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Generativity is a Core Value of the ESJ: A Decade of Growth

Erik Erikson (1902-1994) was one of the great psychologists of the 20th century¹. He explored the nature of personal human identity. Originally named Erik Homberger after his adoptive father, Dr. Theodore Homberger, he re-imagined his identity and re-named himself Erik Erikson (literally Erik son of Erik). Ironically, he rejected his adoptive father's wish to become a physician, never obtained a college degree, pursued independent studies under Anna Freud, and then taught at Harvard Medical School after emigrating from Germany to the United States. Erickson visualized human psychosocial development as eight successive life-cycle challenges. Each challenge was framed as a struggle between two outcomes, one desirable and one undesirable. The first two early development challenges were 'trust' versus 'mistrust' followed by 'autonomy' versus 'shame.' Importantly, he held that we face the challenge of **generativity** versus **stagnation in middle life**. This challenge concerns the desire to give back to society and leave a mark on the world. It is about the transition from acquiring and accumulating to providing and mentoring.

Founded in 2010, the European Scientific Journal is just reaching young adulthood. Nonetheless, **generativity** is one of our core values. As a Journal, we reject stagnation and continue to evolve to meet the needs of our contributors, our reviewers, and the academic community. We seek to innovate to meet the challenges of open-access academic publishing. For us,

¹ Hopkins, J. R. (1995). Erik Homburger Erikson (1902–1994). *American Psychologist*, 50(9), 796-797. doi:<http://dx.doi.org/10.1037/0003-066X.50.9.796>

generativity has a special meaning. We acknowledge an obligation to give back to the academic community, which has supported us over the past decade and made our initial growth possible. As part of our commitment to generativity, we are re-doubling our efforts in several key areas. First, we are committed to keeping our article processing fees as low as possible to make the ESJ affordable to scholars from all countries. Second, we remain committed to fair and agile peer review and are making further changes to shorten the time between submission and publication of worthy contributions. Third, we are looking actively at ways to eliminate the article processing charges for scholars coming from low GDP countries through a system of subsidies. Fourth, we are examining ways to create and strengthen partnerships with various academic institutions that will mutually benefit those institutions and the ESJ. Finally, through our commitment to publishing excellence, we reaffirm our membership in an open-access academic publishing community that actively contributes to the vitality of scholarship worldwide.

Sincerely,

Daniel B. Hier, MD

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The Typicality of the Agri-Food Product Driver of the Enhancement of Destination Tourism The Apulian Case History

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Abstract

Typical products are becoming more and more an element of differentiation and qualification of entire territories, becoming one of their resources or, in some cases, the main resource and the real tourist attraction factor of the tourist resorts that direct their own promotion strategies of the territory to the new segments of tourist demand (tourists of taste or gastronomists, green tourists). In this sense, it becomes essential to activate synergies and commercial relations with the local economic system (for example with catering, trade, crafts) in order to actively consolidate the ancient territorial link, strengthening its image among consumers: thus, effectively serving as a promotional tool and enjoying the benefits derived from such approaches. Objective of the paper: "Indeterminacy" is the term that characterizes the concept of typicality of the agri-food product and that arises from the low level of information either of consumers and producers of agricultural raw materials and other operators in the supply chain. This work aims to analyze how much the knowledge and impact of the typical Apulian agri-food product affects the choice of the tourist destination. Methodology: The work is based on the analysis of data resulting from a survey in 2020 aimed at potential buyers of the agri-food product aimed at understanding the impact of the typical Apulian agri-food product in the choice of tourist

destination. Results: The analysis carried out highlighted how the knowledge, awareness and enhancement of typical products represent a strong attractive lever for tourist flows, with a view to choosing the potential final destination. From the testimonies of the users and internal stakeholders it was clear that the typicality has not affected the value of the destination, which remains primary in the purchase intentions of potential customers, but has triggered a climb in the hierarchy of preferences of those who intend to live an experience Italian or foreign tourists, in fact, evaluate the offer enriched by the multiple nuances of the territorial tradition within a specific tourist route. Research limits: This work is intrinsically limited by the strictly qualitative nature of the survey, as well as by the analysis of a single case study. Originality: The originality of the study lies in the contribution it intends to provide to the advancement of research focused on the analysis based on the connection among the territory, typical products and tourist flows.

Keywords: Typical products, valorization, destination tourism, Apulian food

Introduction

The Italian agri-food industry enjoys an undisputed vocation for quality. This is true not only for the fame of our gastronomic traditions, but also thanks to the value of agricultural raw materials and their great variety, due to a particularly happy and varied intertwining of environmental conditions and historical-cultural sedimentations. Intertwining that runs along the entire peninsula, no area excluded. In particular, the richness and variety of gastronomic traditions in our country undoubtedly represent an important strength in a context of growing appreciation of traditional, diversified products with a strong typical content.

Focusing on quality requires the activation of a series of company functions, aimed at the exact definition of the quality attributes of the product, the identification of the market target, the choice of commercial channels, the relationship with the local culture.

1. Typical products and their relationship with the territory

The term "typical" refers to the constant and distinctive characteristics of a certain category of characteristic products originating from a certain geographical area (Nomisma, 2001).

The theme of local development and marketing as a lever to achieve has conquered the world of entrepreneurship in recent decades, with the aim of providing principles, tools and methods to develop the competitiveness of an area through the identification, enhancement and the management of its offer (Sheet, 2001). In this sense, territorial marketing is a complex and integrated set of resources, economic subjects, social and cultural factors; as a

"system" capable of creating and sustaining demand and orienting the offer of services and products to market needs (Paolini, 2000); it also proposes to provide a correct approach for the inclusion of the heritage of typicality in particular of food and wine and culture, which are increasingly important for the success of the tourist offer programs of an area, guaranteeing differentiating characters and visibility (Nomisma, Palomba, 2009).

If on the one hand, therefore, territorial marketing sees in the food and wine culture the tool of choice for realizing itself, on the other the psychology of consumption and its related effects opens an interesting chapter on consumption choices, on shopping experiences, and on determination of tourist destinations (Pencarelli, 2012). Many consumers associate the concept of typicality exclusively with certain characteristics or values of the product, not considering how this term goes beyond the simple quality or genuineness of the same. (Croce, Perri, 2010).

Producers, on the other hand, very often fail to grasp the real potential of this "label" in the enhancement and territorial development and, above all, how this meaning can be translated into marketing and business development strategies (Nomisma, 2001). It is for these reasons that it is necessary to clarify the real meaning of the term "typicality" in the world of agri-food, a term that is now inflated, abused and caused by a distortion of its deeper meaning.

Interesting is the scope and relevance that territorial marketing has acquired over the last few decades through the enhancement of the food and wine culture, which has now become an essential tool for the development, launch and/or increase of the activities of a "place" (Curini, 2014). Typicality as a factor to be enhanced and preserved to strengthen, specialize, diversify and create products and supply networks in the area, to link tourist productivity to agricultural and agri-food productivity, to give "industrial" strength to minor productions, which risk being lost. Furthermore, another objective is to identify how the new consumption, or, better said, the new ways of using products, can be transformed into the main factors of competitive advantage and a vehicle for development for the territory (Crouch, Ritchie, 2003).

With reference to the "typical product" (Belletti, Brunori, 2006), it is "a product that has some unique quality attributes, which are an expression of the specificities of a particular territorial context in which the production process takes place" .

"Specificity" means the set of elements that distinguishes an agri-food product from other similar ones belonging to the same category. The territory represents an important element in the specificity for the specific exogenous factors of the production area, of the processing area and of the prevailing marketing area: climate, land conformation, historical and cultural heritage favor unique and consolidated processes over time (Marescotti, 2006).

The aforementioned definition of product, however, does not fully highlight the value of the human factor, aggregator of knowledge, know-how and local practices, fundamental for obtaining the typical product, and of the emotional, social, epistemic and contextual factors that they allow the consumer to “benefit not only from qualitative excellence but above all from geographical and cultural links through which to acquire the possibility of accessing a specific social and cultural context” (Cesaretti, Annunziata, 2011).

These factors, relevant in determining the typicality of the product, can be gathered around three axes (Mipaaf degree n. 350/99):

- the specificity of the local resources used in the production process;
- the history and production tradition;
- the collective dimension and the presence of shared knowledge at the local level.

The existence of a close relationship between the typical product and a certain territorial area represents the so-called geographical dimension, a set of geographical and climatic conditions that give the product its own specificity (Angeloni, 2013). Geographical location stands as a requirement of fundamental importance since the qualitative image of the typical product must be immediately connected and identifiable with the territory of origin. For a consumer, in fact, the territorial origin of a typical product represents a fundamental element in terms of differentiation, as it is increasingly perceived as an element of reassurance.

The historical dimension, on the other hand, refers to the knowledge, traditions, uses, culture connected to the product and the set of know-how that have consolidated over time by taking root and implying its ancient presence in the territory. Together with the aforementioned geographical location, the historical memory is perhaps one of the most important and characterizing elements of the typical product. Lastly, the so-called cultural dimension indicates the way of living and thinking of the people who live in the product production area (Presenza, 2007).

These dimensions tend to overlap, so as to attribute the requirement of typicality to the product. There are three different degrees:

- the first level consists of products for which production and consumption were originally carried out in a rather large area and that is why they could be made in another territory without generating confusion in the consumer, since the product-territory link is only an image link with the place;
- the second level consists of products obtained with raw materials present in the place of origin of the product. These are related to the concept of "quality"; they are in fact defined as "quality raw materials" and derive from a long tradition handed down for years and have

undisputed organoleptic properties. These goods could be made elsewhere, but the typicality derives from the raw materials used for their production, from the transformation process and from the marketing methods.

- The third and last level considers those products that use production methods developed in the geographical area of origin and which cannot be replicated elsewhere. This gives the product unique connotations and its degree of typicality is greater than the products of the first and second level.

Other discriminants should be considered to define a product as typical:

- Intertemporal space: time that has elapsed since the first marketing, that is, a product must have been known for at least thirty years.
- Preparation techniques: a product must follow preparation techniques consolidated over time and adequately handed down.
- Product characteristics: requirement that includes all the organoleptic and nutritional characteristics of the product.

Others connected elements: all those elements which, although not directly connected to the product, play a very important role, such as the quantity produced, the type of distribution and storage, the mode of consumption, the sales area (Bottinelli, 2004).

In relation to the requirements described above, three major macro-categories of typical products can be highlighted:

- certified typical products: with quality certificates (such as DOP and IGP) and characterized by a restricted production and marketing area;
- typical non-certified products: of high quality and tradition, they do not have a recognition mark. They are characterized by a notable commercialization even outside the local borders, which determines a strong potential in terms of expansion of their market;
- high-consumption undifferentiated products: well known and with a high level of standardization, characterized by an industrial production process and delocalized marketing.

The typical product must not be confused with the "local product", which expresses, instead, the physical proximity between a product and a consumer. In the case of the typical product, reference is made only to the geographical origin. The local product, therefore, does not have that "close traditional and cultural link that allows it to be typical and therefore differentiate it from other similar products" (Caroli, 2011).

The term “traditional product”, on the other hand, is the result of a historical production tradition that has not wanted or been able to adapt to modern and standardized techniques. A typical example is the PAT (Traditional Agri-food Products), included in a special ministerial list, with the task of promoting their knowledge at national and international level.

A final differentiation is that which concerns "Made in Italy" products compared to typical ones. The "Made in Italy" products, in fact, take into consideration the entire national geographical area and are made with a production process that can be replicated even outside national borders (Spendiani, 2017).

2. Typicality as an element of differentiation

Typical products lend themselves to effective product differentiation, leveraging some peculiar characteristics, for example:

- the location of the product and the production techniques used for its realization within the local tradition and culture;
- the geographical location of the production area;
- the quality of the raw material used and the peculiarities of the production processes deriving from a certain local production tradition.

The link of the typical product with the territory also refers to the aspects of culture and local identity. Very often the typical product characterizes the "historical memory" of the local population, not only in terms of production, but also in terms of its use in gastronomic preparations and social consumption practices, thus representing an element of identity. The cultural and identity element takes on a very important catalyst value of the local community's desire to preserve the product and can strengthen the enhancement processes that are activated locally (Bérard, Marchenay and Casabianca, 2005).

The reference to the link with time and memory, with local traditions and culture, requires us to consider the theme of innovation, a central aspect as often the enhancement of the typical product requires modifying consolidated traditions with respect to the production process and, sometimes, with respect to the product (Marescotti, 2006). The link between product and territory cannot be considered as a rule written once and for all (today many typical products, if made with the techniques and in the manner of a hundred years ago, would not even be considered edible by consumers), but it must be continuously reinterpreted in the light of changes in the local and global context.

The third set of factors relevant to typicality can be identified in the collective dimension (Belletti, 2002; Belletti, Brunori, Marescotti and Rossi,

2002), intimately linked to history and traditions. The typical product, unlike other products of specific quality (such as a product from organic farming), is closely linked not to a single individual or company but to a community of actors, by virtue of the link with a given territory that is it is established, refined, consolidated and modified over time. The typical product is the result of an interaction between the different local producers, and between them and the local population, as well as, when the system opens to more distant markets, with consumers and non-local citizens; it incorporates knowledge built over time and shared within a territorialized community. This process of accumulation and sedimentation of knowledge (contextual and often not codified) means that we can talk about the patrimonial dimension of the typical product (Bérard and Marchenay, 2006), the product, and the ways to produce it, preserve it, distribute it, consume it and appreciate it. they become part of the heritage of the local community. It alone is therefore entitled to appropriate it for economic, social and cultural purposes. Therefore, typicality is not built only on the characteristics of the production process and of the product, but also (and, perhaps, above all) on the relationships between the actors of the system.

Differentiating a product depends not only on the product itself, but on the company's ability and ability to develop and communicate properly with a brand and any other distinctive elements that can be recognized as such by consumers. In particular, considering the entire production chain of an agri-food product, it is clear that "the possibility of differentiating is considerably reduced at the farm level, while it increases in the more downstream phases of the supply chain, when it comes to industrial transformation or marketing" (Antonelli, 2011).

In this panorama are placed the products with the marks of designation of origin, established by the European Union, for which, also on the basis of the institutional regulations (EC Regulation 510/2006), increasing levels of typicality are recognized respectively for STG, PGI and DOP. To these categories are added the products awaiting the completion of the registration procedure for the PDO or PGI denomination and those that for various reasons are proposed to the consumer as typical, such as traditional, farm, local, park / protected area products.

Typicality therefore represents a condition for the differentiation of agri-food goods; a condition that exists exclusively in the potential state and that can be transformed into effective differentiation only through appropriate and effective marketing policies, of which the consumer is able to perceive the value (Martini, 2005).

In essence, marketing has the function of transmitting the signals of value which, if recognized and perceived favorably by the consumer, lead to the formation of a Premium Price. In this perspective, the problem of product

differentiation, even in the consumer's mind, essentially requires marketing policies to be implemented to remove situations of information asymmetry. This occurs on the markets of agri-food products due to the great variety of products that are apparently similar in that they belong to the same product category and the difficulty for the consumer to correctly evaluate the qualitative differences. This happens due to a multiplicity of requirements of the product-producer system not directly ascertainable and assessable by the consumer (nutritional and health requirements, the effectiveness of process control systems, origin, hygienic compliance, application of specific technologies, etc.) that incentivize large retailers to adopt aggressive pricing strategies, relying on vast economies of scale, reputation and customer loyalty. This process leads to a reduction in the supply of products with non-definable technologies, leading, in the longer term, to their disappearance on the market to the advantage of those of standard quality.

The consumer, even if interested in buying a different product, will be oriented to face a higher outlay only if he is able to perceive the qualitative difference, otherwise, his rational behavior will lead him to buy the product that has a lower price. Therefore, for the producer of the highest quality agri-food product the problem is to be able to "communicate" to the consumer the qualitative characteristics (organoleptic, nutritional and intangible) that differentiate his product from the standard one (Prestamburgo, Torquati, 2004). Basically, it is a question of implementing a strategy that allows to differentiate the product not only substantially, but also and above all in the perception of the consumer.

3. Methodology

This work was based on the analysis of data deriving from a survey in 2020, carried out on 200 people (ages 18 and up), aimed at potential buyers of the agri-food product aimed at understanding the incidence of the typical Apulian agri-food product in the choice of tourist destination.

The questionnaire on the appeal, knowledge and impact of the typical Apulian agri-food product in the choice of tourist destination, was created and submitted to potential buyers of the typical agri-food product. The information obtained was suitably analyzed and transcribed into graphs and tables, according to a descriptive statistical methods, with both quantitative and qualitative variables. A further exploratory analysis, which relates the data to each other, can be a subsequent level of the research.

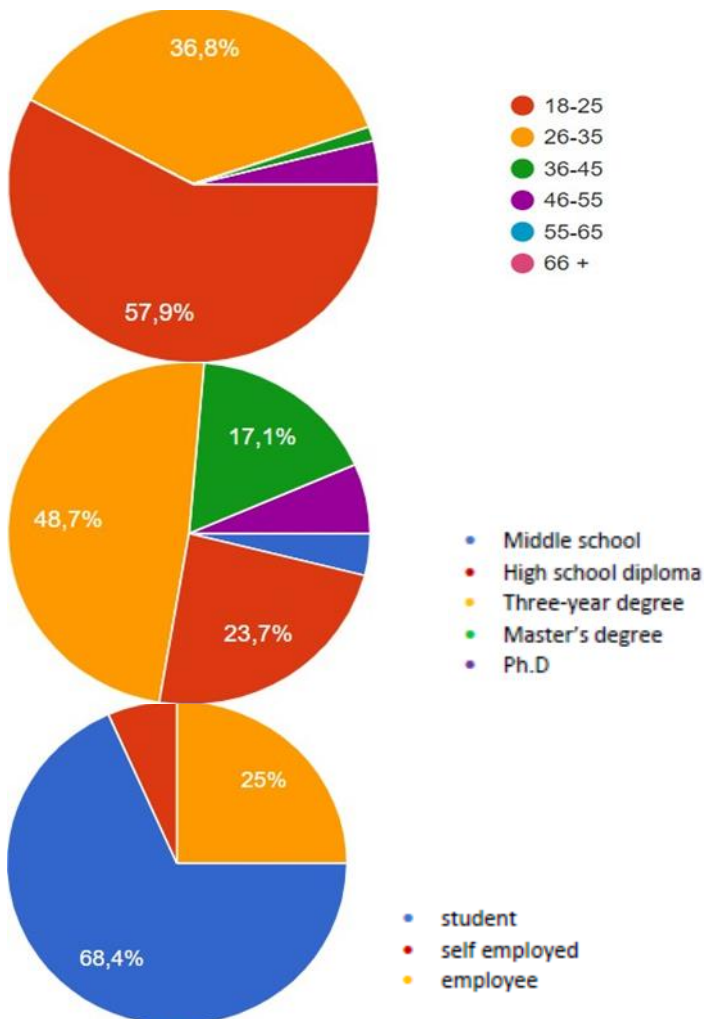
This made it possible to observe both the incidence of the typical product in the choice of the tourist destination, and the knowledge of the characteristics that make it a certified product. In particular, the questions were formulated with the aim of obtaining information of a predominantly quantitative nature and were set according to a multiple choice or hierarchical

scheme, allowing the interviewee to choose the most suitable answer to his opinion. The questionnaire, divided into twenty-two questions (excluding those relating to identity and profession), was preceded by a letter of presentation in which the title of the research and a brief description of its objectives were reported, highlighting the importance of obtaining the information requested for the purposes of research and processing of the collected data.

4. Presentation and discussion of the results

Respondents constitute a balanced segment of potential buyers of the product; segment varied by age, level of education and profession.

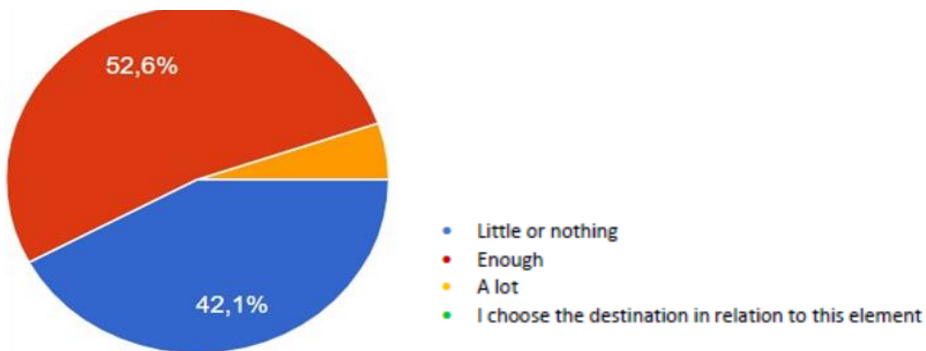
Graph 1: socio-demographic segmentation (age, level of education, profession)



Source: 2020 survey data

These were initially asked how often they traveled during the year, with reference to the pre-pandemic period. 43.4% replied "once", 47.4% said they travel "twice during the year", while the remainder expressed the habit of traveling more frequently. At this point we wanted to understand what rate of incidence the typical agri-food offer has on the choice of the tourist destination, and the relevant data was, certainly, that for which none of these potential travelers opts for a specific territory as a result of a 'territorial agri-food offer'; and indeed, 42.2% give little importance to the element when selecting the destination.

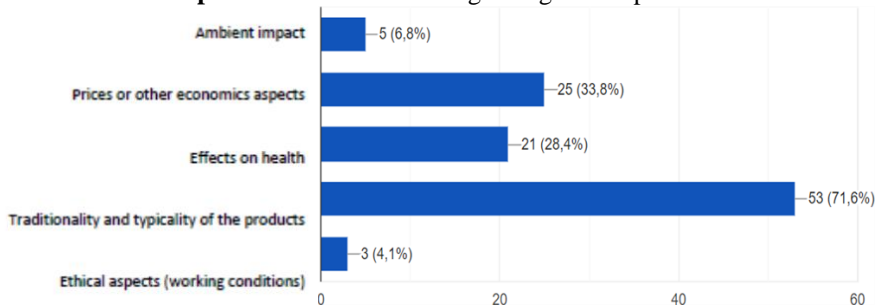
Graph 2: Impact of the agri-food factor on the choice of a destination



Source: 2020 survey data

Having understood the general picture, we wanted to enter the field of specific preferences, needs and purchasing habits of potential customers, focusing on the choice of agri-food product, free from the concept of destination, by the interviewees:

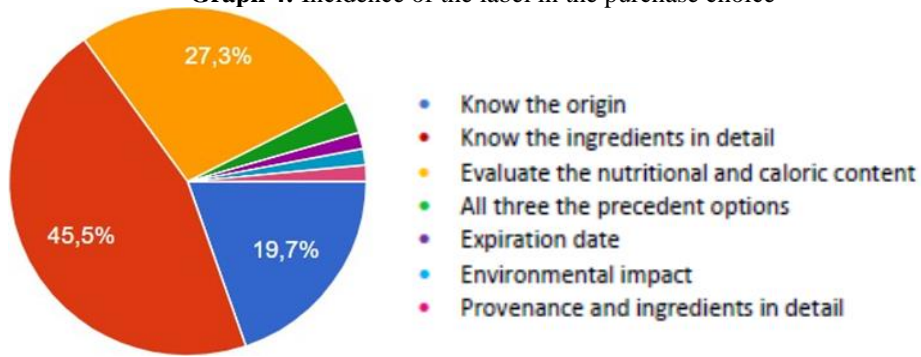
Graph 3: Factors for choosing the agri-food product



Source: 2020 survey data

And 85.5% also stated that when choosing the typical agri-food product, the label plays a fundamental role for the following reasons:

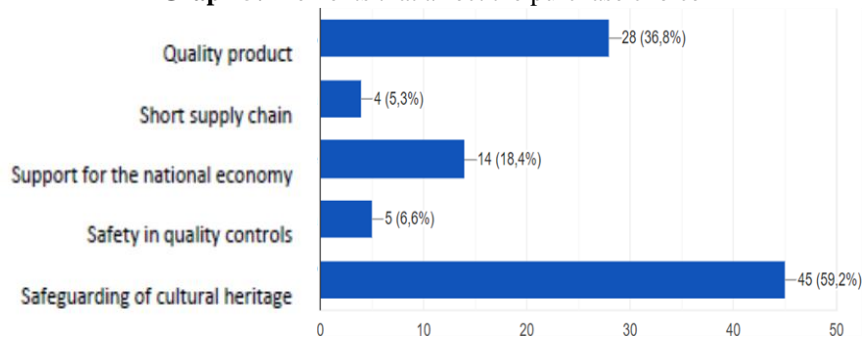
Graph 4: Incidence of the label in the purchase choice



Source: 2020 survey data

The data collected show that 59.2% of the interviewees are (paradoxically) more incentivized to purchase agri-food products, if the process underlying their production safeguards the cultural heritage.

