2013 году это 4% от брутто заработной платы. В 2012 году средняя брутто зарплата в государстве составляла 684 евро, в 2013 году - немногим более 700 евро, т.е. среднестатистический налогоплательщик отправляет на инвестирование примерно 28 евро в месяц (Отчет о доходах жителей Латвии Центрального статистического управления, 2013). Планируется с 2015 года увеличить долю социальных отчислений второго уровня до 6%. Уплачивая социальные взносы, участник ежемесячно приобретает доли инвестиционного портфеля. Стоимость доли зависит от эффективности управления портфелем, может возрастать и уменьшаться. Доходность долей, а так же сохранение их исходной цены приобретения не гарантируется. Уменьшение стоимости доли так же может быть любым, например, в 2008 году падение стоимости доли в самом популярном плане составило 24,5%, что в результате привело к падению стоимости доли ниже цены ее предложения в момент основания плана, т.е. если бы в этот момент участник затребовал свой пенсионный капитал, выплачиваемая сумма была бы меньше, чем сумма ранее произведенных социальных взносов (Отчет за 2008 год плана вложений Dinamika, 2008).

В 2012 году услуги инвестирования предлагали 9 частных управляющих компаний в виде 26 различных пенсионных планов. Пенсионные планы подразделяются на 3 группы: консервативные, сбалансированные и активные. В первом полугодии 2012 года доминировали активные планы- 62% от общего количества участников (724213 человек) и 63% от общей величины активов всего уровня (примерно 840 миллионов евро). Вторыми по популярности были консервативные планы- 29% от всех участников и 28% от совокупных активов. Сбалансированные планы привлекли примерно 9% участников и работали с 10% от общих активов (Доходность, активы и участники второго уровня пенсионной системы, Латвийский центральный депозитарий, 2013).

Для проведения анализа были взяты показатели доходности планов за период с 2003 года до первого полугодия 2012 года включительно. 26 пенсионных планов были поделены на 3 группы: консервативные, активные и сбалансированные. Активные и консервативные планы были поделены на две подгруппы в зависимости от величины активов и продолжительности существования. Для сбалансированных планов разделение на подгруппы не производилось в виду их незначительного количества. Средние показатели доходности за весь период существования были следующими:

1. для консервативных планов:
  - a. 3,96% для всей группы, стандартное отклонение составляло 0,99;
  - b. 4,07% для планов с величиной активов выше среднего, со стандартным отклонением доходности 0,9;
  - c. 3,41% для планов с величиной активов ниже среднего, со стандартным отклонением доходности 1,07;

- d. 4,02% для планов, существующих с 2003 года, стандартное отклонение составляло 0,75;
  - e. 3,76% для планов, существующих с 2005 года, стандартное отклонение составляло 1,11;
2. для активных планов:
- a. 3,69% для всей группы, стандартное отклонение составляло 1,08;
  - b. 4,37% для планов с величиной активов выше среднего, со стандартным отклонением доходности 0,85;
  - c. 3,66% для планов с величиной активов ниже среднего, со стандартным отклонением доходности 1,21;
  - d. 3,77% для планов, существующих с 2003 года, стандартное отклонение составляло 1,05;
  - e. 3,13% для планов, существующих с 2004 года, стандартное отклонение составляло 0,74;
3. для сбалансированных планов:
- a. 4,1% для всей группы, стандартное отклонение составляло 0,32.

Позитивные средние показатели доходности свидетельствуют о приросте капитала участников схемы обязательного фондируемого пенсионного страхования, однако система в целом не выполняет обещаний, декларируемых государством в отношении эффективности деятельности последней. Например, Государственное агентство социального страхования информирует налогоплательщиков о том, что фондируемый капитал прирастает быстрее инфляции и заработной платы (Описание второго уровня пенсионной системы Государственного агентства социального страхования, 2013; Министерство благосостояния, 2013), в то время как среднегодовой уровень инфляции в Латвии с 2003 года до 2012 года составлял 6,05%, а среднегодовой прирост заработной платы без учета инфляции за аналогичный период достиг 10,7%. За указанный период ни показатели доходности отдельных планов, ни средние показатели групп планов не превышали темпы обесценения капитала.