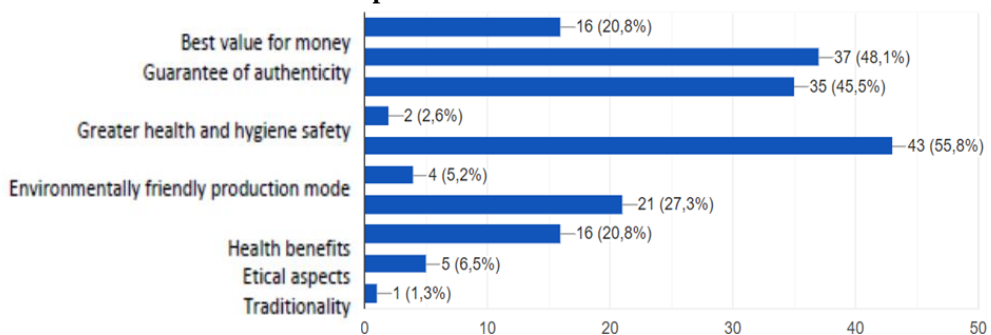
Graph 5: Elements that affect the purchase choice



Source: 2020 survey data

Speaking of the Puglia region, 100% of potential buyers confirmed that they usually know and consume traditional products (total percentage due to the geographical origin of the interviewees, all native to the region). Going into detail, 55.8% consumes them two or more times a week and 14.3% even every day.

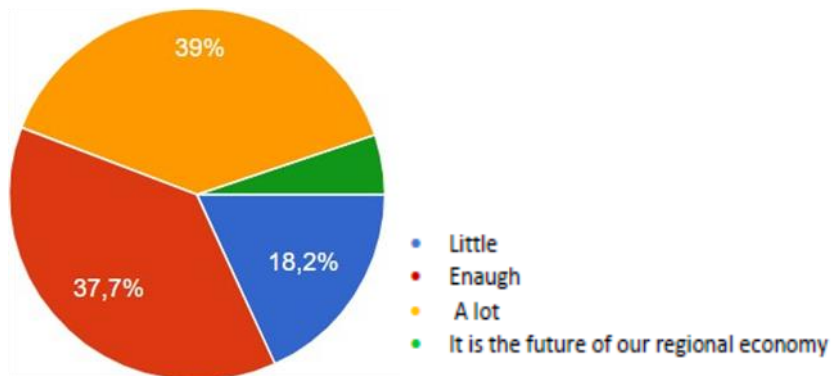
Graph 6: Purchase motivation



Source: 2020 survey data

The aforementioned question was followed by an open question, the subject of which concerned which product best represented the Apulian identity; the plebiscite response was the combination: Orecchiette and extra virgin olive oil. A concept that cannot be overlooked, speaking of the propensity to purchase a typical agri-food product, is that of the willingness to pay a premium for this product; surcharge that refers to the concept of typicality of the agri-food product.

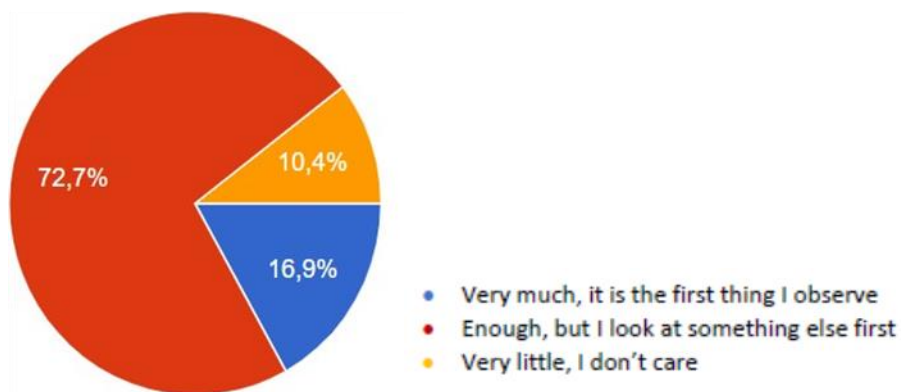
Graph 7: Willingness to pay a premium



Source: 2020 survey data

Turning to the topic of quality certifications (DOC, IGP, DOCG and DOP), 79.2% replied that they know these brands, but not to the point of considering them primary elements in the evaluation of the purchase of the products in question:

Chart 8: Impact of quality certifications in purchasing choice

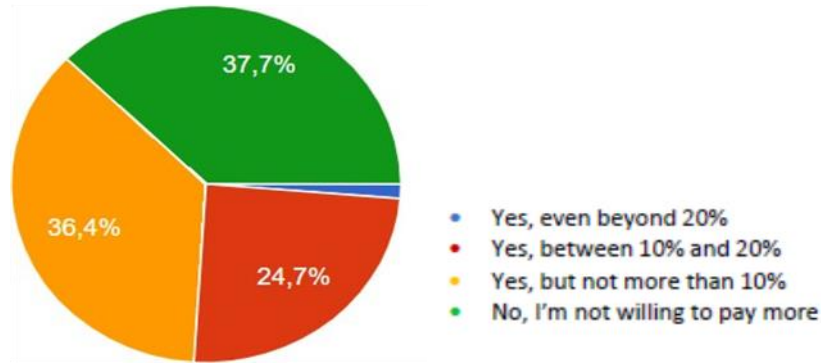


Source: 2020 survey data

Finally, returning to the relationship between typical locality and choice of destination, the respondents to the questionnaire indicated for 62.3% "cultural experience" as an answer to the question on how the tourist consumption of local production can be interpreted. On the other hand, the

response on how much further investments on “agri-food itineraries in Puglia” may affect the tourist development of the territory has been balanced. In fact, although the majority, only 37.7% of those interviewed believe it constitutes the future of the economy of this region.

Graph 9: Impact of food and wine on future prospects



Source: 2020 survey data

Ultimately, returning to what was stated in the 2nd paragraph, the existence of a close relationship between the typical product and a certain territorial area represents a strong geographical dimension, a set of geographical and climatic conditions that give the product its own specificity (Angeloni, 2013). So geographical location stands as a requirement of fundamental importance since the qualitative image of the typical product must be fastly connected with the territory of origin. For a consumer, in fact, the territorial origin of a typical product represents a great and real element of differentiation, as it is increasingly perceived as an element of reassurance.

Besides, about historical dimension refers to the knowledge, traditions, uses, culture connected to the product and the set of know-how that have consolidated over time by taking root and implying its ancient presence in the territory. Together with the geographical location, the historical memory is a very important and characterizing element of the typical product. So, the cultural dimension shows a better way of living and thinking of the people who live in the product production area (Presenza, 2007).

Conclusion

Wanting to make a "balance" about the role assumed by typical products, it can be considered as a whole that these constitute a key element in the enhancement of the territory, especially with reference to the agri-food sector. From the testimonies of the users and internal stakeholders it was clear that the typicality has not affected the value of the destination, which remains primary in the purchase intentions of potential customers, but has triggered a climb in the hierarchy of preferences of those who intend to live an experience

Italian or foreign tourists, in fact, evaluate the offer enriched by the multiple nuances of the territorial tradition within a specific tourist route (from the location to the table, up to the experiences outside); this as a result of the growing attention of consumers to the quality and authenticity of the experience.

The typicality, in addition to constituting a positive differential for the tourist and a surplus value for already attractive territories, represents a potentially relevant resource also for agricultural enterprises located in territories considered marginal and economically more disadvantaged in order to obtain a space for competitiveness in a market. increasingly competitive (Sainaghi, 2008). The recognition of the Italian agri-food sector as having a central role in the development of territorial systems is now unanimous. This development allows the achievement of specific economic and social benefits. Just think that:

- the agri-food system generates a total of over 250 billion euros per year in turnover;
- considering the induced generated, it comes to represent more than 15% of the Italian GDP;
- Made in Italy agri-food products reached an average growth rate of around 10% from 2008 to 2020;
- there is both a growth trend in employment in the sector and an increase in the demand for food and wine tourism.

However, the obstacles and problems about destinations valorization that may arise can be of different nature, and may concern:

- little information on the intrinsic value of the product in reference to the commitment necessary for the realization, to the value of the raw material used to the value of precious and irrecoverable testimony of a specific rural environment;
- insufficient remuneration for the producer who has failed, or is unable, to distinguish his production from similar mass products obtained at significantly lower costs;
- absence of a collective image and general legislation that distinguishes the entire category of typical -local products from the numerous imitations present on the market;
- marketing carried out largely in an elementary and approximate way;
- difficulty in planning promotional interventions aimed at the single product due to the high costs.

In the face of these problems, positive signs emerge, which lead us to look with confidence at the commercial future of local products:

- a generalized increase in consumer interest in what has been defined as the "food satisfaction" area;
- the greater sensitivity to give the right weight to health reasons (genuineness, absence of additives, use of valuable raw materials) in the choice of products;
- the development of the agritourism phenomenon which acts as a promotional factor for typical local products;
- a certain interest on the part of the legislative and government bodies in typical and local products;
- the realization of numerous studies, research aimed at the census and the dissemination of many products otherwise destined to fall into oblivion.

The possibility of the primary sector to develop through typical agro-food productions also depends on the ability of this offer to meet certain segments of demand.

If this were not the case, this would mean relegating the typification paths to a large exhibition of works of art that would not however have admirers and visitors.

Focusing on the case of Puglia, the presence of a not indifferent typical heritage on which the offer system rests was demonstrated, which satisfies the different needs of both residents and tourists. It was possible to ascertain, from interviews with privileged witnesses, the importance of a 0 km production for the territory and its combination, in the offer, with the destination and the cultural aspect. In the last three years, prior to the pandemic, the first accounted for the largest percentage of turnover for companies that diversify their business between hospitality and production, with prices doubled.

All with a promotional push not deriving from the institutions but the consequence of a social trend that has allowed the phenomenon to emerge. Therefore, greater public intervention would be necessary to promote above all those productions that, in addition to not having a consistent market, are unknown to the most unknown. some actions can assume a significant strategic role (Della Corte 2012):

- select all the structures that guarantee the relationship between typicality and quality, from all company points of view;
- start a training activity aimed at professionals who do not yet possess the required quality requirements;
- identify a list of targeted events, to be included in tourist packages to complete the offer of quality accommodation facilities, together with the generic cultural offer;

- build some packages to be submitted to tour operators specialized in food and wine tourism, possibly involving tourist associations, which need to be revitalized;
- organize special educational for the specialized press;
- create a dedicated website / portal;
- through local authorities and actors, prepare regional sector legislation which, in particular, governs the certification of hospitality;
- publish calls for training; support, also involving private individuals, the costs and expenses of communication and promotion.

In an attempt to outline the salient features of local food and wine and its tourist connotations, the ideal route winds through typical territorial initiatives and events, overlaid by the enormous heritage deriving from Apulian gastronomy and tastes. In fact, it is not possible to ask individual entrepreneurs / producers, especially following a period of crisis such as the one we are experiencing, to bear huge economic expenses in order to implement specific marketing and communication policies. In any case, it is considered appropriate to protect and preserve these productions, because in the near future they could take on a certain depth for the enhancement of the territory (Desinano, 2019).

Indeed, it would be a huge mistake to lose the history, culture and tradition that embodies a local product. The Italian agri-food industry plays a primary role and, to date, can be considered a driving and growth sector (Tamma, 2009). Typical production, in fact, constitutes an important opportunity for economic development for the area, as well as for the agri-food system itself.

The demand from local and foreign consumers for typical quality products is constantly increasing and this is a positive factor useful both in solving problems of insufficient competitiveness and in strengthening the image of individual territories. Finally, it is important to remember that the success of a typical product depends on the link with the territory to which it belongs. We must therefore reflect the image of naturalness, safety and genuineness that increasingly conditions those consumers with a certain food culture.

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What is the Relationship between the Four Dimensions of the Balanced Scorecard and Organization Performance of Ghanaian Public Universities?

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Abstract

The Balanced Scorecard (BSC) is one of the best-known strategic planning and evaluation tools that uses both monetary and non-monetary data. This paper focuses on empirically testing whether the four dimensions of the BSC predicts organizational performance of Ghanaian public universities. The study adopted a cross-sectional, descriptive survey design and the primary sources of data was gathered through hand-administered structured questionnaires from both academic and administrative staff of 10 accredited public universities in Ghana. The study also employed structural Equation Model (SEM) with SmartPLS to analyze 134 samples. Results of the bootstrapping method for the structural model and the t-values of the four dimensions of the BSC were significantly and statistically different from each other, but all showed a positive relation on perceived organizational performance. The results showed that non-financial measures have better outcomes for employees' performances which corroborates the central proposition of the Balanced Scorecard. It is recommended that public universities that want to maintain and improve organizational performance must pay attention to the customers' perspective by providing relevant and high-quality education that acquaints students with knowledge and transferable basic skills and also identify opportunities for special initiatives, collaborative partnerships, and accountability to constituents.

Keywords: Balanced Scorecard, public universities in Ghana, strategic management system

Introduction

Global Demands on Higher Education Institutions

For several years now, both private and public universities have been competing in the international market. This is particularly seen in universities that operate within the framework of neoliberal, market-oriented reform policies. They believe that competition is the only valid and authentic norm for all human activity (Bleiklie, 2001; Deem et al., 2008; Fadeeva & Mochizuki, 2010; Storey, 2002). On the other hand, some universities are identified by their decentralised decision-making approach, democratisation of access to tertiary education, and operation within budget constraints (Bleiklie, 2001; Smeenk et al., 2008).

Despite this, universities' stakeholders (i.e., the state, alumni, prospective students, and other external constituencies), demand their increased responsibility, quality improvement, and accountability which is relative to their productivity, efficiency, and usefulness (Billing, 2004; Smeenk et al., 2008; Stewart & Carpenter-Hubin, 2000). Therefore, universities formulate policies, rules, and regulations (PRRs), benchmarks, and quality controls to evaluate their performance since they are increasingly and more frequently customer-driven and market-controlled (Billing, 2004).

Today, more than ever, the society has become increasingly convoluted, and universities are confronted with myriad challenges of managing continuous change to remain relevant (Caruth & Caruth, 2013). Universities are striving always to effect changes in policies to transition from the prevailing circumstances to the future one, which requires new management forms towards greater flexibility, agility, and effectiveness regarding responsiveness to societal demands (Aktas, 2015; Lawrence & McCullough, 2001). Public universities globally are therefore required to keep on innovating and improving their institutional structures and processes in order to tackle the shifting challenges constantly knocking at their doors and to simultaneously take advantage of the myriad opportunities before them.

The new perspective regarding universities as critical building blocks in the socioeconomic life of states is based on the principles of open science or open scholarship (Ayris et al., 2018). This includes the delivery of inclusive, evenly balanced access to quality learning and the dissemination of high impact scientific research project (Arnesen & Lundahl, 2006). Institutions that adopt a cultural change towards open scholarship could grow, expand, and interact with the opportunities and challenges in the environment where they are active participants (Ayris et al., 2018; European Commission, 2018).

These strings of change drivers have intensified in post-World War II era and organizations have increasingly become complex but also with corresponding complexity in the production and management processes. This has put pressure on many organizations as they are determined to cope with the challenges. Consequently, in the 1980s, many corporate leaders adopted new management models and tools, such as Total Quality Management (TQM), the Kaizen job method training (Imai, 1986), structuration theory (Pettigrew, 1990), business process re-engineering and others (Pearce, 2003), to aid them perform more efficiently. This also serves as a means to effectively control human behaviour.

In view of the above, several universities in the developed and developing worlds have adapted or are making the effort to adapt to the changing circumstances as they re-structure their institutions and give priority to the improvement of their institutional performance and accountability (Fijatkowska & Oliveira, 2018). Such advances have unavoidably resulted in the development of bureaucratic or businesslike processes and methods (Jauhiainen et al., 2015). The extant literature even suggest that many public universities have started using the business language to create plans, formulate strategic goals, and apply performance management principles to put institutional resources to effective use (Billing, 2004; Smeenk et al., 2008). In the past, Welch (2007) observed that universities and other higher institutions of learning were implementing new forms of governance, managerial styles, and principles that were widespread and dominant in the corporate business segment. The reasoning behind these novel administrative reforms was to increase universities' value for money or price-performance ratio (Deem, 1998; Waring, 2013). Hence, the financing of universities is an essential component within a regulated and ineffectually free market economy (Marginson, 2013).

Managerial Innovations Within Public Organisations

In the place of the Progressive Public Administration (PPA) accountability model, the New Public Management (NPM) has emerged. NPM embraced a different understanding of public accountability. Also, it adopted different models of trust and distrust, which resulted to a different kind of "accountingization" (Hood, 1995, p.93). The main reason for this new management concept is to reduce or eliminate the differences that exist between the public and the private sector. Thus, this shifts the weight from process accountability towards a greater aspect of accountability in terms of the end-product. Accounting is an essential component in this modern understanding of accountability. Accountability here reflects high trust in the market and private business practices and low trust in professionals and public servants.

The NPM is a two-level concept. First, it is a general theory that the public sector can be improved by the importation of business concepts, techniques, and values. Second, and in ordinary usage, NPM is a bundle of specific concepts and practices which includes greater stress on performance that specifically occurs through the measurement of outputs; a preference for (i.e., lean, flat, small, specialized) organizational structures over large, multifunctional structures; a widespread substitution of contracts for hierarchical relations as the principal coordinating device; a widespread injection of market-type mechanisms, including competitive tendering, public sector league tables, and performance-related pay; an emphasis on treating end-users as ‘customers’ and on the use of generic quality improvement methods such as Total Quality Management (TQM). The discussions of this section and the previous one is summarized in Table 1.

Table 1. *Three waves of reform thinking*

Period	Characteristics of Dominant Discourse
Mid-1960s to late 1970s	Rational, hierarchical planning and cost–benefit analysis. Science and expertise will produce progress.
Late 1970s to late 1990s	New Public Management. Business techniques to improve efficiency. Rise of ‘better management as the solution to a wide range of problems.
Late 1990s–present	No dominant model. Several key concepts, including governance, networks, partnerships, ‘joining up’, transparency, and trust.

Source: *Adapted from Pollitt and Bouckaert (2017, p.11)*

The State of Accredited Public Universities in Ghana

In the last two decades, traditional universities in Ghana have faced several challenges such as frequent changes of legal regulations and education laws, persistent pressures and demands for greater quality, reduced public funding, and increased competition from private and foreign universities. On the other hand, traditional public universities across Ghana are facing the challenges of restructuring and reforming themselves so that they deliver quality education and nurture students who will become productive members of their communities. Public universities in Ghana are also expected to conduct research and provide consultative services so that they address the urgent multifaceted problems of Ghana and transform the nation.

Furthermore, student admissions and enrolments in Ghanaian universities is on the increase recently. Conversely, this puts pressure on the resources of universities and poses a great challenge to institutional performance concerning effective teaching and learning due to the level of autonomy with which universities and other tertiary institutions operate (Ofori & Atiogbe, 2012). Despite the presence of oversight and supervisory institutions, such as the National Council for Tertiary Education (NCTE) and the National Accreditation Board (NAB) which have been set up and mandated to effectively supervise and make the activities of higher institutions

of learning more efficient, the quality of graduates produced by universities remains a serious concern for many stakeholders.

For instance, the NCTE cites weakening quality in service delivery as one of the main challenges facing Ghanaian public universities. This appalling trend is attributed to the high student/staff ratios and proliferation of private universities and university colleges in the country (National Council for Tertiary Education, 2018). Thus, there is the need to evaluate the prevailing strategic performance management practices of accredited public universities in Ghana from a multifaceted perspective such as the Balanced Scorecard.

Past studies have found that the performance measurement systems are particularly important in higher education settings. Therefore, to measure the performance, Al-Zwyalif (2012) indicated that the universities should implement the Balanced Scorecard to manage and assess the overall performance. The orderly methodology leads to clear guidance for employees in the organization to accomplish the annual targets. Balanced Scorecard is an innovative measurement tool in appraising the performance of an organization. It is commonly recognised among organizational level since it was initiated in the early 1990s. Subsequently, BSC provides a comprehensive equilibrium between the short-term and long-term plan, monetary and non-monetary parts, internal and external process, and company's advantage and consumer's advantage (Kassahun, 2010). The BSC also allows the top management to ensure that the strategy is coherent with the mission, vision, and objective of the organization.

Empirical research shows that “only 5 percent of the workforce understands their company strategy, 25 percent of managers have incentives linked to strategy, 60 percent of organizations do not link budgets to strategy, and 86 percent of executive teams spend less than one hour per month discussing strategy” (Balanced Scorecard Collaborative, 2002, p.2). To improve such avoidable failure of executing a strategic plan, professionals suggest setting up a new way of communicating strategy to the final consumer by implementing the Balanced Scorecard (BSC) model. With BSC, strategy gets to every employee in a language that makes sense (Kassahun, 2010).

The Balanced Scorecard puts vision and strategic goals at the centre and not control. This is then translated into a performance measurement system and is sequentially reflected in responsiveness and overall strategic orientation. The Balanced Scorecard is appropriate to the type of design many companies are trying to become. It sets goals but assume that every employee or member of staff of the organization will adopt whatever actions and behaviours are required to attain organizational goals (Camilleri & Camilleri, 2018; del Sordo et al., 2012; Fijatkowska & Oliveira, 2018). Hence, the performance system of the Balanced Scorecard is not envisioned for performance measurement only but also for the purposes of effectively

planning, implementing, monitoring, supervising, and evaluating the entire organization. It is an integrated system that is also in line with the ongoing creativities in many organizations.

By bringing together the financial and non-financial assessments (i.e., financial, internal process & innovation, organizational learning and growth, and customer viewpoints), the leaders of organizations are able to tacitly understand several interconnections. This insight can support leaders and managers to rise above traditional ideas concerning operational obstacles and eventually bring about better quality in problem-solving and effective decision making. The Balanced Scorecard keeps organizations continuously looking and moving into the future rather than looking back (Kaplan & Norton, 1992).

The next section of this article is devoted to the discussion of relevant literature reviews on the nature of the performance management frameworks and the use of the Balanced Scorecard as a performance measurement tool. A separate section describes the elements of the research design and methodology including the selection of study participants and research instruments. This is then followed by the results and interpretation and discussion of the data analysis. The final sections discussed the limitations and provided future research possibilities.

Performance Management Systems

Andre de Waal (2006) defined performance management systems as “the formal, information-based routines and procedures which managers use to maintain or alter patterns in organizational activities”. This definition was adapted from Simons (2000). Performance management systems (PMS) usually revolve around communicating financial and non-financial data that have an impact on decision-making and organizational practices.

Today, more than ever before, organizations and institutions are increasingly implementing a performance management system to realize better organizational outcomes in a dynamic environment that is constantly changing (Bititci et al., 2004; Davis & Albright, 2004; Eccles, 1991; Epstein et al., 2004; Marr, 2004). Despite these positive and constructive benefits of performance management systems, several organizations have difficulties and challenges implementing one (Franco & Bourne, 2003). According to Simons (2000), a performance management system cannot be successfully planned and implemented without considering human behaviour. Therefore, Holloway and Colleagues (1995) observed that the effective implementation of a performance management system largely depends on accepting and accommodating the behavioural elements of performance management. de Waal (2006) strongly reinforced this important view.

The universities evaluative systems may include an analysis of the respective universities stated intentions, peer opinions, government norms and

comparison, and primary procedures from self-evaluation through external peer review. These metrics can be drawn from published indicators and ratings among other frameworks (Billing, 2004). According to Cappiello and Pedrini (2017), universities performance evaluations can be either internally or externally driven. The internally driven appraisal systems put more emphasis on self-evaluation and self-regulatory activities (Baxter, 2017). On the other hand, the externally driven evaluative frameworks may involve appraisal interviews that assess the quality of the employees' performance in relation to pre-established criteria. Public universities ought to continuously re-examine their strategic priorities and initiatives. It is in their interest to regularly analyze their performance management frameworks through financial and non-financial indicators and assess the productivity of their human resources as well. Therefore, they should regularly review educational programs and course curricula (Brewer & Brewer, 2010). On a faculty level, the university leaders ought to keep a track record of changes in the size of departments, age and distribution of academic employees, diversity of students and staff in terms of gender and ethnicity, et cetera. In addition, faculties could examine discipline-specific rankings and determine the expenditures per academic member of staff among other options (Camilleri & Camilleri, 2018).

The Stakeholder Theory

Stakeholder theory is fundamentally a business and management concept. Freeman, Harrison, and Zyglidopoulos (2018) discussed the basic concepts and application of stakeholder notions in addition to the benefits this concept brings to organizations and their management teams. The qualities, power, urgency, and legitimacy of claims characterize the stakeholders of an organization (M'maiti, 2014). Both power and urgency must be paid attention to if executives and leaders are to serve the moral and legal interests of rightful stakeholders of the organization (Mitchell et al, 1997). Therefore, stakeholder theory encompasses processes and procedures that recognize and oversee the interests of stakeholders.

Furthermore, a large volume of work has been performed on categorizing the relative impact of various stakeholders (Mitchell et al, 1997). To be able to distinguish stakeholders from non-stakeholders, M'maiti (2014) advised managers to have a clear idea of what exactly a stakeholder connotes. Freeman (1984, p.46) has defined the concept as "...any group or individual who can affect or is affected by the organization's objectives." This definition is still frequently quoted, and it gives a broad meaning and understanding of the concept. It is also like Thompson's (1967) understanding of a stakeholder, which means "those groups which make a difference." Based on the theory that has been provided, it can be assumed that public universities and higher education institutions can be branded as being complex environments with

manifold stakeholders or participants that frequently hold multiple, distant, and somehow conflicting goals. Nevertheless, there have been no significant evidence from the literature that strongly stops the transfer of operational philosophies, methods, and principles from the business world to the public domain.

Notwithstanding, the possibility of fruitful consequences of such transfers is presumed to have a connection with the level of behavioural modification to fit the descriptions and qualities of the target context. The Balanced Scorecard acts in two ways. First, it is developed to fit the requirements of the ‘citizen sector’. Second, it complements the special needs of the government sector or public domain (Bridoux & Stoelhorst, 2016; Harrison et al., 2019). Though slightly distinct in content and structure, the underlying principle (or logic) for operating either form is the need to improve and achieve a strategy that is more focused on higher metrics than purely financial metrics.

Besides the focus of the Balanced Scorecard on financial elements, it also specifies a foundation for defining other valuable factors that shape how an establishment can function and achieve its vision. Stakeholder theory comprises of a multiplicity of management capacities and methods that are mainly created to support managers working in complex surroundings (Harrison et al., 2019). Core principles of the theory involve accepting that any arrangement or establishment is contained and bounded by a multiple stakeholder and these stakeholders (customers) can greatly influence the establishment of the organization. It is thus imperative to have a sound comprehension of the interests of significant stakeholders to remodel an organization or an establishment with least conflict (Bridoux & Stoelhorst, 2016; Harrison & Wicks, 2013). Stakeholder analysis is mostly constructive in mapping strategic shareholders (stakeholders) of an organization as well as discovering their needs in the organization. The stakeholder analysis therefore appears to be an appropriate solution therapy for the complexity interrelated challenges of the Balanced Scorecard as a critical tool for performance management.

The Balanced Scorecard

According to several academics (Brancato, 1995; Deming, 1993; Ruben, 1999; Williams & Ceci, 1997), the fundamental mission of public universities and their academic departments and programmes is the advancement of excellence in the creation, sharing, and application of knowledge. This is usually described in terms of teaching, scholarship (research), and public service (community outreach). Fulfilling this mission requires a distinguished faculty, high-level research activities, innovative and engaging teaching-learning processes, supporting technology and quality

facilities, capable students, competent faculty and staff, and legislative and public support. Although historically less well appreciated, it also requires excellence in communication and a service-oriented culture, appropriate visibility, prominence within the state and beyond, a welcoming physical environment, a friendly, supportive and respectful social environment, accessible and effective systems and services, and a sense of community.

Specifically, the fulfilment of this mission requires successful engagement with several constituency groups. More so, the desired and potentially measurable outcome can be identified for each group such as the prospective students, current students, faculty, staff, families, alumni, employers, colleagues at other institutions, governing boards, local community, friends, interested individuals, donors and benefactors, legislators, and the public. The Balanced Scorecard approach offers an institution the opportunity to formulate a cascade of measures in order to translate the mission of knowledge creation, sharing, and utilization into a comprehensive, coherent, communicable, and mobilizing framework for external stakeholders and for one another.

The Balanced Scorecard is a performance management framework, i.e., an integrated results-oriented measurement tool, which incorporates the financial and non-financial elements that relate the vision, mission, and core beliefs of the organization with initiatives, strategies, and specific targets that are intended to produce continuous performance improvements (Beard, 2009; Cullen et al., 2003; Kaplan & Norton, 1992; Taylor & Baines, 2012; Umashankar & Dutta, 2007; Wu et al., 2011). The four-performance metrics of the Balanced Scorecard play a critical role in converting the strategies of the organization into actionable activities. Thus, the Balanced Scorecard can be employed to evaluate the performance of public universities. The tool presents a balanced performance management approach as it includes several performance indicators that can evaluate various perspectives of an organization (Taylor & Baines, 2012). According to the Balanced Scorecard approach, the financial dimensionality is a fundamental performance measure. On the other hand, the remaining three aspects, i.e., internal process, organizational capacity, and customer (in particular, students & other stakeholders) perspective, should be considered in the performance evaluations of public universities in Ghana as explained in Table 2 below.

In addition, the performance targets of many universities and other higher education institutions involve the following elements: the research impact of universities, the completion rates of students, establishment of collaborative alliances with business and the labour market, inter alia. These are critical performance indicators that are frequently and extensively being used in global competitive standard practices such as the European Quality Improvement System (EQUIS).

Table 2. The Balanced Scorecard Approach in Public Universities

Perspective	Question	Explanation
<p>Financial This perspective considers the university's productive resources and financial performance.</p>	<p>How can public universities improve their financial performance? How can they use the scarce financial resources in an efficient and effective way?</p>	<p>This perspective covers traditional measures including sales revenue (fees charged for services, etc.), research grants, costs and expenses, profitability, and return on investment.</p>
<p>Internal Business processes This involves faculty members as well as the administrative staff of the university.</p>	<p>What are the universities internal processes that can enhance the educational goals and objectives?</p>	<p>This perspective considers the internal processes and operations. This includes examining the delivery of student-centred quality education, scientific research output of faculty members, and collaboration partnerships with trade and professional bodies. This perspective also considers the internal resources, services, and facilities that are utilized by personnel in internal operations.</p>
<p>Organizational Capacity This concerns innovation, life-long learning, continuous professional development of academic and non-academic employees, and investing in skills development.</p>	<p>How can public universities improve their organizational learning to create value for students, the university, themselves, and the society as a whole?</p>	<p>This dimension takes into consideration the institutional performance through the lenses of human capital, technology, infrastructure, cultural and other capacities that are fundamental and critical towards creation and dissemination of knowledge. It considers the universities' research quality and output, the capacity to maintain a competitive advantage through the identification of training needs of faculty members, administrative staff, and other members of the university.</p>
<p>Customer focus This includes students, parents, alumni, policy makers in education, and publics.</p>	<p>What do public universities customers (stakeholders) need and desire?</p>	<p>This dimension considers organization performance from the perspective of its customers (students/other stakeholders). It focuses on the provision of courses to students and employed individuals who are furthering their education. It includes outreach and collaborative partnership agreements with external bodies such as government, business, and industry.</p>

Furthermore, the Balanced Scorecard can be utilized to evaluate the commitment of faculty members towards their employer (McKenzie & Schweitzer, 2001; Umashankar & Dutta, 2007). Despite this, Wu et al. (2011) maintained that the organizational capacity perspective of the Balanced Scorecard is associated with the employee learning, innovation, and growth. Therefore, the dimension of the universities' intangible resources as well as their intellectual assets are influenced by other dimensions, particularly the financial perspective (Taylor & Baines, 2012).

Balanced Scorecard and Organizational Performance

This study has considered the benefits of the Balanced Scorecard as a performance management system. It was observed that organizations which implemented this new management system obtained unlimited innovations in all aspects of the organization, particularly within the management team (Kaplan & Norton, 2001). This experience is the same with first time adopters who accomplished remarkable results within a relatively short time (i.e., within 12 to 24 months) when they employed the Balanced Scorecard on the organizational strategy map. Lucianetti (2010) found that the formation of strategy maps influences the effectiveness of Balanced Scorecard framework with reference to perceived benefits. It is also a fact that organizations' accomplishments cannot be attributed to new service provision or a new project financing but rather to the organization's maturity and process development. This is achieved through a performance management system that results from the implementation of the Balanced Scorecard (Kaplan et al., 2001). It is the Balanced Scorecard that combines the tangible assets with intangible assets in value-creating activities. For strategy-focused organizations, strategy implementation is probably the most critical success factor influencing corporate valuations and managerial actions.

Therefore, organisations and institutions could gain a lot from the Balanced Scorecard if they formulate strategy maps and combine that with appropriate behaviours and attitudes (Lucianetti, 2010; de Waal, 2004). The notion of organizational performance is greatly linked to strategy execution through the Balanced Scorecard. Figge, Hahn, and others (2002) have explained non-financial initiatives as critical effective factors that enrich organizational performance by deliberately linking sustainability to core strategy (Nathan, 2010).

Other factors cited as valuable factors for optimum resource allocation include planning, budgeting, and formal curriculum implementation. As Farid and Mirfakhredini (2008) have argued, the financial ingredients produce actual results in financial deliverables to enhance organizational performance. Some of these financial elements include fund raising, revenue from operations, and sound financial management. The financial perspective as an

operational management issue is therefore necessary so as to accomplish the goals and objectives of the organization (Saunders et al., 2008).

Barnes (2007) attested that Balanced Scorecard was implemented in the University of KwaZulu-Natal to accomplish the following objectives: (1) to inaugurate an ongoing system of institutional appraisal for the purpose of yearly reporting, (2) to support the yearly staff evaluation process which informs the equitable allocation of scarce resources to different academic units, and (3) to aid the institutional audit process of the university.

The study of Chen et al. (2006) focused on the application of the Balanced Scorecard to design an effective evaluation system in order to improve the performance of Chin-Min Institute of Technology (CMIT). Umashankar and Dutta (2007) recommended a Balanced Scorecard model which can be implemented in all higher education institutions and programs in India. Papenhausen and Einstein (2006) also outlined an all-inclusive and content-specific Balanced Scorecard for a business school. The results indicated that the implementation of a strategic management system requires active participation of every individual within the organization. Thus, every employee of the College should understand the strategy and apply it in the day-to-day activities in ways that contribute to the accomplishment of the strategy. Education and effective communication are critical factors in achieving these initiatives.

The study of Philbin (2011) identified how the management of universities can be improved through the adoption of an integrated performance measurement system based on the Balanced Scorecard. The study revealed specific benefits that arise from the operational use of the scorecard within the Institute which include the provision of specific information such as research and teaching capability. This information contributed to quality decision making concerning the training courses to be introduced and developed in the future.

Schobel and Scholey (2012) demonstrated the application of the Balanced Scorecard in a higher education distance learning setting and underscored the value of financial strategies for higher education at an era when many universities are concentrated on performance system of measurement linked with learning. The study showed that Higher education institutions with clear financial policies that are closely tied to educational outcomes will be uniquely positioned for success even when their funding models change.

Sim and Koh (2001) compared the Balanced Scorecard with the traditional performance measurement practices and the effect of both methods on firm performance. The findings indicated that there is a positive influence of the Balanced Scorecard and performance measurement system combined with objectives and strategies in improving firm performance. Strohhecker

(2007) investigated the effect of Balanced Scorecard on firm performance and the findings of the study revealed that the use of Balanced Scorecard shows a positive influence on organization performance. Wati and Triwiyono (2018) did a research on the relationship of Balanced Scorecard dimensions on firm performance and competitive advantage in Indonesia. The findings revealed that Balanced Scorecard is positively related to competitive advantage and organization performance.

Even though the application of the BSC in the corporate world is well documented, scant research has been reported concerning the application of the BSC in the field of education. In this paper, the effects of using the Balanced Scorecard as a performance measurement tool in accredited public universities in Ghana is empirically tested.

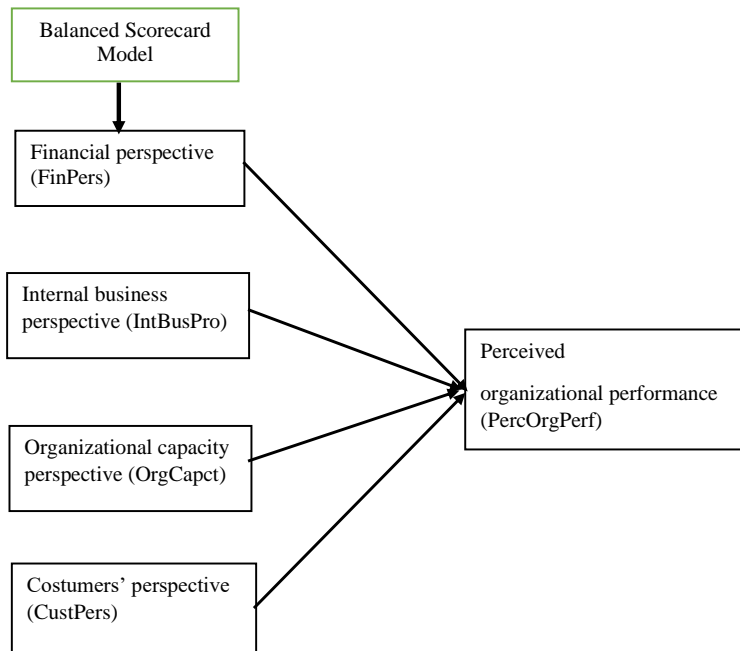
Research Hypotheses

The following set of hypotheses were used based on the survey problem and research objectives.

- H1: The Financial Perspective of the Balanced Scorecard has a positive relation on the Perceived Strategic Performance of Accredited Public Universities in Ghana.
- H2: The Internal Business Processes Perspective of the Balanced Scorecard has a positive relation on the Perceived Strategic Performance of Accredited Public Universities in Ghana.
- H3: The Organizational Capacity Perspective of the Balanced Scorecard has a positive relation on the Perceived Strategic Performance of Accredited Public Universities in Ghana.
- H4: The Customer Perspective of the Balanced Scorecard has a positive relation on the Perceived Strategic Performance of Accredited Public Universities in Ghana.

Figure 1

Conceptual Framework



Methodology

In the past, important academic literature in educational research applied Kaplan and Norton's (1992) Balanced Scorecard (Beard, 2009; Cullen et al., 2003; Taylor & Baines, 2012; Wu et al., 2011) to examine the performance management in higher education institutions (Camilleri & Camilleri, 2018). Thus, the contribution of this study adds value to the existing literature as it examines the appraisal and performance management system of Ghanaian public universities from the African context.

This section of the study consists of the methodology, sampling techniques, the instruments, and data collection tool, which is utilized in the research to explore the link of the Balanced Scorecard constituents to the strategic performance of public universities in Ghana. The research adopted a cross-sectional, descriptive survey design (the positivist paradigm) to address the objective nature of the research goals (Bell et al., 2018). Since the present study has a practical and objective perspective, the quantitative methodology was considered the most appropriate approach to accomplish the objectives of the study (Bell & Bryman, 2007; Bell et al., 2018). The objective was to show

the usefulness of the Balanced Scorecard as a performance management tool for the assessment of public universities in Ghana. Structural equation model (SEM) was utilized with SmartPLS to analyze the data collected. SEM is a comprehensive statistical method that is used to test hypotheses about relations among observed and latent variables (Hair et al., 2019). In this study, the goal was to understand the patterns of correlation/covariance among a set of variables of the BSC and organizational performance.

The relevant population for the study consisted of all public traditional universities in Ghana. According to the National Accreditation Board (NAB) of Ghana, the total number of accredited public universities in Ghana is ten (10). Thus, this study is a census survey of all public universities in Ghana. Although there are public technical universities in Ghana, there were excluded because they have been recently upgraded to the status of a university. Data were obtained from the universities staff, i.e., both academic and administrative personnel.

Table 3 shows the list of names of these universities.

Table 3. *Accredited Public Universities in Ghana (Traditional)*

No.	Institution	Nickname	Founded	Location
1	University of Ghana	LEGON	1948	Accra, Greater Accra
2	Kwame Nkrumah University of Science and Technology	KNUST	1952	Kumasi, Ashanti
3	University of Cape Coast	CAPE VARS	1961	Cape Coast, Central
4	University of Winneba, Winneba	UEW	1992	Winneba, Central
5	University for Development Studies	UDS	1992	Tamale, Northern
6	University for Professional Studies	UPS	1965	Accra, Greater Accra
7	University of Mines and Technology	UMAT	2001	Tarkwa, Western
8	University of Health and Allied Sciences	AHAS	2011	Ho, Volta
9	University of Energy and Natural Resources	UENR	2012	Sunyani, Brong Ahafo
10	Ghana Institute of Management and Public Administration	GIMPA	1961	Achimota, Greater Accra

Source: National Accreditation Board, Ghana

Data Collection and Analysis

The data collection instrument is one of the most comprehensive and fundamental parts of any scientific research. The research instrument was divided into three main parts: the demographics, which captures the profile information of respondents including the nature of work, educational qualification, and experience level. The Balanced Scorecard measures four

aspects namely, financial, internal business process, organizational capacity, and customer or stakeholder perspective. The strategic performance explains core elements of organizational performance such as growth, monitoring, and control. Integrated with the research paradigm, the survey adopted the closed-ended, structured questionnaire to ensure the impartial responses of respondents or study participants. It was a five-point Likert scale spanning from strongly disagree to strongly agree, which was valued as 1-5: 1 signifying “the least” and 5 signifying “the highest”. The survey instrument was adapted from the research documented by Baird and Su (2018) and M’maiti (2014). Items of the questionnaire were adapted based on the context and the result of the discussion with experts. The outcome was a pilot study involving fifty respondents. This pilot study was carried out to ensure the suitability and applicability of the survey instrument. The study then applied the Kaiser-varimax rotation from principal component analysis together with a confirmatory factor analysis. This was done to eliminate any tenuous variables and to maintain key drivers (Pallant, 2005). Furthermore, the reliability test was also carried out to confirm the trustworthiness of the survey instrument. All Cronbach’s alpha values were greater than 0.70, which signifies satisfactory internal consistency (Yang, 2005).

Research Findings and Discussion

The study administered questionnaires to 182 employees (Deans, Heads of Departments, Faculty members, Administrative Staff) from the 10 accredited public universities in Ghana. The demographic information of respondents was as follows:

Table 4. *Demographic Information of Respondents*

Variables	Demographic characteristics	Frequency	Percent
Study sample	Academic	95	70.9
	Administrative	39	29.1
	Total	134	100.0
Education level	PhD	64	47.8
	Master	44	32.8
	Bachelor	26	19.4
	Total	134	100.0
Experience	Below 10 years	25	18.7
	10-20 years	47	35.1
	Above 20 years	62	46.3
	Total	134	100.0

However, responses were received from 147 respondents, which represents a response rate of 81 percent. Thirteen (13) questionnaires were excluded from the statistical analysis since these questionnaires had incomplete data on the study variables. Thus, there was a total of 134 usable

questionnaires. This gave an effective response rate of seventy-four percent; (74%). This is considered representative and satisfactory to draw valid conclusions for the research.

The reliability values are indicated in Table 5. Cronbach’s Alpha (internal reliability) co-efficient was obtained for each of the study variables to ensure the trustworthiness of the research output. Tavakol and Dennick (2011) stated that Cronbach’s Alpha spans from 0.70 to 0.95, even though there are diverse reports regarding its acceptability. For this current study, the values of the Cronbach’s alpha ranges from 0.827 and 0.884, which are good enough (satisfactory) values.

Table 5. Reliability of Constructs

Constructs	Cronbach’s Alpha	Composite Reliability	Average Variance Extracted (AVE)
FinPers	0.827	0.892	0.636
IntBusPro	0.875	0.910	0.670
OrgCapct	0.798	0.861	0.555
CustPers	0.884	0.912	0.632
PercOrgPerf	0.867	0.908	0.637

Consequently, the acceptable value of convergent validity (CR) is above 0.70, while the acceptable value of the average variance extracted (AVE) is 0.50 or above (Hair et al., 2017; Hair et al., 2019; Hair et al., 2018). From the table above, the minimum value of the composite reliability is 0.861. This value is more than the normal or standard value. The minimum value of the AVE in the current study is 0.555, which is more than the minimum standard value of 0.50. Thus, both the average variance extracted and composite reliability values are up to standard.

Discriminant Validity

Discriminant validity is suitable for assessing the measure error. It is usually applied to correct the attenuation which helps to determine whether the concepts are related. The study employed the Heterotrait-monotrait ratio of correlations (HTMT) to measure the discriminant validity. Hair et al. (2019) defined Heterotrait-monotrait ratio as “the mean value of the item correlations across constructs that is relative to the geometric mean of the average correlations for the items measuring the same construct” (p.9). Discriminant validity issues arise when the HTMT values are high. Henseler et al. (2015) recommended a threshold value of 0.85 when the constructs are conceptually well-defined. According to Hair, Risher et al (2019), the heterotrait-monotrait ratio of correlations should be less than 0.85 to confirm the discriminant validity. The results of the heterotrait-monotrait values are captured in Table 6 below. All the values are less than 0.85.

Table 6. Discriminant Reliability

Constructs	FinPers	IntBusPro	OrgCapct	CustPers	PercOrgPerf
FinPers	0.797				
IntBusPro	0.710	0.819			
OrgCapct	0.488	0.412	0.745		
CustPers	0.821	0.704	0.523	0.795	
PercOrgPerf	0.723	0.563	0.561	0.650	0.798

Confirmatory Factor Analysis

The results of the confirmatory factor analysis are presented in Tables 7-11. The acceptance rule is that all the items must be less than or equal to 0.50 (≤ 0.50). Thus, all the output numbers had gone beyond the accepted value. After a thorough examination, factors such as PercOrgPerf1, OrgCapct6, and FinPers1 were omitted since 20% of total items can be deleted (Henseler et al., 2015). Furthermore, the factor loading in Table 6 shows that within the financial perspective variable, item FinPers3 is the highest (0.912) while item FinPers6 is the lowest (0.806) among the values. The IntBusPro has values ranging from 0.885 to 0.745 (Table 8). Also, the OrgCapct values of the factor loading are between 0.849 and 0.556 for OrgCapct1 and OrgCapct5, respectively (Table 9). On the other hand, CustPers has the highest value of 0.838 and the lowest value of 0.756 (Table 10). The path model is shown in Figure 2 below.

Figure 2. Path Model

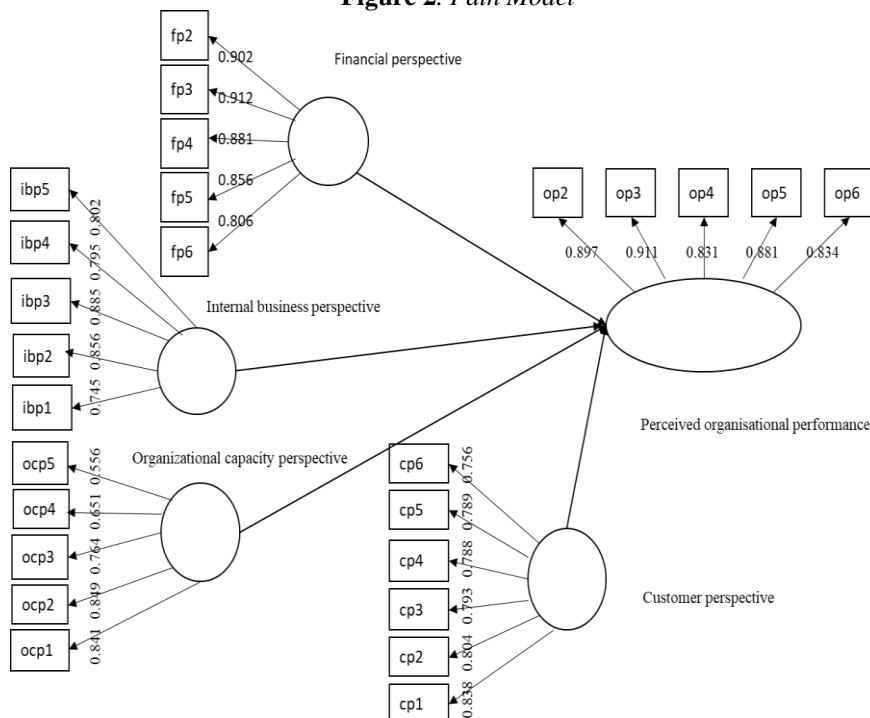


Table 7

Items	Financial Perspective
FinPers2	0.902
FinPers3	0.912
FinPers4	0.881
FinPers5	0.856
FinPers6	0.806

Table 8

Items	Internal Business Processes
IntBusPro1	0.745
IntBusPro2	0.856
IntBusPro3	0.885
IntBusPro4	0.795
IntBusPro5	0.802

Table 9

Items	Organizational Capacity Perspective
OogCapct1	0.841
OrgCapct2	0.849
OrgCapct3	0.764
OrgCapct4	0.651
OrgCapct5	0.556

Table 10

Items	Customers' Perspective
CustPers1	0.838
CustPers2	0.804
CustPers3	0.793
CustPers4	0.788
CustPers5	0.789
CustPers6	0.756

Table 11

Items	Perceived Organizational Performance
PercOrgPerf2	0.897
PercOrgPerf3	0.911
PercOrgPerf4	0.831
PercOrgPerf5	0.881
PercOrgPerf6	0.834

Results Confirmatory Factor Analysis

However, in the perceived organizational performance variable, the factor loading ranges from 0.911 and 0.831 for the highest and lowest values, respectively (Table 10). The rationale behind the test runs was to ensure that the unrelated constructs are removed in order to ensure the reliability of the dataset. Consequently, managers and organizational leaders can depend on the research results as they engage in the decision-making processes.