Следует так же отметить, что до 2013 года схема только аккумулировала пенсионные взносы и работала практически без выплат пенсионного капитала, поскольку, как было упомянуто выше, на момент введения второго уровня был ограничен максимальный возраст участников. Первые несколько выплат были произведены в 2011 и 2012 годах в связи с преждевременным уходом на пенсию, но данные выплаты были незначительными как для системы, так и для отдельных планов. Наряду с эффективностью управления средствами, появление массовых выплат в 2013 году может изменить показатели доходности планов, поскольку существует вероятность снижения величины активов системы. Около 90% трудоспособного населения уже участвует в системе, значительный приток новых участников маловероятен в силу негативной демографической ситуации (количество населения трудоспособного возраста ежегодно снижается на 2-3%) и активной эмиграции жителей.

## Заключение

Анализ средних показателей доходности не выявил значительных отличий среди различных групп планов, а так же значительного вклада отдельных планов или какой либо из групп планов в увеличение уровня благосостояния Латвийских пенсионеров. Для планов с активами ниже средних, а так же для планов с более коротким сроком существования отмечается большее отклонение показателей, что свидетельствует о большей разнице в показателях внутри данных групп. Наибольший вклад в увеличение капитала схемы обязательного фондируемого пенсионного

страхования внесли активные и консервативные планы с величиной активов выше величины средних активов в группе, а так же сбалансированные планы, причем, как было отмечено ранее, сбалансированные планы пользуются самой низкой популярностью среди участников системы. Группа активных планов, пользующаяся наибольшей популярностью, характеризуется самой низкой доходностью. Например, самый популярный активный план SWEDBANK Dinamika (33% от общего количества участников всей схемы и 32% от совокупных активов системы) среди 10 активных планов находится на восьмом месте по уровню доходности за весь период существования – 10 лет. Вышеупомянутая ситуация позволяет сделать выводы о том, что средний налогоплательщик выбирает пенсионный план, не анализируя показатели доходности, а подчиняясь агрессивному маркетингу частной управляющей компании.

Накопление капитала в схеме обязательного фондируемого пенсионного страхования является альтернативой отсутствию накоплений как таковому, поскольку реального накопления не происходит из-за превышения уровня инфляции над уровнем доходности. В то же время частная управляющая компания получает вознаграждение за управление средствами независимо от результатов деятельности. Если в 2003 году величина отчислений управляющему составляла 0,3 – 0,4% от средней стоимости активов плана, то в 2013 году это 1,6 - 1,8%.

Информация об управляющей компании не предоставляется в виде рейтинга, показывающего соотношение доходности и риска, налогоплательщику предлагаются данные о показателях доходности за различные периоды. Можно предположить, что среднестатистический участник системы не способен полноценно анализировать данную информацию для выбора наиболее эффективно работающей компании.

Государство и частные управляющие компании стараются создать позитивное мнение о схеме обязательного фондируемого пенсионного страхования, не открывая рисков, связанных с инвестированием. Таким образом, в обществе поддерживается иллюзия относительно значительности пенсионных планов второго уровня в формировании будущего уровня благосостояния. В то же время, исследования, проведенные и опубликованные автором статьи ранее, свидетельствуют о том, что 40% участников системы не знают величину отчислений на страхование пенсии, 26% не знают, какой управляющей компании направляются их взносы и 96% не интересуются показателями доходности своих вложений (Bule, 2010). На основании вышеизложенного, можно сделать выводы о том, что на данный момент сформировалась благоприятная среда для того, чтобы частные управляющие компании работали больше в своих интересах, нежели в интересах общества.

Научные исследования результатов деятельности второго уровня пенсионной системы практически не производятся, однако, в немногих опубликованных результатах исследований указывается на ошибки в инвестиционной политике (Lieksnis, 2010, Volskis, 2012) и несоответствие элементов пенсионной системы декларируемым принципам честности и солидарности (Volskis, 2012).

На основании вышеизложенного автор предлагает:

1. разработать систему мероприятий по информированию налогоплательщиков о рисках инвестирования и увеличению интереса к результатам деятельности частной управляющей компании; в рамках информационной кампании разработать в том числе инструкцию для налогоплательщика по выбору наиболее подходящего пенсионного плана;
2. создать рейтинговую систему для планов аналогичную существующим рейтингам взаимных фондов, где инвестор четко видит лидеров рынка, а лидеры определяются, исходя из соотношения риска и доходности. Данное нововведение позволит делать выбор, обоснованный результатами

деятельности, а не агрессивной рекламой, а так же создаст частным управляющим компаниям дополнительную мотивацию для увеличения эффективности инвестиций;

3. в условиях отсутствия значительной части информации, необходимой для выбора пенсионного плана, налогоплательщикам выбирать фонды с большей величиной активов и более продолжительным периодом существования.

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