Path Coefficient

To investigate the likely relationship between the statistical variables in the structural equation modelling, the study verified the path coefficient weights. The results of the bootstrapping method for the structural model are illustrated in Table 12 below.

Table 12. Bootstrapping Results (direct effects)

Hypot hesis	Relationship	Standard Deviation (STDEV)	T Statistics (o/STDEV)	p-Values	Decision
H1	FinPers→PercOrgPerf	0.167	4.381	0.000	Accepted
H2	IntBusPro→PercOrgPerf	0.096	3.213	0.032	Accepted
H3	OrgCapct→PercOrgPerf	0.076	4.375	0.000	Accepted
H4	CustiPers→PercOrgPerf	0.204	3.461	0.034	Accepted

At 5% significant level (t-value \geq 1.96)

The t-values establishing relationships between the constructs are as follows: FinPers→PercOrgPerf (t = 4.381), IntBusPro→PercOrgPerf (t = 3.213), OrgCapct→PercOrgPerf (t = 4.375), and CustPers→PercOrgPerf (t = 3.461), which were found to have significant relationships.

Hypothesis 1 based on the test results is accepted. It shows the link between the financial perspective and the perceived organizational performance since the p-value is < 0.05. This means that the financial perspective of the Balanced Scorecard has a positive influence on the perceived organizational performance. The remaining three hypotheses (H2, H3, and H4) were all accepted. To be specific, all the four Balanced Scorecard perspectives have a statistically significant positive effect on perceived organizational performance. The results of this study are in line with the results of earlier studies carried out by Sim and Koh (2001), Strohhecker (2007), and Wati and Triwiyono (2013). Correspondingly, their studies generated the same findings that BSC positively influences or impacts organization performance.

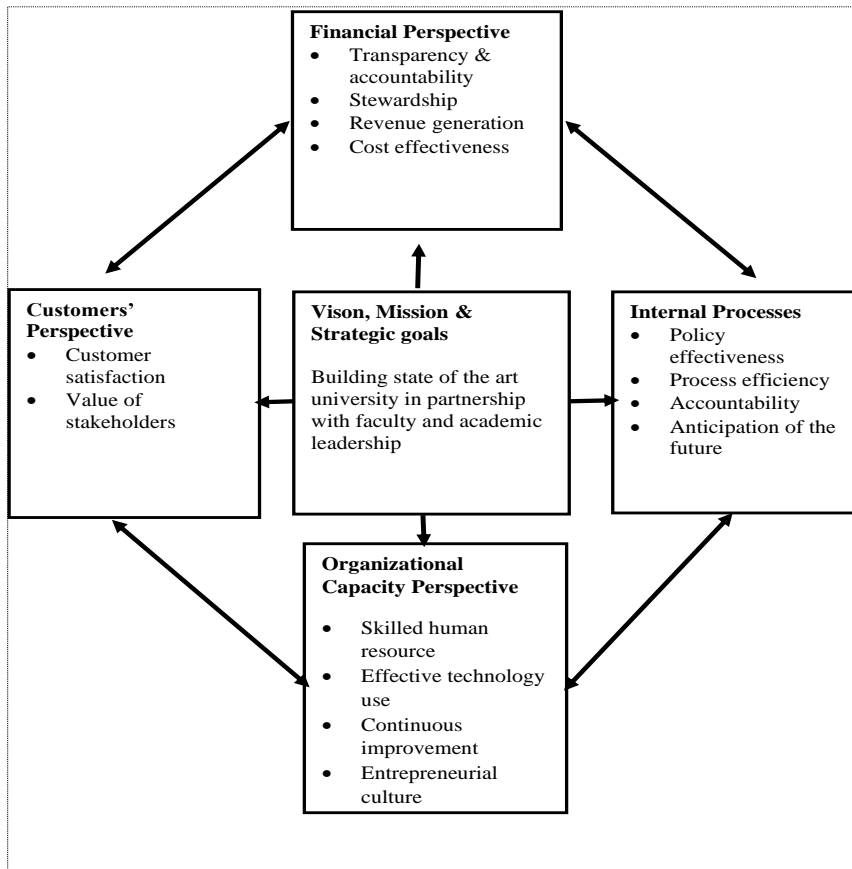
In addition, the results are important for the administrators of the ten public universities in Ghana. This will help to set a clear direction of their institutions as regards the application of the Balanced Scorecard's ideas in their various universities.

Figure 3 shows the picture of a Balanced Scorecard with each of its perspective providing a framework through which the strategic performance

within a public higher education environment can be seen. The study assumed that the four constituents of the Balanced Scorecard must align with the vision, mission, and strategic goals of the universities to allow the administrators/leadership monitor and review their strategies appropriately (Camilleri & Camilleri, 2018). Therefore, it helped to form the culture of evidence.

Figure 3

Balanced Scorecard Model



Discussion

It is clear from the results of the research that there is a statistically significant positive relationship between performance management systems and higher education institutions' performance. The results have revealed that

non-financial metrics have greater implications for employees' effective functioning in their core activities. This is so because the performance management metrics empower employees to be more responsible within their primary work domain. Subsequently, the outcomes of this study aligns with the findings of Kaplan and Norton (2004). It is therefore recommended to highlight the application of non-financial metrics alongside the financial measures to effect improvements within the internal business processes. This will in turn build a great teaching and learning environment. For instance, the success of execution of the objectives to deliver innovative and high-quality academic curricula and optimize the utilization of the universities' scarce resources can be assessed through some key performance metrics such as the number of learning opportunities, satisfaction of students towards the university's facilities, as well as the student's/teacher occupancy ratio. The results of this research also underscore organizational capacity that should be engaged as a part of repetitive and everyday exercise rather than seen as a random activity.

This study suggests that the Balanced Scorecard aids the leadership and management of Ghanaian public universities to pay attention to the financial and non-financial measures. The broad measures of the Balanced Scorecard enable university management to consider other areas of the performance of academic staff. Specifically, the financial perspective of the Balanced Scorecard includes robustness of the budgeting procedures, transparency of the financial administration system, an analysis of past financial performance, and fairness in the allocation of resources and funds (Camilleri & Camilleri, 2017; Geuna & Martin, 2003). The internal business perspective is focused on the performance of all the employees of the university, both teaching and non-teaching staff, in relation to evaluating their primary mandates. For the teaching staff, the measurement is focused on research output, teaching, and rendering service to the community in quantifiable measures (for instance, the number of manuscripts published in high-impact research journals). More so, lecturers and professors can be evaluated through several ways such as attendance and contribution in national and international conferences related to their area of specialization, contribution to local and national debates on developmental matters, participation in professional development programs, and so on. The organizational capacity component is linked to life-long learning and innovation. According to some scholars, organizational capacity entails the intellectual competences, skills development, and capabilities (Brown, 2012; Lassoued, 2018). This component of the Balanced Scorecard scans the functioning of universities based on availability and quality of infrastructure, technology transfer, quality human resources, and other resources that are required for knowledge construction and dispersal. The customer's

perspective specifically appraises the universities strategic performance based on faculty members, students and their parents, sponsors, and the Ghanaian society overall.

Furthermore, this study reviewed literature on the stakeholder theory. However, while listening to some of the participants during the survey, several points were raised which bordered on the concepts of institutional theory (DiMaggio & Power, 1983). This provides a broadening of the application of institutional theory, which gives details to some of the motivations behind certain performance management practices adopted by universities. For instance, there is a presence of political influence and the crisis of legitimacy, professionalization, and standard responses to uncertainty in the public universities in Ghana (Simpson & Aboagye-Otchere, 2014). In the future, research could be conducted to explore in depth whether the interrelationship between institutional factors and organizational leaders' interests affect the implementation of performance management systems in universities. This is because power relations between the different stakeholder groups faced by an organisation could have a considerable impact on the side of performance indicators employed.

Conclusion

Basically, this research was carried out to investigate the link between the four perspectives of the Balanced Scorecard and how it influences organizational performance within the context of Ghanaian accredited public universities. Based on the findings, it can be concluded that there is a positive and significant influence of the four Balanced Scorecard dimensions to universities performance. Nevertheless, it is important to bear in mind that the exploration of the relationship between the four perspectives of the Balanced Scorecard and the strategic organizational performance was solely on perceived basis. The operationalization and measurement did not take into consideration the different levels of the organizational hierarchy such as lower, middle, and upper levels. This was one of the constraints of the study. Therefore, it should be a caution on the part of policy makers to make allowances for this limitation during the time of decision-making.

Applying the Balanced Scorecard as a strategic management tool in the education sector is quite new in Ghana and in the African continent. There is scant research reported concerning the Balanced Scorecard usage in higher education institutions (Abdulai, 2016; Karathanos & Karathanos, 2005; Pereira & Melao, 2012). There appears to be well-recorded empirical studies in the business sector than in the field of education. Thus, this study has enriched the existing empirical literature on the application of the Balance Scorecard in the domain of higher education.

Also, the study's contribution has included a critical review of the literature where it related the increased introduction of managerialism in private and public higher education institutions. This phenomenon has unsurprisingly led to an intensified reliance on suitable performance management and appraisal of academic members of staff. Therefore, the researcher relied on four perspectives of the Balanced Scorecard to survey the academic staffs' experiences of the strategic performance appraisal process in the traditional university setting.

The Way Forward

The Balanced Scorecard has a great capacity to create value in higher education institutions. It is a strategic performance management tool that can empower universities and higher education institutions to clarify their missions and visions. Its balanced viewpoints can enhance the performance of universities since it ascertains what genuinely matters to students (customers) and other stakeholders. The Balanced Scorecard evaluates both the past and present performance. Also, its non-financial performance indicators, its objectives, and targets are wide-ranging and across the board as they provide realistic guidance for the future.

The key-performance indicators of the Balanced Scorecard as well as their incorporation into the strategic planning of universities are projected to enrich the quality and ranking of universities regarding the following: (a) the provision of student-centric education, (b) enhancing the universities research impact, and (c) fostering and intensifying outreach with stakeholders, among other goals. Inevitably, the universities' achievements in the above areas could give rise to significant advances in global rankings. Consequently, Ghanaian public universities will be able to attract more students and highly productive academia.

Suggestion for Future Research

As a way forward, there are several future research possibilities. First, there is room for further research to observe how universities make use of the Balanced Scorecard performance management tool. Currently, the Balanced Scorecard tool is not mature in the Ghanaian context. A limitation of this study was associated with methodological element. Although the research design demonstrated universal applicability and objective reality, there is still room to investigate the phenomenon subjectively. Therefore, future research works can employ qualitative methodologies and other survey designs in different settings. There is also room to carry out longitudinal studies to explore how the Balanced Scorecard and its performance system of measurements contribute towards high quality education for the sustainability and improvement of public universities. According to Simons (2000), a

performance management system cannot be successfully planned and used without considering the important element of human behaviour. Hence, it would be intriguing to do a study to find out how the attitude of employees affect the use and effectiveness of the Balanced Scorecard. Finally, this study proposes to carry out a comparative investigation between the application of the Balanced Scorecard in public and private higher education institutions to highlight the peculiarities between the two institutional arrangements.

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Resumen

La pandemia sigue afectando al componente social de las personas, debido a las restricciones, los distanciamientos y los confinamientos, provocando cambios drásticos en la forma de convivir con el entorno y en las interrelaciones laborales. Con estas perspectivas surge la necesidad de conocer y evaluar los entornos laborales durante la pandemia, con el objetivo de conocer las particularidades y conflictos que se desarrollan en esta nueva relación laboral. La educación se ha adaptado a la modalidad de teletrabajo para los docentes y de teleeducación para los estudiantes, donde ambos grupos humanos han tenido que ajustar los entornos de su residencia para desarrollar las diferentes actividades. La presente investigación tiene como propósito analizar el clima laboral en el Instituto Superior Tecnológico Juan Bautista Aguirre de la ciudad de Daule (Ecuador) durante la pandemia de covid-19; para ello se realizó una encuesta a 61 docentes voluntarios, en la cual se abordaron las dimensiones de: sentido de pertenencia, relaciones entre compañeros, satisfacción, eficacia y eficiencia, liderazgo, reconocimiento y oportunidades de desarrollo e innovación. Adicionalmente se realizó una entrevista a la máxima autoridad de la institución para conocer las perspectivas gerenciales relacionadas al clima laboral. De manera general se determinó el

promedio porcentual de las dimensiones, donde el 73% de la valoración fue positiva, mientras que el 27% fue negativa.

Palabras claves: Clima laboral, dimensiones, pandemia, valoración

Analysis of the Working Climate at the Juan Bautista Aguirre Institute of Technology in Times of Pandemic

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Abstract

The pandemic continues to affect the social component of people, due to restrictions, distancing, and confinement, causing drastic changes in the way of living with the environment and in work interrelationships. With these perspectives arises the need to know and evaluate the work environments during the pandemic, with the aim of knowing the particularities and conflicts that develop in this new employment relationship. Education has been adapted to the modality of telework for teachers and tele-education for students, where both human groups have had to adjust the environments of their residence to develop the different activities. The purpose of this research is to analyze the work environment at the Juan Bautista Aguirre Higher Technological Institute in the city of Daule (Ecuador) during the covid-19 pandemic; For this, a survey was carried out on 61 volunteer teachers, in which the dimensions of: sense of relevance, peer relationships, satisfaction, effectiveness and efficiency, leadership, recognition and opportunities for development and innovation were addressed. Additionally, an interview was conducted with the highest authority of the institution to learn the managerial perspectives related to the work environment. In general, the average percentage of the dimensions was determined, where 73% of the assessment was positive, while 27% was negative.

Keywords: Work environment, dimensions, pandemic, assessment

Introduction

Las metodologías de trabajo siguen evolucionando de la mano de las nuevas tecnologías, las cuales permiten incrementar la productividad en todos

los ámbitos dentro de la administración de una empresa o institución. Sin embargo, aún persiste un tema sin resolver, el mismo que está ampliamente abordado y es de vital importancia para el correcto desarrollo organizacional, el denominado clima o ambiente laboral. Este aspecto se sigue desarrollando de parte de muchos investigadores, sociólogos, catedráticos, gerentes y empleados de las diferentes organizaciones públicas y privadas, ya que tener un buen “ecosistema laboral” mejora todos los aspectos y procesos dentro de las mismas (Revista Líderes, 2018).

Los trabajadores poseen ideas preconcebidas sobre sí mismos y de su ambiente, las cuales reaccionan con el entorno donde trabajan, tales como su jefe inmediato, la rigidez de la estructura organizacional y las opiniones de los grupos de trabajos. Todo esto conlleva a que el desempeño de los empleados dependa del análisis objetivo de las circunstancias y las impresiones subjetivas del ambiente donde labora. Aquellas empresas o instituciones que no sean capaces de reclutar o mantener una fuerza laboral eficaz, serán aquellas que poseen menores niveles de crecimiento económico o de desarrollo institucional (Dessler & Varela, 2011).

De manera irrefutable las personas intercambian información con el medio y crean un equilibrio dinámico con él, diseñando actitudes de correspondencia con el mismo, por ello, los espacios laborales son también entornos psicológicos, en donde convergen las percepciones personales y colectivas, y de esta manera se establece la conducta organizacional de todos los trabajadores (Acosta & Venegas, 2010).

En 1968 Litwin y Stringe fueron los primeros en conceptualizar el clima laboral desde la visión perceptual de cada uno de los miembros de una empresa, quienes establecieron que dicho ambiente es la suma de todos los elementos del entorno laboral, los cuales consiguen ser medidos de forma directa e indirecta y que pueden verse alterados por los comportamientos de los otros miembros o por las motivaciones internas. Estos autores propusieron la existencia de nueve dimensiones que explicarían el clima laboral, las cuales son: estructura, responsabilidad, recompensa, riesgo, calor, apoyo, estándares de desempeño, conflicto e identidad (Acosta & Venegas, 2010).

Uno de los grandes retos del siglo 21 es mejorar las relaciones laborales, no tan solo en sus condiciones estructurales o en lo referente a la escala salarial, sino en el ambiente que perciben las personas al realizar sus actividades habituales. Un buen ambiente genera sentimientos positivos de autorrealización mejorando la autoestima, ya que existe satisfacción de los colaboradores al saber que aportan de forma significativa a su organización, repercutiendo directamente en su calidad de vida (Bobadilla, 2017).

Se define como clima laboral las diferentes percepciones que poseen los empleados en relación con la satisfacción de las necesidades sociales y del buen sentimiento de la labor que realiza, por lo tanto, el análisis crítico del

ambiente laboral permite interpretar las situaciones para posteriormente reorientar las acciones, con el propósito de lograr la satisfacción de los involucrados (Moreno & Pérez, 2018).

Un buen ambiente de trabajo crea en los colaboradores un sentido de identidad y pertenencia, generando un compromiso más amplio con la organización, donde las reglas estrictas son un factor secundario para la realización de las actividades. Esto confluye en la creación de un capital social humano con elevadas características laborales, quienes buscan constantemente el bienestar para la organización y en las relaciones interpersonales. Lo anteriormente indicado no niega los posibles conflictos, sino que las posiciones individuales suelen mimetizarse a través de los intereses colectivos (Daft, 2011).

El clima laboral no es un factor homogéneo ni estático dentro de una organización, donde existen “microclimas” en cada uno de los diferentes departamentos, por lo tanto, la suma de todos los microclimas corresponde al clima organizacional. Dentro del mismo sobresalen aspectos como la multidimensionalidad y la sectorialidad, el primero hace referencia a la diversidad de aspectos que componen el clima, mientras que el último hace relación a la variabilidad existente dentro de una misma unidad administrativa (García, 2006).

Dentro de una organización los individuos se comportan de acuerdo con los estímulos internos y externos percibidos, los cuales inciden en la productividad, en el sentido de pertenencia, en la calidad del servicio, en la efectividad, en su eficacia y en el impacto social que se genera. De manera general, el clima laboral afecta de manera positiva o negativa en el desempeño de toda la organización, de tal manera que se busca reducir los posibles conflictos entre la parte administrativa y la operativa (Salazar et al., 2009). El clima laboral no es una moda reciente, sino que es una preocupación recurrente de las instituciones, el mismo se constituye como un elemento de la calidad laboral de sus trabajadores, pero que ha tomado nuevas connotaciones a partir de la pandemia que se inició en el 2020, debido a que muchos trabajadores cambiaron su forma laboral de la presencialidad a la virtualidad (teletrabajo), por lo tanto, existen nuevas particularidades que se deben establecer para conocer el “clima laboral” desde la virtualidad de las actividades. Por ello, la investigación analiza la percepción del clima laboral de los docentes del Instituto Superior Tecnológico Juan Bautista Aguirre de la ciudad de Daule, a partir de la aplicación de una entrevista a la máxima autoridad institucional y en el desarrollo de una encuesta basada en varios elementos del cuestionario de clima organizacional de Litwin y Stringer (1968) y en las dimensiones de Bizneo (2021), Litwin y Stringer (1968) y de Patterson et al. (2005).

Metodología

El enfoque de la investigación es mixto, debido al análisis de los porcentajes proporcionados por la aplicación de encuestas a 61 docentes voluntarios del Instituto Superior Tecnológico Juan Bautista Aguirre, y a la realización de la entrevista a la doctora Ida Campi Mayorga, quien se desempeña como máxima autoridad de la institución objeto de estudio. Esta investigación tomó elementos de los estudios realizados por Miguel (2020).

El diseño es no experimental con elementos longitudinales de evolución de grupo (docentes). La información para el análisis del clima laboral proviene de fuentes primarias (entrevista a la autoridad institucional objeto de estudio y a las encuestas proviene de los docentes), las cuales se realizaron a través de Google Forms (encuestas) y de la plataforma Zoom (entrevista).

Las preguntas aplicadas son las siguientes:

1 ¿Se siente bien en su trabajo?

- Si
- A veces
- No

2 ¿Siente plena satisfacción laboral bajo la modalidad virtual?

- Si
- A veces
- No

3 ¿Qué modalidad laboral prefiere?

- Presencial
- Virtual

4 ¿Cuál es su nivel de satisfacción de manera regular mientras realiza las labores docentes?

- Muy satisfecho
- Satisfecho
- Neutro
- Insatisfecho
- Muy insatisfecho

5 ¿Cuál es su nivel de satisfacción de manera regular mientras realiza las labores administrativas?

- Muy satisfecho
- Satisfecho
- Neutro
- Insatisfecho
- Muy insatisfecho

6 ¿Tiene claro lo que se espera de su trabajo?

- Si

- A veces
 - No
- 7 ¿Considera que su esfuerzo ha tenido el justo reconocimiento?
- Si
 - A veces
 - No
- 8 ¿Los objetivos de la institución reflejan sus intereses?
- Si
 - No
- 9 ¿Considera que la carga laboral docente es la idónea para usted?
- Si
 - No
- 10 ¿Las directrices para realizar un determinado trabajo asignado son claras?
- Si
 - A veces
 - No
- 11 ¿Los plazos dados para realizar y entregar un trabajo están proporcionalmente establecidos?
- Si
 - A veces
 - No
- 12 ¿Existe flexibilidad para la entrega de trabajo atrasado que le fue asignado?
- Si
 - A veces
 - No
- 13 ¿De manera regular es interrumpido en sus horas fuera de la jornada laboral?
- Si
 - A veces
 - No
- 14 ¿Considera que el clima laboral de la institución se ha deteriorado durante la pandemia?
- Si
 - No
- 15 ¿Existe un ambiente de cordialidad que permita la retroalimentación constante entre las autoridades y compañeros?
- Si
 - A veces
 - No

16 ¿Cree que tiene oportunidades para crecer profesionalmente en la institución?

- Si
- No

17 ¿Su jefe directo es justo en sus decisiones?

- Si
- A veces
- No

18 ¿Ha tenido oportunidades de innovar en su trabajo?

- Si
- A veces
- No

19 ¿Considera que existen sesgos de parte de las autoridades para favorecer a ciertas personas?

- Si
- No

20 ¿Existe una buena relación con sus compañeros de trabajo?

- Si
- A veces
- No

21. De manera general el clima laboral de la institución es

- Muy satisfactorio
- Satisfactorio
- Regular
- Malo
- Muy Malo

El alcance es descriptivo, donde no se profundiza en las causas – efectos de los resultados en cada una de las dimensiones, sino que se toma una postura imparcial sobre el clima laboral óptimo (presencial o virtual).

Para analizar y procesar la información se elaboraron tablas y gráficos estadísticos que representan los porcentajes de cada dimensión. La encuesta constaba de 21 preguntas y se utilizó la escala de Likert para determinar el grado de preferencia en cada una de las preguntas. Para determinar los niveles porcentuales positivos y negativos de cada dimensión, se estableció la siguiente valoración:

Tabla I. Valoración positiva o negativa de las diferentes escalas usadas en la encuesta

Escala	Emotición usado en encuesta	Valoración	Observaciones
Si		Positiva	La pregunta 3 fue excluida para determinar la valoración de la dimensión satisfacción. En las preguntas 13, 14 y 19, se consideró como positivo a los porcentajes de las respuestas con “no”
A veces		División entre positiva y negativa	
No		Negativa	
Muy satisfecho		Positiva	
Satisfecho		Positiva	
Neutro		División entre positiva y negativa	
Insatisfecho		Negativa	
Muy insatisfecho		Negativa	

A través de los promedios de los porcentajes de cada una de las dimensiones se estableció la valoración positiva y negativa, proyectándose dicho valor como el indicador numérico para el clima laboral.

Tal como fue mencionado anteriormente, el análisis del clima laboral en el Instituto Superior Tecnológico Juan Bautista Aguirre se basó en las dimensiones de Bizneo (2021), Litwin y Stringer (1968) y de Patterson et al. (2005), dado que existen paralelismos entre sus elementos y las particularidades del desarrollo laboral de los docentes en la institución objeto de estudio durante el confinamiento por la pandemia de covid-19. El establecimiento de las dimensiones permitió la estructuración de las encuestas aplicadas. Siendo las siguientes dimensiones analizadas:

Dimensiones del Clima Laboral



Figura 1. Dimensiones establecidas para medir el clima laboral en el ISTJBA. Fuente: los autores

Las características que considera de cada dimensión son las siguientes:

1. Sentido de pertenencia: compromiso del colaborador con la institución, donde los objetivos de esta son considerados como propios.
2. Relaciones entre compañeros: percepción de bienestar y cordialidad en las relaciones sociales entre los miembros de la institución.
3. Satisfacción: sentimientos de bienestar al realizar las actividades inherentes al trabajo.
4. Eficacia y eficiencia: percepción de la capacidad para realizar una actividad de forma clara, dentro de plazos establecidos y extendidos.
5. Liderazgo: percepción de la capacidad en la toma de decisiones de parte de las autoridades, de forma ordenada y justa.
6. Reconocimiento: conocimiento de la valía que le otorga la institución a las personas.
7. Oportunidades de desarrollo e innovación: percepción del crecimiento personal y permeabilidad institucional para establecer diferentes opciones laborales.

Adicionalmente las dimensiones fueron divididas en internas, neutras y externas, definiéndose los criterios para esta agrupación de la siguiente manera:

1. Interna: son aquellas percepciones que de manera general se establecen dentro de la psiquis de las personas, las cuales pueden ser modificadas por las dimensiones externas.
2. Neutra: aquí se consideró la dimensión de eficacia y eficiencia, debido a que las opiniones de esta pueden ser moldeadas de forma rápida por las dimensiones internas y externas.
3. Externa: las dimensiones externas son los estímulos que captan las personas en las diferentes interrelaciones que desarrollan, básicamente es la percepción de las condiciones que diseñan terceros para desarrollar su trabajo.

Todas las dimensiones son dinámicas, por lo tanto, las percepciones dentro de un lapso de tiempo pueden ser alteradas de manera significativa en diferentes fechas o circunstancias.

En base a la anterior clasificación se separaron las preguntas de la encuesta:

Tabla II. Clasificación de las preguntas por cada dimensión

Dimensiones		Preguntas
Interna	Sentido de pertenencia	6, 8
	Relaciones entre compañeros	15, 20
	Satisfacción	1, 2, 3, 4, 5, 14
Neutra	Eficacia y eficiencia	9, 10, 11, 12
Externa	Liderazgo	13, 17, 19
	Reconocimiento	7
	Oportunidades de desarrollo e innovación	16, 18

Resultados

A continuación, se detalla el análisis por cada una de las dimensiones.

Dimensiones internas

El sentido de pertenencia promueve la proyección de la filosofía institucional en los colaboradores hacia el exterior, de tal manera que se identifican con la misma y logran un mejor desempeño de las funciones (Jurado, 2014). Los resultados estratificados por la dimensión de sentido de pertenencia indican que el 67,2% de los docentes tiene definido de manera específica lo que se espera de su labor docente, por su parte el 80,3% de los encuestados se ven identificados con los objetivos institucionales (tabla III).

Este sentido de pertenencia proviene de varios elementos internos, no exclusivamente de los mencionados en este apartado, sin embargo, el nivel de este varía según la sensación de seguridad que experimentan las personas al realizar sus actividades, esto conduce a que se busquen conductas que permitan ocupar o mantener un determinado lugar dentro de la institución (Chiavenato, 2009).

Tabla III. Resultados de la dimensión interna sentido de pertenencia

¿Tiene claro lo que se espera de su trabajo?		
Sí	A veces	No
67,2%	29,5%	3,3%
¿Los objetivos de la institución reflejan sus intereses?		
Sí	No	
80,3%	19,7%	

Tal como fue mencionado anteriormente, para la valoración de los niveles positivos y negativos de cada una de las preguntas, se consideró positivo a los porcentajes con las respuestas afirmativas y negativas a los porcentajes opuestos (con las excepciones mencionadas en la metodología), mientras que los valores neutros (a veces) fueron divididos en partes iguales y asignados a los niveles positivos y negativos. La valoración de la dimensión fue establecida mediante el promedio de los valores positivos y negativos de cada pregunta que componen dicha dimensión.

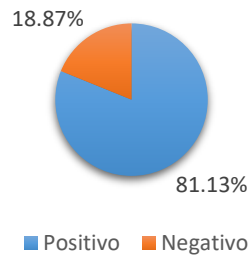


Figura 2. Valoración de la dimensión sentido de pertenencia

Esto evidencia que existe un alto sentido de pertenencia entre los miembros de la comunidad educativa de la institución objeto de estudio. Esta dimensión crea el compromiso entre los colaboradores y la institución, en eso radica su importancia.

La dimensión de relación entre compañeros es una de las más analizadas por los diferentes investigadores, ya que estas relaciones permiten crear vínculos sociales que fomentan la colaboración grupal para un determinado objetivo. Los altos niveles de compañerismo están directamente relacionados con los niveles de armonía interna, donde prevalece la comunicación, la confianza, la retroalimentación, etc.

Surge la pregunta ¿es posible crear o mantener relaciones sanas entre compañeros laborales en la virtualización de las relaciones sociales? Para ello, hay que interiorizar en los elementos que permiten mantener o crear este tipo de relaciones sociales. En este factor tampoco existe un consenso claro para identificar de manera precisa cuáles podrían ser los elementos, sin embargo, para el presente análisis se consideró la retroalimentación y las buenas relaciones de forma general (respeto, comprensión, amabilidad, y comunicación).

El 50,8% de los docentes consideran que existe cordialidad en la institución, la misma que permite la retroalimentación entre las autoridades y sus pares. El 41% estimó que únicamente a veces existe este ambiente (tabla IV). Esto supondría que la comunicación virtual no permite crear una atmósfera de cordialidad para dicha retroalimentación. Posiblemente se debe a que la interrelación por los medios tecnológicos es puntual y no se llega a profundizar en elementos que permiten conocer la perspectiva de los pares, en otras palabras, existe comunicación unidireccional que no permite la retroalimentación, donde las personas se transforman en oidores de las disposiciones de la gerencia o de las autoridades.

A nivel horizontal, la relación de compañerismo es percibida de manera favorable en 83,6% de los encuestados, lo que indicaría que las relaciones de compañerismo y de amistad se han mantenido (incluso aumentado) durante la pandemia. Esto se debe presumiblemente a factores

como la conectividad a través de plataformas sociales que son significativamente superiores, las cuales promueven relaciones informales que son características de la amistad, o debido a que los niveles de conflictividad de manera virtual son inferiores a los niveles de conflictividad de forma presencial (Condella, 2012).

Tabla IV. Resultados de la dimensión interna relación entre compañeros

¿Existe un ambiente de cordialidad que permita la retroalimentación constante entre las autoridades y compañeros?		
Sí	A veces	No
50,8%	41%	8,2%
¿Existe una buena relación con sus compañeros de trabajo?		
Sí	A veces	No
83,6%	16,4%	0

La valoración positiva y negativa de la dimensión relación entre compañeros es:

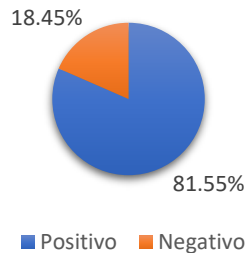


Figura 3. Valoración de la dimensión relación entre compañeros

Esta dimensión también es alta, lo cual demuestra que existe una elevada relación entre compañeros de la institución, y que es favorable la interacción durante la pandemia a través de las redes sociales informales.

En la dimensión de satisfacción se estimaron numéricamente varios aspectos, por ejemplo, la sensación de bienestar (al momento de efectuar la encuesta) equivalió al 80,3%, la satisfacción en la realización de las actividades a través de la modalidad laboral virtual fue del 50,8%, la preferencia en relación al tipo de modalidad laboral fue por la virtual en un 55,7%, la satisfacción mientras se ejecutan actividades docentes es del 50,8%, mientras que este porcentaje cae al 34,4% al realizarse actividades administrativas, finalmente la mayoría de las personas (54,1%) consideran que no se ha deteriorado el ambiente laboral durante la pandemia (tabla V).

El porcentaje de personas que prefieren la modalidad laboral virtual es del 55,7%. Esta misma pregunta fue abordada meses antes por Méndez et al. (2020) en la misma institución, teniendo como preferencia la modalidad presencial con un 64,6%; lo que indicaría que a medida que transcurre el tiempo, un mayor número de docentes prefiere realizar sus actividades docentes y administrativas desde su hogar.

También resalta que la satisfacción en las actividades de docencia es superior a la satisfacción en las actividades administrativas. Estas últimas corresponden a realización de syllabus, planes analíticos, informes de seguimiento, informes finales, informes como directores o gestores departamentales, informes como coordinadores o gestores de la coordinación, entre otros. Este bajo nivel de satisfacción podría corresponder a que las actividades administrativas son ejecutadas fuera de las jornadas laborales (presumiblemente), o debido a la rutina que representa poder realizarlas.

Tabla V. Resultados de la dimensión interna satisfacción

¿Se siente bien en su trabajo?				
Sí	A veces		No	
80,3%	19,7%		0	
¿Siente plena satisfacción laboral bajo la modalidad virtual?				
Sí	A veces		No	
50,8%	42,6%		6,6%	
¿Qué modalidad laboral prefiere?				
Presencial		Virtual		
44,3%		55,7%		
¿Cuál es su nivel de satisfacción de manera regular mientras realiza las laborales docentes?				
Muy satisfecho	Satisfecho	Neutro	Insatisfecho	Muy insatisfecho
50,8%	37,7%	11,5%	0	0
¿Cuál es su nivel de satisfacción de manera regular mientras realiza las laborales administrativas?				
Muy satisfecho	Satisfecho	Neutro	Insatisfecho	Muy insatisfecho
34,4%	31,1%	26,2%	6,6%	1,7%
¿Considera que el clima laboral de la institución se ha deteriorado durante la pandemia?				
Sí		No		
45,9%		54,1%		

La valoración positiva y negativa de la dimensión satisfacción es:

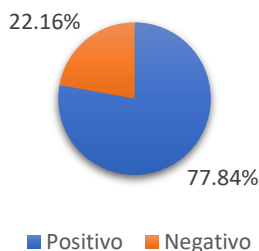


Figura 4. Valoración de la dimensión satisfacción

Cabe mencionar que no se tomaron en cuenta los porcentajes de la pregunta 3, ya que no es posible indicar alguna preferencia como positiva o negativa.

En esta última dimensión interna la valoración es positiva, lo cual indica que existe una elevada satisfacción de los docentes en la realización de las actividades laborales.

Dimensión neutra

La eficacia es entendida como la consecución de metas, los logros de los objetivos propuestos, evidenciándose una capacidad administrativa para alcanzar los resultados, de tal manera que impactan en la productividad y en la efectividad de un equipo de trabajo. La eficiencia es el criterio económico que revela la capacidad administrativa de producir el máximo resultado con el mínimo de recurso, energía y tiempo, por lo que optimiza la utilización de los recursos disponibles para la obtención de resultados deseados (Rojas et al.,2018). Esta dimensión analiza desde el punto de vista de los colaboradores, los logros alcanzados vs los recursos empleados (incluyéndose la flexibilidad).

La eficacia y eficiencia fue determinada como la única dimensión neutra, indagándose en la percepción sobre la carga laboral, donde el 78,7% estimó que es la correcta, por su parte el 39,3% considera que las directrices son dadas de manera clara, el 49,2% menciona que los plazos son los adecuados para la realización de las actividades laborales y el 70,5% indica que existe flexibilidad para entregar asignaciones atrasadas (tabla VI).

Tabla VI. Resultado de la dimensión neutra eficacia y eficiencia

¿Considera que la carga laboral docente es la idónea para usted?		
Sí	No	
78,7%	21,3%	
¿Las directrices para realizar un determinado trabajo asignado son claras?		
Sí	A veces	No
39,3%	55,8%	4,9%
¿Los plazos dados para realizar y entregar un trabajo están proporcionalmente establecidos?		
Sí	A veces	No
49,2%	41%	9,8%
¿Existe flexibilidad para la entrega de trabajo atrasado que le fue asignado?		
Sí	A veces	No
70,5%	27,9%	1,6%

La valoración positiva y negativa de la dimensión eficacia y eficiencia es:

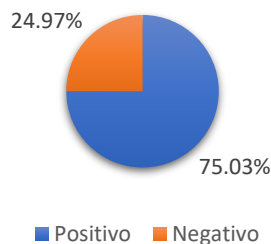


Figura 5. Valoración de la dimensión eficacia y eficiencia

La valoración en la dimensión eficacia y eficiencia indicaría que existe proporcionalidad entre las actividades, las directrices y los plazos, además de flexibilidad en la entrega de las asignaciones laborales.

Dimensiones externas

El liderazgo organizacional es el proceso mediante el cual una persona influye en otros para lograr los objetivos comunes a corto y largo plazo. Esta característica puede ser aprendida, sin embargo, las habilidades y conocimientos pueden ser influenciados por las creencias, los valores, la ética y el carácter (Cuartas, 2010). En base a lo anterior se indagó sobre la percepción de liderazgo proyectado en la institución objeto de estudio, donde el 39,3% de las personas indica que son interrumpidos regularmente fuera de sus horas laborales (tabla VII), existiendo una clara violación a la “Ley de Apoyo Humanitario” que fue aprobada en el año 2020 en Ecuador, donde se menciona que “*el empleador debe respetar este derecho (de la desconexión), garantizando el tiempo en el cual el colaborador no estará obligado a responder sus comunicaciones, órdenes u otros requerimientos*” (El Comercio, 2020), esta desconexión deberá ser de al menos 12 horas continuas, en un período de 24 horas. Es importante señalar que el 63,9% de los encuestados considera que su jefe directo es justo en la toma de las decisiones, mientras 55,7% indica que existen sesgos de las autoridades para beneficiar a ciertas personas.

Tabla VII. Resultado de la dimensión externa liderazgo

¿De manera regular es interrumpido en sus horas fuera de la jornada laboral?		
Sí	A veces	No
39,3%	47,5%	13,2%
¿Su jefe directo es justo en sus decisiones?		
Sí	A veces	No
63,9%	34,4%	1,7%
¿Considera que existen sesgos de parte de las autoridades para favorecer a ciertas personas?		
Sí	No	
55,7%	44,3%	

La valoración positiva y negativa de la dimensión liderazgo es:

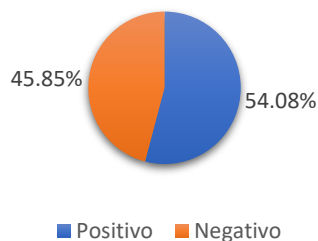


Figura 6. Valoración de la dimensión liderazgo

Se consideró en esta dimensión la interrupción de las horas de descanso, dado que las decisiones son tomadas por los jefes inmediatos o por las autoridades institucionales.

La valoración del liderazgo es positiva, sin embargo, los factores negativos se encuentran próximos al margen de error del 5%, es decir, matemáticamente son valores diferentes, pero estadísticamente son iguales. Por lo tanto, se debe fortalecer esta dimensión dentro de la institución.

El reconocimiento laboral es una dimensión fundamental para que los colaboradores se sientan parte de la institución, proporcionándole una satisfacción personal que les hace desarrollar su trabajo de forma positiva. Según Gitman y Mc. Daniel (2008) el reconocimiento laboral es una retroalimentación, donde se motiva y refuerza positivamente a los empleados, ya que estos necesitan conocer que están realizando un buen desempeño en sus funciones.

El 44,3% de los docentes considera que han recibido el justo reconocimiento de su esfuerzo, mientras que el 37,7% menciona que en ocasiones lo ha recibido (tabla VIII).

Tabla VIII. Resultado de la dimensión externa reconocimiento

¿Considera que su esfuerzo ha tenido el justo reconocimiento?		
Sí	A veces	No
44,3%	37,7%	18%

La valoración positiva y negativa de la dimensión reconocimiento es:

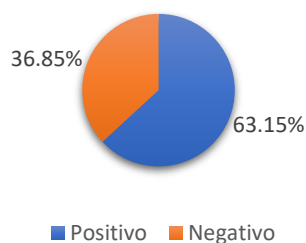


Figura 7. Valoración de la dimensión reconocimiento

La valoración de la dimensión reconocimiento es positiva, donde se infiere que las autoridades reconocen el esfuerzo de todos los miembros de la institución educativa.

Las oportunidades para el desarrollo profesional efectivo mejora la satisfacción de las personas, eleva su autoestima, permite reducir el estrés y fortalece la salud psicológica y física de los colaboradores o empleados. Este desarrollo profesional dentro de la institución beneficia a ambas partes, ya que los empleados se adaptan de manera más rápida y mejor a las necesidades, y la organización mejora los niveles de productividad y se crean las condiciones para la innovación (Inesem, 2018).

El 78,7% de los encuestados considera que existen las condiciones necesarias para crecer profesionalmente en la institución, mientras que el 63,9% estima que pueden realizar innovaciones dentro de sus funciones laborales (tabla IX).

Tabla IX. Resultado de la dimensión externa innovación

¿Cree que tiene oportunidades para crecer profesionalmente en la institución?		
Sí	No	
78,7%	21,3%	
¿Ha tenido oportunidades de innovar en su trabajo?		
Sí	A veces	No
63,9%	29,5%	6,6%

La valoración positiva y negativa de la dimensión oportunidades de desarrollo e innovación es:

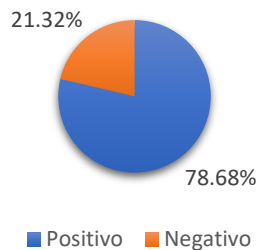


Figura 8. Promedio de las valoraciones positivas y negativas de las siete dimensiones

La dimensión oportunidades de desarrollo e innovación tiene una puntuación general determinada como alta, con ello se deduce que existen las condiciones internas para que los colaboradores puedan crecer profesionalmente y crear mecanismos que terminen en innovaciones.

Con los porcentajes anteriormente indicados, se diseña el siguiente gráfico donde se detallan las valoraciones positivas y negativas de cada una de las dimensiones:

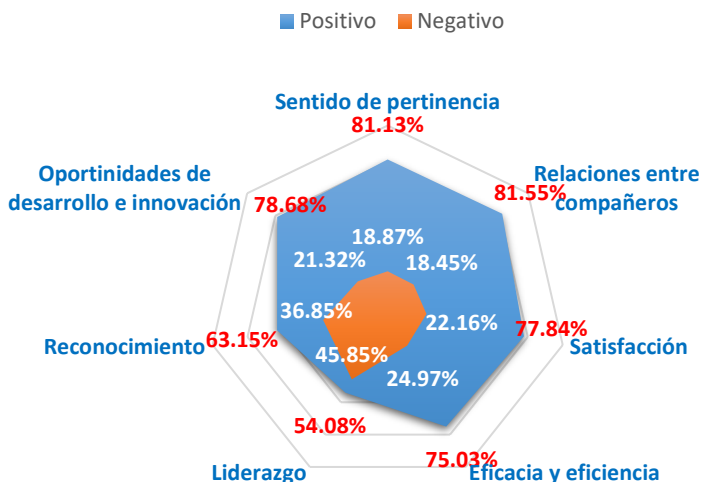


Figura 9. Resumen de las valoraciones de cada una de las dimensiones

La valoración final entre las siete dimensiones es la siguiente:

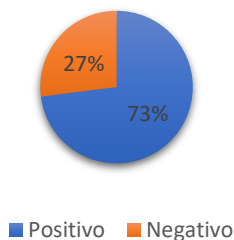


Figura 10. Valoración de las 7 dimensiones

Finalmente, se les preguntó a los docentes participantes sobre su percepción del actual clima laboral institucional. El 54,1% lo estimó como satisfactorio, el 24,6% como muy satisfactorio y el 21,3% como regular (figura 11).

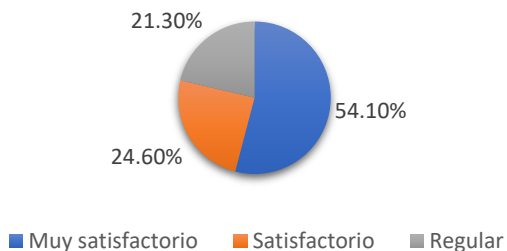


Figura 11. Clima laboral de manera general según los docentes participantes

Entrevista a la autoridad máxima de la institución

La doctora Ida Campi Mayorga, rectora de la institución concedió una entrevista el jueves 25 de marzo, donde se resaltan los siguientes comentarios en los diferentes ejes abordados:

- Valores de un líder: el compromiso y la responsabilidad son los principales valores que debe tener un líder institucional, donde no se descartan otros tipos de valores, no obstante, sobre estos dos giran los demás, los cuales consienten buenos resultados de manera colectiva.
- Sostenimiento del buen liderazgo en medio de la pandemia: la transformación de los hábitos laborales repercutió de manera significativa en la institución, donde el equipo docente pudo responder de manera positiva a las nuevas exigencias, sin embargo, en la parte operativa debido a las restricciones de movilidad, estas afectaron las operaciones normales de la institución (no significativamente). Todo esto demuestra que no existe una receta única para mantener un liderazgo, sino que él mismo es la suma de todos los esfuerzos internos.
- Calidad laboral en teletrabajo: no se considera que la realización de las actividades laborales dentro del hogar haya afectado en la calidad. Las actividades propias del hogar (principalmente en las mujeres) son un factor que pueden generar estrés en las personas, pudiendo sentirse agobiados por la combinación de las actividades del hogar y laborales, pero con la particularidad que ambas convergen en el mismo espacio, ya que ahora no existe la barrera física que delimita ambas acciones.
- Las actividades virtuales y calidad laboral: en las actuales circunstancias no podría identificarse que la calidad laboral es peor o mejor, sino que podríamos hablar del grado de adaptación laboral, ya que no existen parámetros previos que permitan evaluar las actividades presenciales vs las virtuales.
- Mejoramiento de las condiciones laborales: al realizarse las jornadas laborales de manera virtual, los docentes son los encargados de mejorar su entorno (hogar), de tal manera que les permita cumplir con sus actividades programadas. La institución responsable de su capital humano ha realizado varias capacitaciones virtuales en diferentes temáticas, con el objetivo de mejorar dichos entornos dentro de los hogares.
- Clima laboral en la pandemia: los elementos positivos no han disminuido, eso se evidencia a través de los diferentes resultados que la institución sigue alcanzando, a pesar de las circunstancias adversas presentadas.

Discusión

Las dimensiones que componen el clima organizacional han sido caracterizadas por muchos investigadores, no existiendo un consenso para establecerlas de manera general, ya que muchos consideran las particularidades únicas dentro de un ambiente social. Por ejemplo, Cabrera (1999) considera que los elementos que configuran el clima laboral dependen de la percepción de los miembros de esta, entre las que se encuentran las variables del ambiente físico, estructurales y las propias del comportamiento de la organización. Patterson et al. (2005), establece las siguientes dimensiones: bienestar de los empleados, autonomía, participación, comunicación, énfasis en el entrenamiento, integración, apoyo de la supervisión, formalización, tradición, flexibilidad, innovación, foco en lo exterior, reflexión, claridad, esfuerzo, eficiencia, calidad, presión, retroalimentación. Taylor y Bowers (1972), estudiaron las siguientes dimensiones laborales: apertura a los cambios tecnológicos, recursos humanos, comunicación, motivación y la toma de decisiones. Litwin y Stringer (1968), definieron a través de un cuestionario nueve dimensiones que se relacionan con las propiedades de la organización y que explicarían las principales interacciones dentro de la misma, las cuales son: estructura, responsabilidad, recompensa, desafío, relaciones, cooperación, estándares, conflictos e identidad.

En base a lo anterior, se puede inferir que la dimensionalidad en el análisis del clima laboral es algo subjetivo para cada investigador y que los elementos establecidos para medirlo varían según las particularidades existentes dentro de un lugar o ambiente. Por lo tanto, no existe un estándar de medición, sino un conjugado de elementos que se deben considerar, los cuales dependen de los factores que se desean establecer.

Para Moreira-Moreira (2016), “la importancia del clima organizacional en la formación de recursos humanos en la educación superior; se reflexiona sobre diferentes formas de determinación de este clima, el liderazgo, en donde se explora la experiencia ecuatoriana para el cambio organizacional de las instituciones de educación superior como pilar fundamental para el mejoramiento de su calidad académica”. También menciona que el análisis de los estudios del clima organizacional en la gestión del recurso docente en la educación superior permite generar información oportuna y necesaria para lograr identificar las necesidades en relación con el futuro deseado dentro de la institución, y con ello trazar las estrategias y acciones pertinentes.

En base a los enunciados anteriores, se reafirma la importancia del clima laboral en una institución de educación superior, donde los hallazgos de la presente investigación ayudan a deducir que este elemento sigue teniendo aspectos altos que ayudan a desarrollar las diferentes actividades

institucionales. Claramente la investigación realizada analizó la percepción de los docentes desde la virtualidad de las actividades, tampoco existen parámetros anteriores para comparar los resultantes entre la presencialidad y con esa nueva forma laboral, sin embargo, se infiere que la interrelación entre las personas y la institución se encuentra fortalecida a pesar de los distanciamientos físicos causados por la pandemia.

Conclusiones

En base a los fundamentos de las revisiones bibliográficas, se establecieron 7 dimensiones para determinar el clima laboral institucional, las cuales son: sentido de pertenencia, relaciones entre compañeros, satisfacción, eficacia y eficiencia, liderazgo, reconocimiento y oportunidades de desarrollo e innovación. Estas fueron subdivididas en internas, neutra y externas. Estas dimensiones tratan de abarcar las principales interrelaciones que desarrollan los docentes dentro de la institución objeto de estudio.

Luego de la aplicación de las encuestas realizadas a los docentes del Instituto Superior Tecnológico Juan Bautista Aguirre, se logró determinar que el clima laboral de la institución es satisfactorio, ya que, más de la mitad de los encuestados concordaron con esta postura. La estimación porcentual de las 7 dimensiones permitió establecer que existe una valoración positiva equivalente al 73% de las opiniones y un 27% de las percepciones fueron negativas. El primer valor representa la determinación del clima laboral a través de la estimación favorable de los porcentajes en cada una de las dimensiones analizadas. La valoración positiva más alta proviene de la dimensión relación entre compañeros, mientras que la valoración negativa más alta pertenece a la dimensión liderazgo. Al aplicarse el criterio de positividad para las opiniones de muy satisfactorio y satisfactorio en los resultados de la pregunta 21, se denota que el 78,7 % de los participantes considera como altamente favorable el actual clima laboral durante las jornadas de teletrabajo.

La entrevista con la rectora de la institución permitió conocer la percepción de la gerencia en la relación a los valores del liderazgo, la calidad laboral durante la pandemia, aportes de la institución para mejorar las condiciones laborales dentro de los hogares y en la estimación cualitativa del actual clima laboral institucional, siendo este último elemento favorable desde la visión de la entrevistada. Esto permitió contrastar la opinión de los docentes y de las autoridades de la institución objeto de estudio, donde ambos grupos estiman como positivo el clima laboral, lo que fomenta el correcto desempeño de las labores institucionales.

La investigación permitió conocer la percepción de los docentes en un “clima laboral virtual”, el mismo que lógicamente posee muchos contrastes con el presencial. Sin embargo, existen la noción generalizada que es posible mantener un ecosistema laboral positivo que permita realizar las actividades

regulares a pesar de la barrera que implica la no presencialidad. Los resultados no son comparativos con otros estudios, sino que intentan dejar la semilla teórica para futuros análisis comparativos.

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Análisis bibliométrico sobre energía solar fotovoltaica aplicada en el sector agrícola como alternativa socioambiental

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Resumen

La investigación analiza mediante la bibliometría, publicaciones relativas a la energía solar fotovoltaica aplicada en el sector agrícola mundial durante el quinquenio 2017- 2021. La metodología utilizada se ajustó a un proceso de búsqueda y revisión literaria en las principales bases de datos: Redalyc, Science Direct, SciELO y Science.gov; con 30 artículos que tratan sobre el tema, y como resultado se concluye que el mayor número de publicaciones se han realizado en China, con incremento de las publicaciones en el 2021 en Science Direct.

Palabras claves: Análisis bibliométrico, fotovoltaica, sector agrícola, base de datos, socioambiental

Bibliometric Analysis of Photovoltaic Solar Energy Applied in the Agricultural Sector as a Socio-Environmental Alternative

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Abstract

The research analyzes through bibliometrics, publications related to solar photovoltaic energy applied in the global agricultural sector during the five-year period 2017-2021. The methodology used was adjusted to a process of search and literature review in the main databases: Redalyc, Science Direct, SciELO and Science.gov; with 30 articles dealing with the topic, and as a result it is concluded that the highest number of publications have been made in China, with increased publications in 2021 in Science Direct.

Keywords: Bibliometric analysis, photovoltaic, agricultural sector, data base, socio-environmental

Introduction

El análisis bibliométrico es un procedimiento de cálculo en base a características bibliográficas observadas en la literatura publicada en los círculos científicos y académicos, que ayuda a analizar las características de la actividad científica que incluye la producción y usabilidad de la información. Para el análisis se requiere información bibliográfica completa utilizando una base de datos bibliográfica consistente en un conjunto de registros con información bibliográfica actualizada (Ardanuy, 2012).

Un estudio bibliométrico tiene por objetivo principal evaluar la elaboración de investigaciones científicas para comprender su naturaleza a través de estudios estadísticos cualitativos y/o cuantitativos, con información procesada utilizando modelos matemáticos e instrumentos informáticos para pronosticar o predecir (Rosero & Vázquez, 2018). Hoy en día el analizar publicaciones crea un eslabón elemental dentro del desarrollo de investigación, que permite apreciar la calidad de conocimiento procesado y el impacto en su entorno (Morocho, Novillo, Cevallos & Romero, 2019).

La investigación bibliométrica ofrece un amplio abanico de posibilidades para estudiantes y profesionales por su carácter interdisciplinario

y grado de dificultad, que no excluye el método descriptivo, que, aunque es de menor complejidad no es menos importante (Romaní, Huamaní & González, 2011).

La energía solar fotovoltaica es una tecnología que genera corriente continua a través de un semiconductor cuando es iluminada por un haz de fotones. Cuando la luz incide en una célula solar, denominado así al elemento fotovoltaico individual, se produce energía eléctrica, que, al momento de apagar la luz, se extingue la electricidad. Las células solares no necesitan cargarse a diferencia de las baterías. Varias células solares han estado en funcionamiento en la tierra o en el espacio durante 30 años (Montes, Fernández, Jiménez, Lecuona, Mellado, Plaza, Ramos & Sala, 2002).

Los niveles actuales de dependencia de los combustibles fósiles, la necesidad de reducir las emisiones de carbono asociadas con el uso de energía en perspectiva de desarrollar un campo tecnológico nuevo y altamente innovador, hacen que la energía fotovoltaica sea cada vez más atractiva. Estos incentivos han estimulado su crecimiento, haciendo que la industria fotovoltaica esté lista para expandirse. La competencia va en aumento ya que estas nuevas tecnologías están evolucionando permanentemente. Los sistemas solares son un 60% más baratos hoy que en la década del 90 (Piebalgs & Potočník, 2009).

Este tipo de energía puede utilizarse para satisfacer las necesidades energéticas de varias maneras, como el uso de una bomba solar fotovoltaica para regar granjas; un pulverizador y espolvoreador fotovoltaico para protección de plantas; el secador fotovoltaico para trillar materiales y limpiar granos en ausencia de vientos, así como deshidratar las futas y verduras de forma eficaz y eficiente. Todas estas actividades que utilizan energía solar en las explotaciones agrícolas incrementan la producción de cultivos, reducen pérdidas posteriores a la cosecha y mejoran los ingresos (Poonia, Jain, San & Singh, 2018).

La producción de electricidad por medio de la energía fotovoltaica no genera contaminación, tampoco emite gases efecto invernadero, ni utiliza combustibles fósiles para su funcionamiento (Ishikawa, 2002). Esta energía renovable se considera cada vez más como la opción energética del mañana, porque presenta una solución alternativa y eficaz para minimizar las emisiones de CO₂ y aminorar las compensaciones entre el medio ambiente y el desarrollo energético (Gawande & Chaudhry, 2019).

La energía solar fotovoltaica ha generado interés social debido al rápido crecimiento de la población y al aumento de la demanda de agua. Se espera que esta alternativa garantice el desempeño económico y ambiental a largo plazo de los sistemas agrícolas, permitiendo cultivos más rentables con una menor degradación de los recursos naturales (Feitosa, Lopes, Andrade, Magalhães & Freitas, 2021). Así como, de gran utilidad para los lugares de

difícil acceso a la red eléctrica tradicional, además de los menores costos en comparación al servicio que prestan (Marín, 2019).

Las revistas científicas tienen la función de dar a conocer los avances del conocimiento y ser herramientas de la investigación (Borrego, 2017). Además, sirven como mecanismo de la investigación difundida en los diferentes medios (López-Cózar, Ruiz-Pérez & Jiménez-Contreras, 2006). Es este entorno, donde los métodos de evaluación bibliométrica poseen particular importancia, ya que cuenta con requisitos básicos como la solidez, autenticidad de la medición, utilización y su reproducibilidad (Glañzel & Moed, 2012).

La presente investigación tiene como objetivo: determinar los principales países con mayor cantidad de investigaciones científicas sobre el tema, el idioma, el año de publicación y la base de datos con mayor número de artículos. El estudio consta de cuatro partes: revisión de literatura, metodología utilizada, presentación de los resultados y conclusiones.

Materiales y métodos

La metodología utilizada en este estudio, tuvo su sustento en el proceso de revisión de literatura en las bases de datos de Redalyc, Science Direct, SciELO y Science.gov. Las técnicas de observación se realizaron mediante análisis e interpretación, con un enfoque en las variables cuantitativas y cualitativas, con el propósito de determinar el grado de relevancia y originalidad del estudio.

Para este trabajo se utilizó Microsoft Excel 2016, donde los datos recopilados se sometieron al análisis y los resultados representados mediante gráficos estadísticos. El primer gráfico indica el país de origen; el segundo, el idioma y año en el que han sido publicadas; y el último, el número de artículos científicos por base de datos.

Es importante señalar que este estudio se centra en la energía solar fotovoltaica aplicada al sector agrícola, y los resultados obtenidos que permiten beneficios en el entorno socioambiental. Para el método de búsqueda de la información se utilizaron las siguientes palabras: “Energía fotovoltaica en la agricultura” o “Photovoltaic energy in agriculture”.

Resultados

Esta sección presenta los resultados del análisis bibliométrico, y responde a las preguntas planteadas en la investigación: ¿qué país alberga la mayor o menor cantidad de publicaciones? ¿en qué idioma y año se han publicado?, y ¿cuál base de datos posee el mayor número de artículos?, todas ellas formuladas en base al objetivo de la investigación.

Publicación por países de origen

En el Gráfico 1, se presenta la cantidad de artículos científicos relacionados con el tema de investigación, publicados por el país de origen.

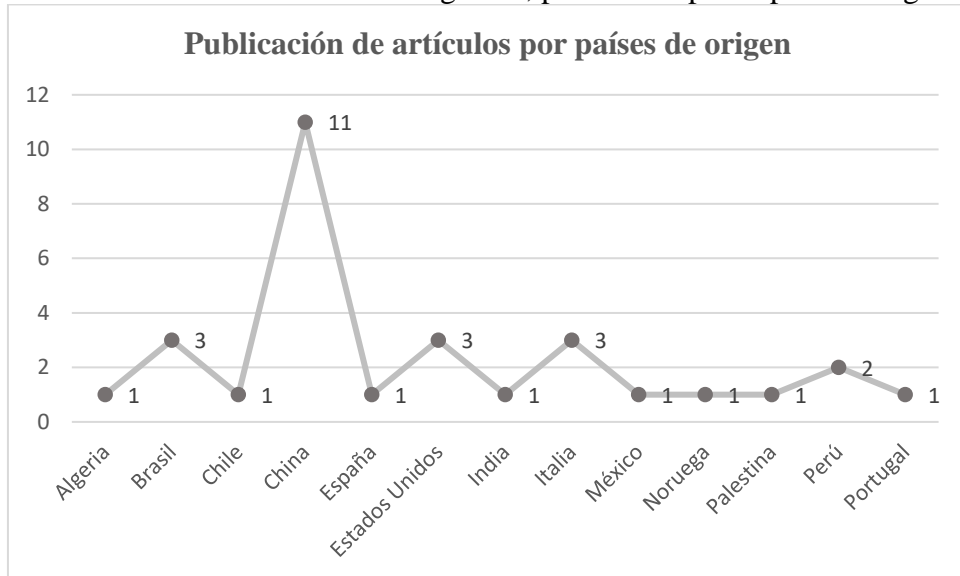


Gráfico 1. Publicación de artículos por países de origen

Fuente: los autores

China es el país con mayor cantidad de publicaciones (11), que representa el 37% del total de artículos investigados, una diferencia muy notoria contra países como Algeria, Chile, España, India, México, Noruega, Palestina y Portugal, los cuales tuvieron una cantidad menor por año (1), una aportación del 3%.

Es de resaltar que China ha obtenido logros notables en innovación y tecnología en un tiempo récord, lo que ha conmocionado a los gobiernos, empresas y sociedad civil de todo el mundo y muchos análisis se han adelantado a anunciar sobre el surgimiento de un nuevo líder mundial en innovación en las próximas décadas (Estévez, 2019).

Países como Brasil, Estados Unidos e Italia muestran un número bajo de artículos científicos (10%), pero esto no atribuye a que en otras bases de datos su cantidad sea igual de pequeña, dado que son países con potencial, tanto científico como tecnológico, y pueden tener una gama más amplia de publicaciones.

Publicación de artículos por año

En el Gráfico 2, se presenta la cantidad de artículos publicados por año, relacionados con el tema de investigación.

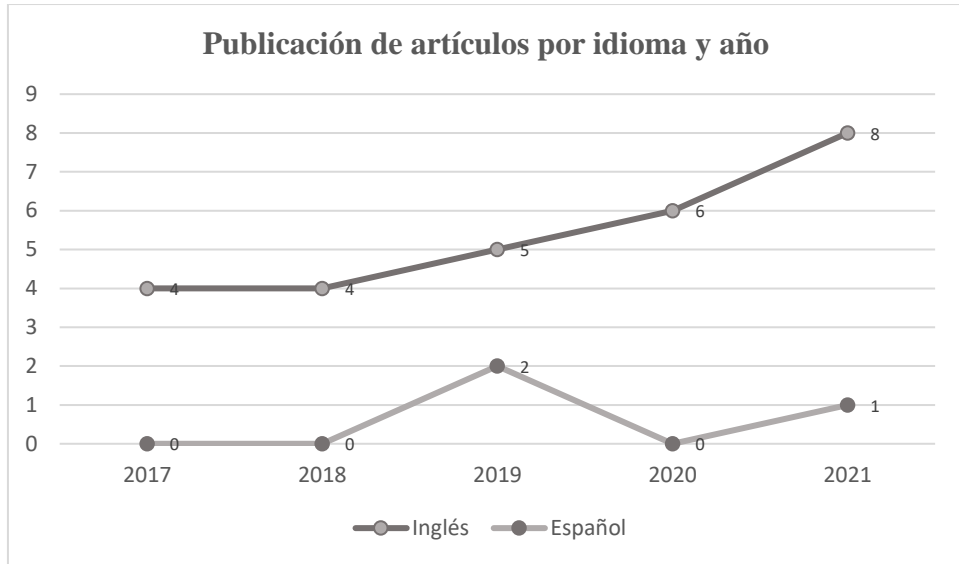


Gráfico 2. Publicación de artículos por idioma y año

Fuente: los autores

Desde el año 2018 ha existido un constante crecimiento de publicaciones en relación a la energía solar fotovoltaica, siendo 2021 el auge para este tema dentro del sector agrícola, donde los países de habla inglesa representan el 90% del total de las investigaciones.

Este crecimiento no se aprecia en el idioma hispanoamericano, por encontrarse por debajo del nivel de investigación, representando solo el 10% del total de las investigaciones.

Publicación de artículos por base de datos

En el Gráfico 3, se presenta la cantidad de artículos científicos disponibles en las bases de datos investigadas.

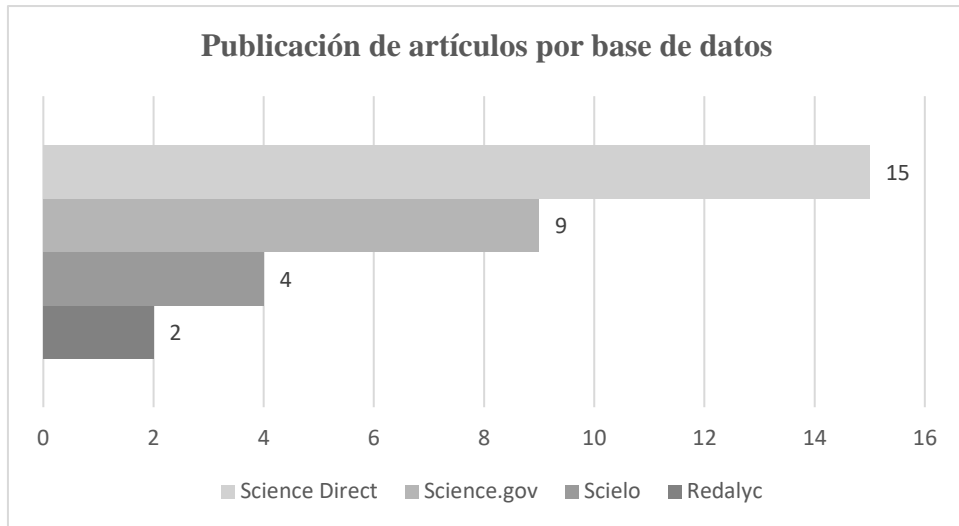


Gráfico 3. Publicación de artículos por base de datos

Fuente: Los autores

Evidentemente, Science Direct, es la base de datos que tiene una mayor aportación en cuanto al tema de la energía solar fotovoltaica (15), representando así el 50% de todos los artículos analizados.

Así mismo, Science.gov, su aporte es menor (9), que representa el 30%; la diferencia en la cantidad de publicaciones de ambas bases de datos es regular.

Por otro lado, la base de datos Redalyc, cuenta con tan solo (2), constituyendo con el 7% del total de publicaciones.

Una base de datos consta de varios objetivos, por un lado, apoya la producción de nuevos conocimientos gracias al carácter acumulativo de la ciencia respaldada en trabajos anteriores, y por otro, otorga métricas e informaciones sobre las características de resultados científicos que permiten a los encargados de la ciencia tomar resoluciones informadas (Codina, 2020). La función principal de las bases de datos es asegurar que los investigadores en cada caso tengan la información más relevante para el éxito de su estudio (Codina, 2017).

Conclusiones

Desde el año 2018 ha existido un constante crecimiento de la investigación fotovoltaica en la agricultura, demostrando así, la relevancia de las energías renovables en este sector y más en la actualidad donde son una alternativa frente a las energías convencionales.

Se observa que la mayor cantidad de aportes científicos se realiza en el idioma inglés (90%), además de que China es el país que lleva el primer

puesto, esto debido a que destina mayores recursos en investigación y desarrollo.

Se identificó que la base de datos Science Direct, abarca numerosa información sobre este tipo de energía renovable (50%), esto debido a que es la base de datos más importante actualmente, y que a diferencia de otras plataformas no requiere suscripción previa.

Las diferentes bases de datos por medio de sus editoriales, permiten que la comunidad académica y científica se beneficie de las múltiples investigaciones y descubrimientos llevados a cabo, permitiendo así el desarrollo de la sociedad en el ámbito científico.

Es muy importante que las energías fotovoltaicas sean consideradas de alta prioridad en los países dedicados al sector agropecuario, pues, al modernizarse y utilizarla, incentivarían la competitividad y sostenibilidad tanto ambiental, económica y social.

Lo que se investiga y no está escrito, o está escrito y no se publica, equivale a no investigación; en este caso, la coherencia se pierde con el tiempo y también la cantidad de información de investigadores y equipos científicos. Por lo tanto, los investigadores están obligados a publicar los resultados de sus investigaciones y a dar gracias por el apoyo financiero de agencias gubernamentales o universidades (Palomares, 2019).

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Análisis de la adquisición de vivienda a través de créditos hipotecarios con instrumentos de prorrateo de edad

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Resumen

Identificar áreas en la zona metropolitana de San Luis Potosí (ZMSLP) para la compra de vivienda usada susceptible a un crédito hipotecario, genera que las personas no tengan que adquirir alguna propiedad en zonas retiradas de su espacio de movimiento. El objetivo de este trabajo es detectar las áreas donde se han recuperado distintos tipos de edificaciones para uso habitacional por medio de un análisis de las valuaciones realizadas en los últimos meses, determinando áreas de oportunidad para la adquisición de viviendas susceptibles a reincorporarse al mercado inmobiliario. Este diagnóstico refleja la oportunidad de evaluar la posibilidad de comprar algún patrimonio mediante un producto bancario o crédito gubernamental. Estos proyectos reciben una intervención física que ayuda a disminuir su vida útil normal, mejorando sus condiciones de habitabilidad. Para esta investigación se revisaron 119 propiedades en un período de 6 meses, de las cuales solamente 35 presentaron la opción de aplicación de la tabla de prorrateo de edad con distintas características físicas y de ubicación. Esta tabla es un instrumento que se utiliza en los procesos de valuación profesional para mejorar los porcentajes de trabajo en las partidas de construcción. Los resultados de esta investigación establecen las áreas habitacionales donde se han llevado a cabo dichas intervenciones e indica las colonias donde se pueden remodelar o adecuar espacios para un segundo tiempo de uso, así como las características generales que presentan; sirviendo como vitrina para evaluar y comparar dentro de la toma de decisiones.

Palabras claves: Edad prorrateada, Valor de Reposición Nuevo, Mercado Abierto Individual, Vida Útil Normal

Analysis of Home Purchase Through Mortgage Loans with Age Apportionment Instruments

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Abstract

Identifying areas in the metropolitan zone of San Luis Potosí (ZMSLP) for the purchase of used housing susceptible to a mortgage loan, means that people do not have to acquire a property in remote areas of their space of movement. The objective of this work is to detect the areas where different types of buildings for residential use have been recovered through an analysis of the valuations carried out in recent months, determining areas of opportunity for the acquisition of homes susceptible to rejoining the real estate market. This diagnosis reflects the opportunity to evaluate the possibility of buying a patrimony through a bank product or government credit. These projects receive a physical intervention that helps reduce their normal useful life, improving their living conditions. For this research, 119 properties were reviewed in a 6-month period, of which only 35 presented the option of applying the age apportionment table with different physical and location characteristics. This table is an instrument used in professional valuation processes to improve work percentages in construction items. The results of this research establish the residential areas where these interventions have been carried out and indicate the neighborhoods where spaces can be remodeled or adapted for a second time of use, as well as the general characteristics they present; serving as a showcase to evaluate and compare within decision making.

Keywords: Prorated Age, New Replacement Value, Individual Open Market, Normal Useful Life

Introduction

Según datos del sector de la construcción de vivienda, este ramo del desarrollo económico contribuye con un 6% del PIB en México. Los desarrollos habitacionales en el país contribuyen de manera importante en el movimiento económico, detonan otros sectores mercantiles que generan

ingreso y bienestar en la población. Por lo que la compra y venta de vivienda nueva o usada forman parte de una estructura dinámica para el ejercicio de otras instituciones públicas y privadas.

El Subdirector Gerente del Fondo Monetario Internacional (FMI) comento en una de sus conferencias, “El sector inmobiliario es esencial para la economía, pero también es un sector que ha sido fuente de vulnerabilidad y crisis” (Zhu, 2014) en este sentido podemos visualizar la importancia del campo inmobiliario y sus efectos en la economía de cada país.

Los escenarios económicos actuales se tornan confusos. Los efectos de la pandemia y la baja en los precios del petróleo han golpeado severamente al gremio de la construcción. Las empresas dedicadas a la edificación de proyectos habitacionales han tenido que recurrir a distintos instrumentos financieros para lograr continuar con metas y objetivos. Las instituciones de otorgamiento de crédito Sociedad Hipotecaria Federal (SHF, 2001) han apoyado para proporcionar fondos para la gestión de créditos hipotecarios de los bancos y otras dependencias diversas. Evitar los descabros como en 1994 y 2008 donde el sector de la construcción fue afectado por el exceso en la aprobación de créditos para la adquisición de vivienda, por una falta de organismos de control y regulación, han servido como experiencia para prevenir situaciones problemáticas.

El autor Fidel Álvarez González comenta en su libro “Introducción a la Valuación de Inmuebles” en su capítulo VI de economía, escribe que, en esta se deben de establecer como se producen los distintos productos y servicios, así como determinar los diferentes mecanismos que los generan, para finalmente especificar quiénes son las personas o grupos que necesita o requieren tales insumos, por lo tanto la actividad económica es medular para continuar con el desarrollo y crecimiento, el mercado inmobiliario participa de forma trascendental, detonando operaciones mercantiles para los habitantes de cualquier sector social. (Álvarez, 2012, pág. 146)

El sector inmobiliario cada día toma mayor fuerza y se presenta más competitivo. Año tras año, surgen nuevas empresas constructoras con mejores estrategias de mercado y dominio en el manejo de los créditos hipotecarios. Y precisamente los procesos de otorgamiento de créditos son un tema fundamental para los jóvenes, quienes actualmente analizan la posibilidad de obtener alguno.

Como se menciona en el libro de “Phoenix, Valuación Inmobiliaria” referente al tema del mercado inmobiliario, en él se describe que “En el intervienen un conjunto de compradores potenciales con la necesidad de satisfacer la adquisición, venta o disfrute de un bien inmueble” (Cordova, 2017, pág. 10) siendo así un menester la compra de un bien inmueble en un momento determinado, por alguna persona, con el objetivo de poseer un patrimonio,

tarde o temprano las personas estudian la posibilidad de adquirir un espacio propio para vivir.

La actividad valuatoria evoluciona cada día, nuevos sistemas, aplicaciones se ofrecen para mejorar el ejercicio y la práctica. El compromiso del valuador representa retos nuevos, actualización constante para ser pieza clave en el desarrollo económico de su localidad.

“No obstante la alta responsabilidad del profesional de la valuación, del desarrollo de las tecnologías de la información y el incremento del tamaño del mercado, se observa en particular en el rubro de elementos tecnológicos” (Pérez, 2007)

En la actualidad los jóvenes que estudian nivel superior requieren conocer el comportamiento del mercado de vivienda, su oferta y demanda. El alumno universitario visualiza en un futuro adquirir un espacio propio, conformar un patrimonio y poseer así un lugar para vivir cómodamente. En este sentido, el sector inmobiliario ofrece una gran diversidad de opciones para comprar un bien inmueble para fines domésticos; desde casas de interés social, hasta de tipo residencial.

Por lo tanto, es vital que los jóvenes identifiquen los puntos fundamentales en el proceso de gestión de un crédito hipotecario. Debido a que, posteriormente al inicio de su vida laboral, recibirán por parte del patrón la prestación de seguro social, misma que les otorgará el beneficio de solicitar un crédito y adquirir una vivienda en corto plazo (ver imagen 1). Lo anterior obedece a que generalmente existe desconocimiento por parte de los jóvenes sobre las opciones y oportunidades que ofrece el Instituto del Fondo Nacional de la Vivienda para los Trabajadores (INFONAVIT), institución que ofrece una variedad de oportunidades para la compra de un patrimonio.

En el libro “Valoración Inmobiliaria, Métodos y Aplicaciones” define a los bienes inmuebles como terreno y cualquier otra cosa que sea parte de los mismos, refiriéndose a los distintos elementos que el hombre pueda integrar e incorporar a un predio, como por ejemplo edificios o mejoras (Bellver, 2021, pág. 23). Esto nos permite contextualizar e identificar el espacio donde se desarrolla el movimiento mobiliario, sus alcances y razones, permite reflexionar sobre el comportamiento económico que se presenta actualmente, sus causas y efectos, así como la necesidad natural del ser humano de poseer un hogar. Otros autores utilizan el termino propiedad “La valoración inmobiliaria trata de discernir el valor de una determinada propiedad, constituida generalmente por suelo, edificación o inmueble” (Garcia, 2007, pág. 8) por lo tanto se entiende que los bienes inmuebles están relacionados con los elementos de terreno o pedio con las edificaciones que se realicen en su interior.



Imagen 1. Vivienda tipo Interés Medio.
Elaboración propia. 2021

El campo de la valuación de bienes inmuebles evoluciona constantemente y requiere de actualizar sus mecanismos para su operatividad. El ejercicio de nuevos créditos para la adquisición de vivienda es una actividad constante por los agentes inmobiliarios que promueven la compraventa de patrimonio para los jóvenes que pueden acceder a créditos tradicionales como: INFONAVIT, Bancarios y del Fondo de la Vivienda de Seguridad y de Servicios Sociales de los Trabajadores del Estado (FOVISSSTE). De esta manera, el crecimiento de la población es un indicador importante que genera la exigencia en la adquisición de vivienda y por lo tanto, representa un incremento del número de solicitudes de créditos hipotecarios, tanto para viviendas nuevas, como para viviendas usadas Mercado Abierto (MAI).

El proceso para acceder a esto créditos se puede sintetizar en los siguientes pasos. i) Se estudian y analizan los posibles compradores a través de su historial crediticio, liquidez, registro en el buró de crédito, así como las posibilidades reales que tienen para recibir un crédito. ii) Se diseñan créditos hipotecarios según los ingresos y su capacidad de pago. Cabe mencionar que las diferentes instituciones bancarias promueven sus productos hipotecarios, haciendo énfasis principalmente en las bondades de su tasa de interés. iii) Posteriormente el cliente debe evaluar otros aspectos como: las comisiones de apertura de crédito, gastos notariales, costo del avalúo, seguro del crédito y las características más específicas del crédito (pronto pago, adelantos de mensualidades y plazo del crédito).

Las instituciones financieras cuentan con un departamento de créditos hipotecarios, los cuales establecen metas y estrategias cada año para colocar sus créditos. Estas áreas tienen el objetivo de otorgar la mayor cantidad de créditos, tanto para construcción de vivienda como para la adquisición individual de bienes inmuebles. Por lo general, los tiempos de duración de un crédito hipotecario pueden ser de 10, 15 y hasta 20 años.

En el mercado de vivienda, existen dos opciones para el financiamiento por parte de las instituciones anteriormente mencionadas. El primero es la vivienda nueva o de paquete y el segundo es la vivienda usada MAI “Opción que tienen los acreditados para ejercer su crédito para la adquisición de vivienda nueva o usada en forma individual, no en paquete” (Mello, 2007) Para este caso analizaremos el tema de la vivienda usada o de mercado abierto. Es indispensable aclarar que, para obtener un crédito hipotecario para la adquisición de una vivienda usada, el inmueble debe contar con una edad menor a 30 años, ya que la vida útil normal de una vivienda de interés social es de 60 años. En caso de superar los 30 años no es factible asignarle un crédito hipotecario debido a que la vida remanente no alcanzaría a cubrir el tiempo del crédito, “la vida útil normal se define como el período, expresado en años en el cual puede esperarse razonablemente que un bien realice la función para la cual fue construido, a partir de la fecha en que fue puesto en servicio” (Córdova, 2019, pág. 252).

Zonas de Vivienda usada

En la capital del estado de San Luis Potosí se localizan diversas zonas de vivienda usada que superan los 30 años. El mercado de clientes, para la compra de este tipo de edificaciones es constante aún y cuando presenten edad avanzada, derivado de que cuentan con buena ubicación, servicios e infraestructura, a diferencia de las colonias de la periferia de la Zona Metropolitana de San Luis Potosí (ZMSLP). De esta manera, las viviendas que se construyeron en fraccionamientos en las décadas de 1970 y 1980 son una opción viable de compra por parte del sector joven de la población.

En este sentido, las unidades de valuación son las entidades encargadas de realizar y vigilar las valuaciones a los inmuebles que son susceptibles a obtener un crédito hipotecario. Estas unidades son auditadas constantemente por la SHF. Anteriormente, al momento de presentarse la solicitud de un crédito para valorar un inmueble que rebasara los 30 años, ésta era automáticamente rechazada. Para resolver esta situación las unidades de valuación han diseñado instrumentos para prorratear su edad que enlistan las partidas de obra que presenta una vivienda, cada una tiene un porcentaje según su costo de participación en el proyecto. “El surgimiento de las Unidades de Valuación en México se debe al mandato establecido por el Congreso en fecha 3 de abril de 2001” (Guerrero, Hernández, & Pacheco, 2007, pág. 28)

Cuando en la vivienda se comprueba que ha recibido trabajos de mejoras o de remodelación, estos porcentajes son determinados nuevamente. Lo anterior, conlleva a una disminución de su edad y aumento en su vida remanente, dando como resultado que el crédito hipotecario sea factible.

La implementación de estos nuevos instrumentos ha sido de gran beneficio, ya que rescata una importante cantidad de viviendas que todavía

pueden ser viables para ser habitadas y canalizadas para un crédito hipotecario (ver imagen 2). La ZMSLP cuenta con este segmento de inmuebles que generan y reactivan el desarrollo económico y como consecuencia estas colonias se pueden volver a habitar, así como el efecto financiero que producen con las instituciones bancarias, unidades de valuación, valuadores, controladores, brokers y agentes inmobiliarios. Estos mecanismos ayudan a que los jóvenes puedan adquirir una vivienda en una zona más accesible a su área de trabajo y no tengan que emigrar a fraccionamientos ubicados en la periferia de la ciudad.



Imagen 2. Vivienda con 40 años.
Elaboración propia. 2021

La estructura de la tabla de prorrates está conformada por una hoja cálculo de Excel. En la primera columna se enlistan las distintas partidas que componen un presupuesto de obra. En la segunda columna se muestran los porcentajes de incidencia por cada partida. En la tercera columna se muestra el resultado de multiplicar el Valor de Reposición Nuevo (VRN) del inmueble analizado por el porcentaje de incidencia. En la cuarta columna se establecen los porcentajes de avance de las partidas que han sido intervenidas, estos porcentajes son vaciados por el valuador al realizar la visita de inspección al inmueble. En la última columna se coloca el resultado de multiplicar el porcentaje de incidencia (segunda columna) por el porcentaje de trabajo de remodelación (cuarta columna) dando como resultado el porcentaje mejorado en cada partida. Finalmente se realiza la sumatoria de esta lista de porcentajes que determinan el total de trabajo de mejora de este inmueble, se hace una conversión en años para así obtener la nueva edad del inmueble (ver Imagen 3).

VRN DEL INMUEBLE EN CONDICIONES NORMALES (A)	\$6,200.00	FUENTE: MANUAL DE COSTOS UNITARIOS BIMSA		
EDAD REAL DEL INMUEBLE	53	EDAD DE LA REMODELACION (TIEMPO TRANSCURRIDO DESDE LA REMODELACION)		5
PARTIDAS	%	PRECIO	REMODELACION	PORCENTAJE APLICABLE
CIMENTACIÓN	12.99%	\$805.38	0.00%	0.00%
ESTRUCTURA DE CONCRETO	19.54%	\$1,211.48	0.00%	0.00%
ALBAÑILERIA	10.41%	\$645.42	70.00%	7.29%
INSTALACION HIDRAULICA	2.90%	\$184.76	70.00%	2.09%
INSTALACION SANITARIA	1.44%	\$89.28	70.00%	1.01%
INSTALACION ELÉCTRICA	0.89%	\$55.18	70.00%	0.62%
INSTALACION DE GAS	0.15%	\$9.30	70.00%	0.11%
ACABADOS INTERIORES	14.85%	\$920.70	90.00%	13.37%
ACABADOS EXTERIORES	11.74%	\$727.88	90.00%	10.57%
ACCESOS	1.96%	\$121.52	100.00%	1.96%
CANCELERIA	2.55%	\$158.10	100.00%	2.55%
MOBILIARIO FIJO	9.60%	\$595.20	100.00%	9.60%
EQUIPO	0.25%	\$15.50	100.00%	0.25%
GUARDA	3.81%	\$236.22	100.00%	3.81%
ACCESORIAS	6.84%	\$424.08	100.00%	6.84%
	100.00%	\$6,200.00		
			PORCENTAJE RESTANTE DE NO REMODELACION	40%
			PORCENTAJE DE REMODELACION	60%
			Área sin remodelar	39.95%
			Edad sin remodelar	53
			Área remodelada	60.05%
			Edad remodelada	5.00
			EDAD PRORRATEADA	24.18

Vida probable tesorería	70
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Imagen 3. Tabla de prorrateo de edad. CTI.
Consortio Técnicos Inmobiliarios S.A. de C.V., 2021.

Para contextualizar respecto a el significado del término valor de reposición nuevo se analizó la definición de Costo de Reposición Nuevo, que menciona: “es el costo actual de un bien valuado, considerándolo como nuevo, con sus gastos de ingeniería y de instalación, en condiciones de operación, precio de contado” (Córdova, 2019, pág. 322) por lo tanto se debe de proponer un valor que contemple todos los trabajos necesarios para edificar un bien con el mismo sistema constructivo, acabados, alturas y especificaciones marcadas. Por otro lado, en el Diario Oficial de la Federación menciona como “costo a precios actuales de un inmueble nuevo similar, que tenga la utilidad o la función equivalente más próxima al inmueble objeto de estudio” (Diario Oficial, 2004, pág. 2)

En el libro “Costo y Tiempo en Edificación” menciona que el análisis de este es aproximado, ya que, al no existir dos procesos constructivos iguales, el intervenir la habilidad personal del operario, y el basarse en condiciones promedio de consumos, insumos y desperdicios (Salazar, 2013, pág. 22) por lo tanto para establecer el costo de un tipo de construcción, es necesario realizar un análisis del sistema constructivo, materiales, acabados y especificaciones propias del proyecto.

Metodología

En México, el sector de la valuación inmobiliaria es regulado por la Secretaría de Economía, institución federal que vigila los procesos en este sector, tal como lo menciona José Manuel Salas Tafuya en “El Modelo de Valuación Inmobiliaria en México”, explicando que la norma NMX-C-459-

SCFI-ONNCCE-2007 se enumeran los lineamientos para desarrollar esta actividad. Es importante realizar con calidad profesional y ética el servicio de valuar bienes inmuebles, y se identifica en el segundo paso, en donde determina la eficiencia en este ejercicio: La inspección de los bienes a valuar para constatar su existencia identificación y ubicación (Salas, 2015). Por consiguiente, podemos establecer que existen distintas metodologías implementadas en fases de valuación, tanto por organismos de gobierno como privados.

Se realizó un sondeo, donde se obtuvo información del sistema digital SAX de avalúos de la unidad de valuación Consorcio Técnicos Inmobiliarios, S.A. de C.V. (CTI). Las unidades de valuación son empresas o sociedades mercantiles registradas debidamente ante la SHF, con el objetivo de elaborar avalúos certificados para créditos hipotecarios, respetando la normatividad que se establece y marca este ejercicio, en caso de no realizar correctamente sus actividades son sancionadas severamente con multas o suspensión por periodos de tiempo. Las unidades de valuación en nuestro país tienen como antecedente la circular 1462 de la Comisión Nacional Bancaria y de Valores (CNBV) (Guerrero, Hernández, & Pacheco, 2007, pág. 24) Se tomaron datos a partir del mes de octubre de 2020, hasta el mes de marzo de 2021 de 119 viviendas en el interior del estado y municipio de San Luis Potosí. A continuación, se describen los 5 pasos que se utilizaron para el diagnóstico de los inmuebles.

Paso 1. Se ingresó al sistema SAX para obtener información, en la bandeja de entrada es el espacio donde se enlistan los folios de las solicitudes de avalúos certificados.

Paso 2. Se analizaron los folios partir del día 1 de octubre de 2020, hasta el último folio del mes de marzo de 2021, es decir un tiempo total de 6 meses, se revisaron cada una de las solicitudes en donde se obtuvo la información relevante, siendo principalmente la ubicación y si utilizo la tabla de prorrateo.

Paso 3. La información obtenida se vació a una hoja de cálculo del programa Excel, donde se separó por medio de columnas, catalogando así la información generada por cada solicitud de avalúo: ubicación, valor del inmueble, institución que otorgó el crédito, por mencionar algunas.

Paso 4. Posteriormente, se graficó solamente la información relevante, esto con el objetivo por obtener datos relacionados principalmente sobre las áreas donde se han aplicado este tipo de instrumentos.

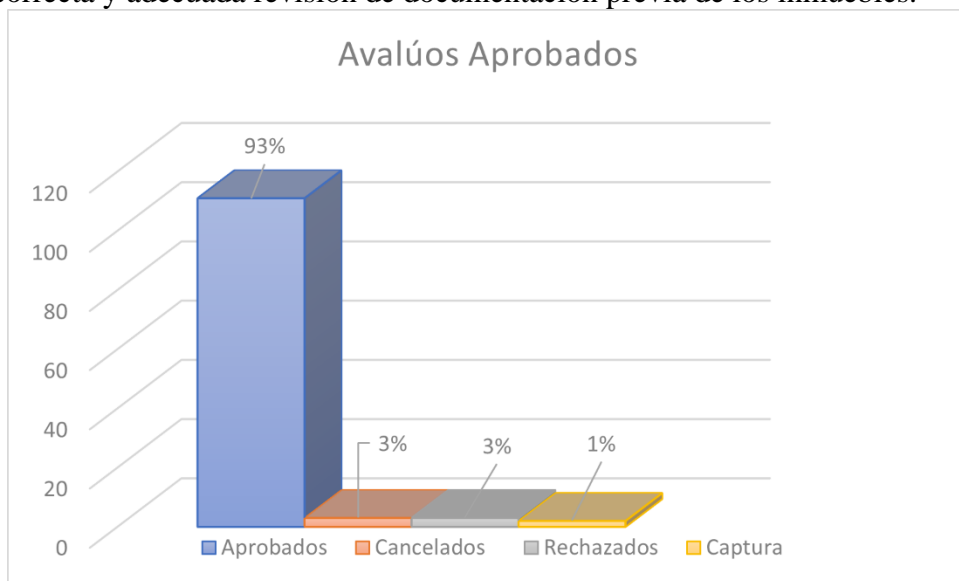
Paso 5. Se realizó la reflexión y depuración de datos, esto con el objeto de elaborar el diagnóstico y evaluación de los resultados de este ejercicio.

Las conclusiones obtenidas en esta investigación se eligieron, de tal forma que se eliminó del proceso, aspectos que no presentaban relación con el objetivo de trabajo. La aportación es lograr identificar las zonas donde se están

reutilizando estos espacios habitacionales y así poder dar difusión para su aprovechamiento.

Resultados

El mayor porcentaje de viviendas se concentra en los municipios de San Luis Potosí y Soledad de Graciano Sánchez. Del total de 119 viviendas, solamente 35 avalúos utilizaron esta tabla. En este período de los 35 avalúos analizados, el 93.2 % fueron aprobados para su seguimiento en el proceso del crédito, solamente el 2.5% fueron cancelados, otro 2.5% rechazados y finalmente un 1.8% quedó con estatus de captura (ver gráfica 1). Esta información nos indica que un mayor porcentaje de avalúos son los que terminan correctamente su proceso de elaboración y continúan en el procedimiento de gestión para un crédito hipotecario, lo cual demuestra una correcta y adecuada revisión de documentación previa de los inmuebles.



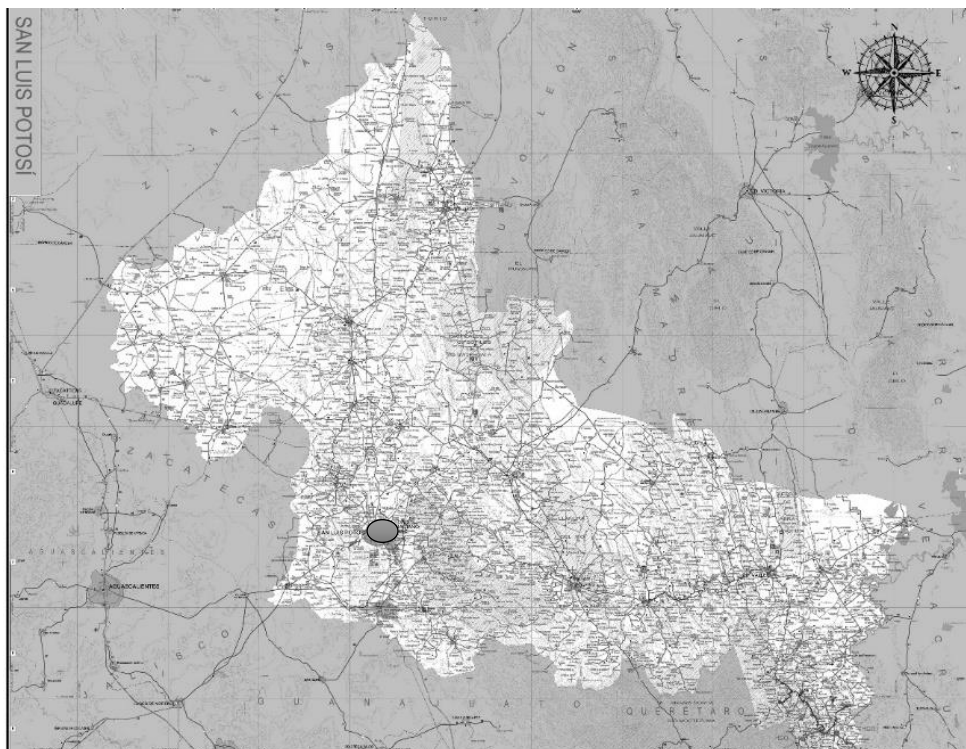
Gráfica 1. Porcentaje de avalúos aprobados.
Elaboración propia, 2021

El estado de San Luis Potosí se localiza al Noreste de la República Mexicana, colinda con los estados de: Querétaro, Guanajuato, Hidalgo, Veracruz, Tamaulipas, Nuevo León y Zacatecas. La posición del estado es estratégica, la carretera federal 57 México-Piedras Negras, atraviesa el estado, generando desarrollo económico en la región. La zona industrial del municipio de San Luis Potosí, actualmente está conurbada con el municipio de Villa de Reyes, creando así desde hace varios años un “cluster” en la producción de autopartes para vehículos (ver mapa 1).



Mapa 1. Mapa República Mexicana indicando ubicación del Estado de San Luis Potosí.
Elaboración propia. 2021

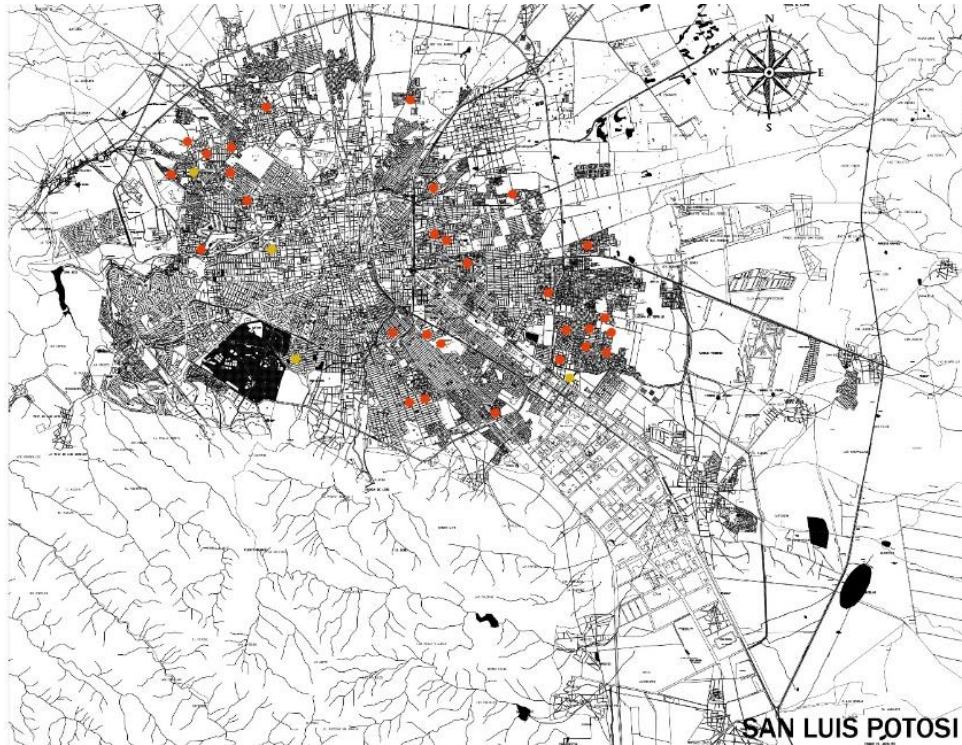
El estado de San Luis Potosí está conformado por 58 municipios. Así mismo el estado está dividido en cuatro zonas: centro, altiplano, media y huasteca. El municipio de San Luis Potosí se ubica al suroeste del estado, así mismo el municipio de San Luis Potosí pertenece a la zona centro, colinda con los municipios de: Villa de Reyes, Villa de Zaragoza, Soledad de Graciano Sánchez, Cerro de San Pedro, Villa Hidalgo, Villa de Arista, Moctezuma, Ahualulco, Villa de Arriaga y Mexquitic de Carmona. El municipio de San Luis Potosí está integrado por cuatro delegaciones: Villa de Pozos, La Pila, Bocas y Escalerillas (ver mapa 2).



Mapa 2. Mapa del Estado de San Luis Potosí ubicando la mancha urbana del municipio de San Luís Potosí.

Elaboración propia. 2021

El mapa 3 muestra la distribución espacial de los 35 avalúos que utilizaron la tabla de prorateo de edad. Esta información determina que solamente un 29% del total de valuaciones de vivienda en un período de 6 meses utilizaron este instrumento. El resto de las viviendas presentan una edad menor en donde no es necesario recurrir a este tipo de instrumento para disminuir la edad de los inmuebles y así poder ser susceptibles a un crédito hipotecario. Por lo tanto, la mayor parte de los bienes inmuebles que se gestionan para un crédito son casas habitación o departamentos nuevos o que presentan mejores condiciones, en donde no es necesario realizar una intervención o remodelación física. La mayor parte de estas viviendas se ubican en zonas o fraccionamientos de la periferia y en un segundo plano en zonas intermedias del área metropolitana de los municipios de San Luis Potosí y Soledad de Graciano Sánchez. En la zona suroriente se puede detectar una mayor concentración.



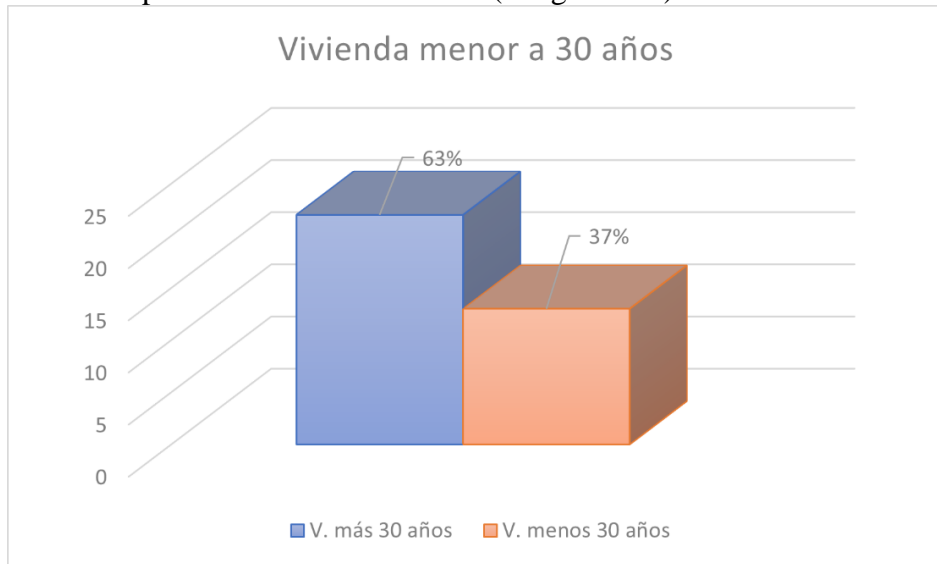
Mapa 3. Ubicación de viviendas donde se aplicó la tabla de prorrateo.
Elaboración propia. 2021

- Vivienda de interés social
- Vivienda de interés medio

La Unidad Habitacional Rancho Viejo II, localizada en el municipio de Soledad de Graciano Sánchez, se identifica como la zona donde se ubican una mayor cantidad de departamentos en donde se utilizó la tabla. Estos inmuebles fueron remodelados en su interior para poder disminuir su edad. Generalmente los trabajos que se realizan son: cambio de piso y muebles de baño, suministro y colocación de pintura, puertas y clósets de madera. Solamente en casos especiales se requiere de cambiar totalmente las instalaciones hidráulicas de tubo galvanizado o cable eléctrico, ya que la vida útil de estos materiales ha transcurrido y deben ser remplazados. También hay algunas viviendas que fueron en un tiempo invadidas y se tiene que desarrollar un trabajo de rehabilitación más especializado a elementos de la propia estructura del inmueble, como muros y losas.

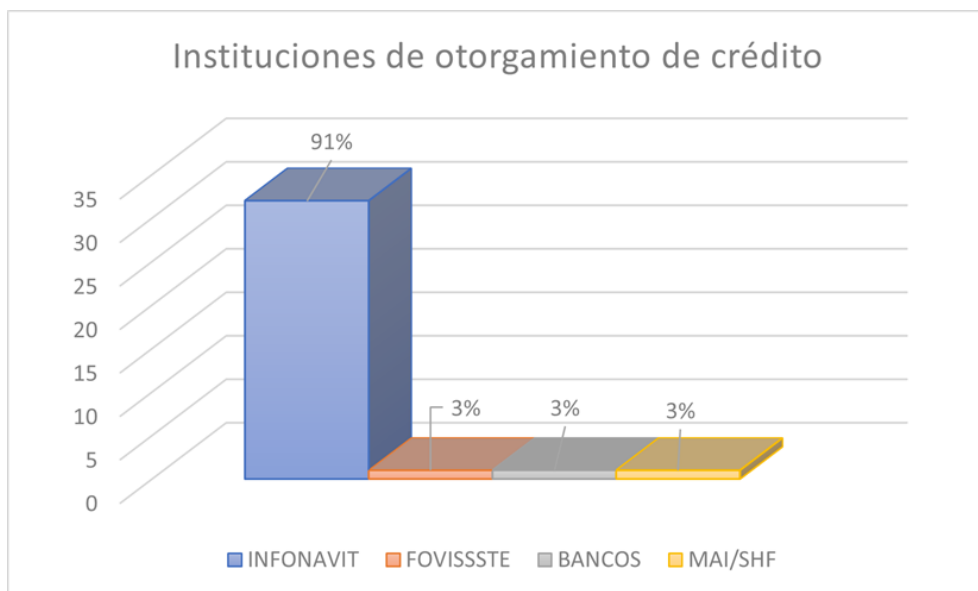
En un principio se pensaba que la tabla solamente se aplicaba para viviendas que presentan edad mayor a 30 años, pero al realizar el sondeo se detectó que hay casas habitación o departamentos que tiene menos de 30 años. Esta situación deriva de que se pueden ofrecer en el mercado inmuebles que tengan que recibir algún trabajo previo de restauración a su ofrecimiento en el

mercado o que simplemente el vendedor toma la decisión de hacer una intervención de remodelación en el inmueble para que así presente una mejor imagen y sea más atractivo para su promoción. Las viviendas con más de 30 años reflejan un 63% mientras que los inmuebles con menos de 30 años solamente representan un 37% del total (ver gráfica 3).



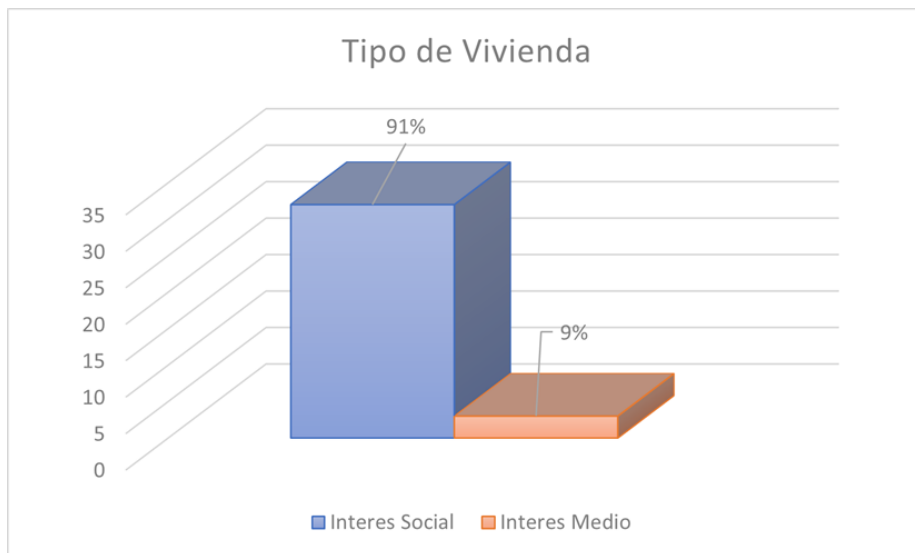
Gráfica 3. Vivienda con edad menor a 30 años.
Elaboración propia, 2021

En el estudio también se detectó la institución que genera mayor cantidad de créditos para la adquisición de vivienda. El INFONAVIT se visualiza con un 91% de créditos otorgados. Le siguen el FOVISSSTE, mercado abierto MAI y los créditos bancarios, estos últimos tres con solo un 3% cada uno. El INFONAVIT se establece con mayor determinación como la institución con mayor presencia en el otorgamiento de créditos hipotecarios (ver gráfica 4).



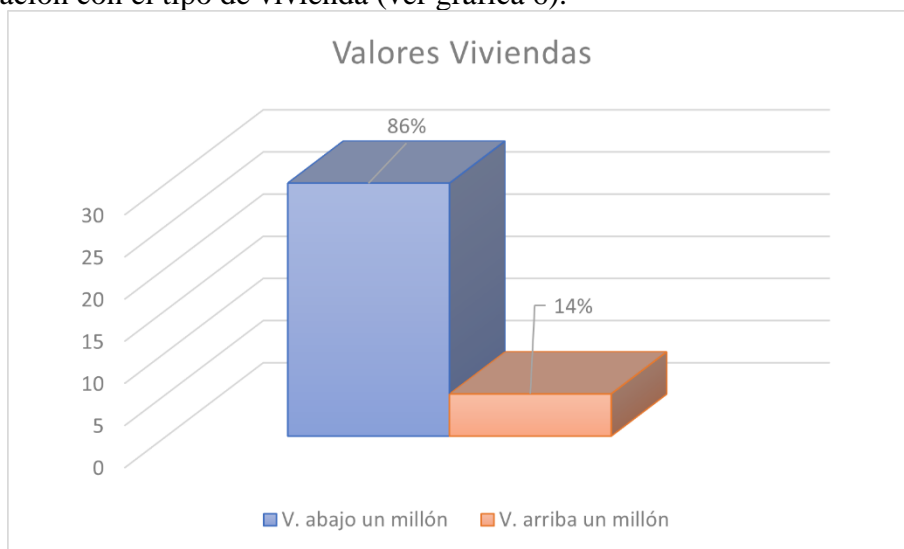
Gráfica 4. Instituciones de otorgamiento de crédito.
Elaboración propia, 2021.

En el presente estudio se identificó el tipo de vivienda donde se utiliza la tabla de prorrateo con mayor frecuencia. La vivienda de interés social se diagnóstica con un 91%, siendo así el tipo de inmueble en donde se requiere este instrumento. La vivienda de interés medio aparece con solamente un 9%, reflejando un porcentaje bajo con respecto a la vivienda de interés social. Por lo tanto, la vivienda de interés social se posiciona como el tipo de inmueble que maneja con mayor frecuencia esta herramienta con el objetivo de ser más comercial y volver a colocarse en el mercado como una opción de compra para diferentes tipos de personas que son susceptibles a un crédito hipotecario (ver gráfica5).



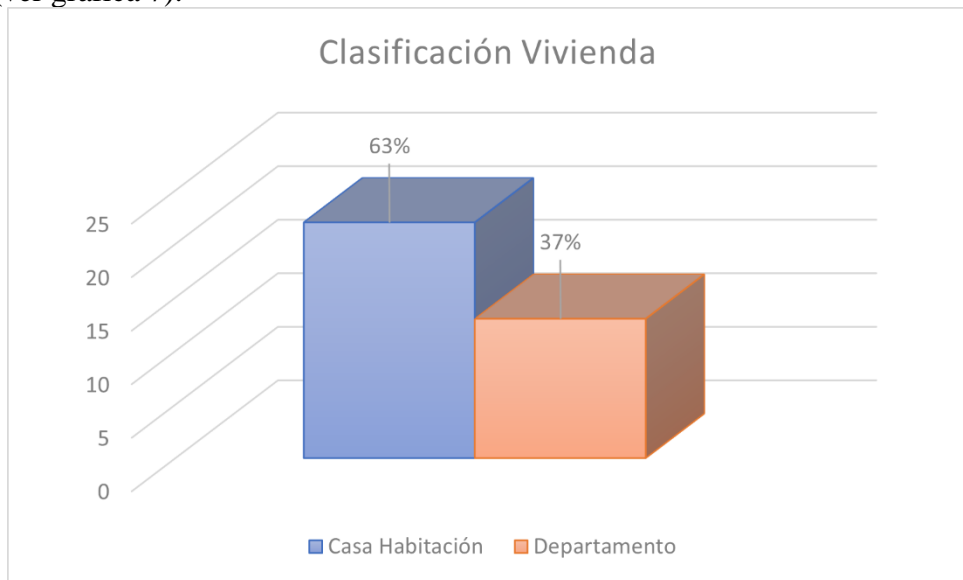
Gráfica 5. Tipo de vivienda que utiliza la tabla de prorrateo de edad.
Elaboración propia. 2021

En el campo de los valores de estas viviendas se obtuvo la siguiente información. Las viviendas con un precio por debajo de un millón de pesos representan el 86%. Las viviendas con un costo arriba del millón de pesos aparecen solamente con un 14%. Esta situación se traduce derivado que la mayor cantidad de viviendas que emplean este instrumento son viviendas o departamentos de interés social, a esto se relaciona con los porcentajes y la relación con el tipo de vivienda (ver gráfica 6).



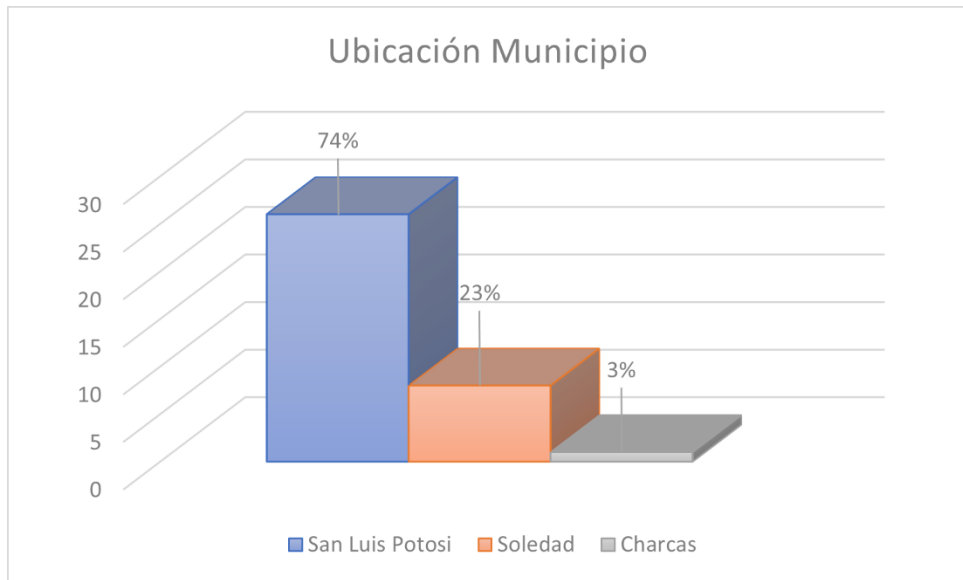
Gráfica 6. Porcentajes de viviendas con un valor arriba de un millón de pesos.
Elaboración propia, 2021.

En el renglón de la clasificación de vivienda las casas habitación representan un 63%, mientras que los departamentos en régimen de condominio aparecen solamente con un 37%. Esta información se analiza determinado que las casas habitación presentan mayor rango en aplicación de la tabla de prorrateo de edad, se requiere en mayor porcentaje este instrumento para lograr ubicar este inmueble como oferta de compra para derechohabientes (ver gráfica 7).



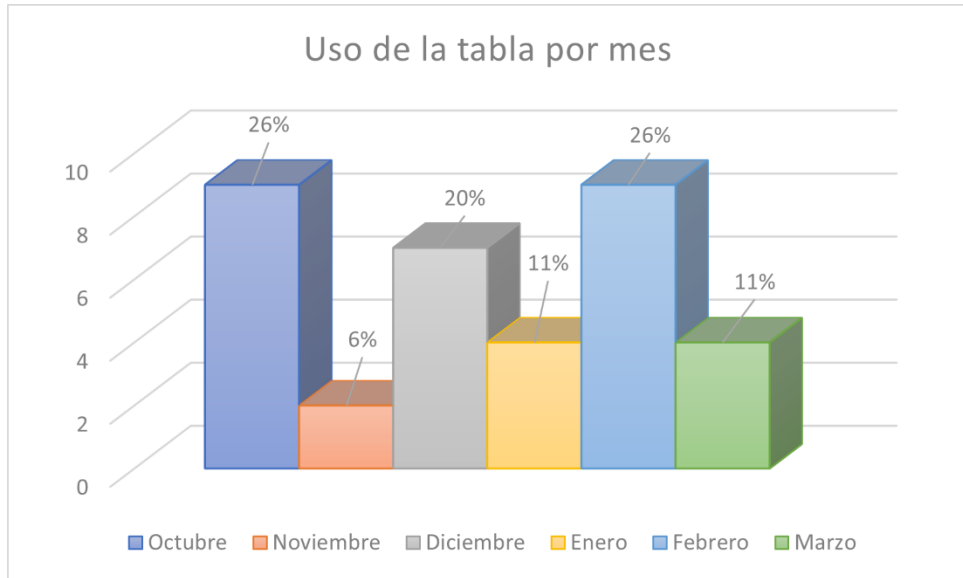
Gráfica 7. Clasificación de vivienda.
Elaboración propia. 2021

En el diagnóstico realizado se logran conocer los municipios en donde se utilizó en mayor número esta herramienta. El Municipio de San Luis Potosí aparece con un 74%, seguido del vecino municipio de Soledad de Graciano Sánchez con un 23%, en un tercer plano con solamente un 3% viviendas de otros municipios del interior del estado. Por lo tanto, el municipio de San Luis Potosí se ubica en primer lugar como zona para recurrir a este tipo de herramienta, derivado de la población que presenta este municipio se puede entender o relacionar el porcentaje que arroja este estudio (ver gráfica 8).



Gráfica 8. Localización de Municipios que utilizan la tabla de prorrateo.
Elaboración propia. 2021

Finalmente, otro de los hallazgos de este estudio es que octubre y febrero son los meses cuando se utilizó más la tabla de prorrateo de edad. Esto se traduce como un mayor movimiento o solicitudes de créditos. En el mes de octubre se presenta esta situación ya que se visualiza el cierre del año y el sector inmobiliario se esfuerza en acomodar los últimos créditos. Para el caso del mes de febrero, se relaciona con el despegue del movimiento de créditos hipotecarios posterior a la cuesta de enero, momento que refleja el arranque del ejercicio de gestión de negocios de venta de inmuebles (ver gráfica 9).



Gráfica 9. Uso de la tabla por mes.
Elaboración propia. 2021

Conclusión

Se puede determinar que esta nueva herramienta genera que una cantidad importante de viviendas que presentan una edad avanzada en la ZMSLP puedan ser nuevamente susceptibles a un crédito hipotecario con alguna institución privada bancaria o de gobierno. Por lo tanto, el objetivo de la presente investigación se alcanzó, generando áreas de oportunidad a compradores y vendedores del sector inmobiliario. Asimismo, coadyuva a desarrollar movimiento económico y ampliar las posibilidades de los jóvenes de adquirir una vivienda en zonas con inmuebles con edad avanzada.

Este estudio permite visualizar de una mejor manera las zonas y ubicación donde se utilizó la tabla de prorrateo, así como el tipo, el valor y la clasificación de vivienda en donde se empleó el instrumento, encontrando que la vivienda de interés social es hasta el momento el sector que recurre mayormente a esta herramienta.

El campo de la valuación aporta con este tipo de recursos, nuevas estrategias para el campo inmobiliario, reutilizando viviendas con una vida mayor a 30 años que son poco atractivas para futuros compradores. Aunque posean una ubicación óptima, son candidatas como selección para jóvenes o persona adultas que utilizan un crédito hipotecario inclusive en una segunda ocasión.

La implementación de este tipo de herramientas genera trabajo para personas del campo de la construcción, gestores inmobiliarios, valuadores y vendedores de viviendas. Lo más importante de este estudio es motivar y generar la reactivación de zonas y/o complejos habitacionales donde sus

unidades rentables presentan una mejor ubicación. Para lo cual solamente se requiere de planear adecuadamente una restauración estratégica de sus espacios y fomentar finalmente la reutilización de estas viviendas.

Son muchos los retos de la situación actual de la adquisición de vivienda en San Luis Potosí. En particular preocupan dos: i) las limitantes que impone el entorno económico para los jóvenes que buscan adquirir una vivienda propia; ii) la reutilización de casas que todavía se encuentran en buenas condiciones de habitabilidad y que por desconocimiento de este instrumento no se consideran una opción viable de compra. Por lo tanto, este estudio representa el primer esfuerzo por localizar todas las viviendas en la ZMSLP susceptibles a reincorporarse al mercado inmobiliario a través del uso de la metodología expuesta. De esta forma, se recomienda en una primera etapa realizar un censo detallado que contemple la edad, la ubicación y un presupuesto paramétrico de las mejoras de los inmuebles. Lo anterior, integraría una base de datos de suma importancia para difundir, en una segunda etapa, la información entre arquitectos y edificadores jóvenes que busquen un nicho de trabajo y a su vez colaboren para que las nuevas generaciones de la población económicamente activa adquieran un bien inmueble.

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La Formation Initiale des Etudiants Stagiaires de l'Ecole Normale Superieure d'Abidjan (Cote d'Ivoire) et l'Approche par Competences

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Resume

La formation initiale s'avère déterminante dans la qualité de tout système éducatif comme celui de la Côte d'Ivoire. Elle est axée sur l'alternance entre les apprentissages théoriques et pratiques. Elle aide les enseignants à s'adapter au monde qui change et évolue et relève les défis multiples liés au développement. La nécessité de s'adapter à l'évolution des sociétés est une exigence des systèmes éducatifs. En Côte d'Ivoire, l'Ecole Normale Supérieure est la seule structure étatique de formation initiale des personnels d'éducation. Elle a fait le choix de maintenir ses méthodes pédagogiques ouvertes afin de les ajuster en cas de besoin. Cette étude a trois (3) objectifs : le premier objectif est d'évaluer le niveau de connaissances et de compréhension des étudiants stagiaires sur l'Approche Par Compétences (APC), le deuxième est d'analyser la perception que ces étudiants stagiaires ont de l'APC et la troisième est de déterminer les obstacles à l'utilisation de l'APC dans les classes. Pour parvenir à ces objectifs, nous avons opté pour la méthode quantitative qui se fonde sur un questionnaire auprès des étudiants stagiaires et la méthode qualitative basée sur l'entretien semi-directif auprès des enseignants de l'Ecole Normale Supérieure. Les résultats ont montré que les étudiants stagiaires ont peu de connaissances et de compréhension de l'APC, des perceptions sont plus négatives que positives. Un des obstacles le

plus rencontré est le manque de documents sur l'APC pour les enseignants. A partir des obstacles, des pistes de solutions ont été suggérées.

Mots-clés : Formation initiale, méthodes pédagogiques, apprentissages, systèmes éducatifs

The Initial Training of Student Trainees of the Ecole Normale Supérieure of Abidjan (Cote d'Ivoire) and the Competency Approach

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Abstract

Initial training is decisive in the quality of any education system like that of the Ivory Coast. It focuses on the alternation between theoretical and practical learning. It helps teachers adapt to the changing and evolving world and the multiple challenges of development. The need to adapt to changing societies is a requirement of education systems. In the Ivory Coast, the Ecole Normale Supérieure is the only state structure for the initial training of education personnel. It has chosen to keep her teaching methods open in order to adjust them if necessary. This study has three (3) objectives: the first objective is to assess the level of knowledge and understanding of the Competency Approach, the second is to analyze the perception that student trainees have of Competency Approach and the third is to determine the barriers to the use of Competency Approach in the classroom. To achieve these objectives, we opted for the quantitative method which is based on a questionnaire with student trainees and the qualitative method based on semi-structured interviews with teachers at the Ecole Normale Supérieure. The results showed that the student interns have little knowledge and understanding of Competency Approach, the perceptions are more negative than positive. One of the biggest obstacles is the lack of Competency Approach materials for teachers. From the obstacles, possible solutions were suggested.

Keywords: Initial training, pedagogical methods, apprenticeships, educational systems

I. Introduction

En Côte d'Ivoire, l'École Normale Supérieure d'Abidjan (ENS) a été créée en 1964. Cela fait de cette institution un établissement en charge de la formation initiale des enseignants du secondaire général. Depuis quelques années, le niveau de recrutement est celui du BAC + 3 ans pour les professeurs de collège et BAC+4 ans pour ceux de lycée. Cela indique un renforcement de celui-ci. La formation du futur enseignant comprend une formation théorique générale du contenu des disciplines, une formation aux Sciences de l'éducation et de la formation pédagogique pratique. Cette dernière intervient au cours de la 2^{ème} année à travers un stage de terrain dans les lycées et collèges. Un mémoire de fin d'année constitue l'élément de validation de cette formation (Ecole Normale Supérieure [ENS], 1998). Les programmes d'enseignement ont toujours évolué et eu pour vocation, à travers leurs objectifs d'être utiles à la société qui les a engendrés. Ils tiennent compte du niveau économique, socio-culturel et des avancées scientifiques de la société. Celle-ci doit assurer la formation de ses membres pour non seulement les aider à s'adapter au monde qui change et évolue mais aussi relever les défis multiples. En effet, aucun système scolaire n'est statique ; toutes les sociétés à un moment donné de leur histoire, sont confrontées à de nouvelles réalités. Il en est de même pour les programmes scolaires ivoiriens. En ce qui concerne la Côte d'Ivoire, l'histoire des programmes éducatifs et des méthodes pédagogiques qui les accompagnent a connu cinq (5) moments de son évolution. Hérité de la colonisation, le système éducatif ivoirien prend appui sur le modèle Français :

- De 1887 – 1960 : Programmes à caractère colonial visant à former des cadres subalternes ;
- De 1960 – 1977 : Enseignement basé sur le programme dit de construction nationale fondé sur l'encyclopédisme et des méthodes traditionnelles d'enseignement qui suscitent et entretiennent la passivité des apprenants ;
- 1977 – 1995 : Programmes rénovés basés sur la méthode active qui place l'apprenant (e) au centre du processus d'enseignement /apprentissage ;
- 1995 – 2002 : Programmes éducatifs selon la Pédagogie Par Objectif (PPO) basés toujours sur la méthode active ;
- Depuis 2002 : Programmes éducatifs formulés selon l'Approche Par Compétence (APC) depuis l'enseignement de base (Désalmand, 1983 ; Ministère de L'Education Nationale et de la Formation de Base 1999; Odounfa, 2003).

Aussi faut-il souligner que les méthodes pédagogiques enseignées aux formateurs connaissent des changements après l'indépendance de la Côte

d'Ivoire. L'approche pédagogique traditionnelle faisait de l'enseignant, le seul détenteur du savoir, considéré comme l'acteur principal des actions pédagogiques. Il exerce une autorité absolue sur ses élèves. Il n'est pas contesté, le sujet apprenant ne pose pas de questions, car poser des questions c'est mettre en doute l'enseignement reçu. Dans cette méthode pédagogique, le sujet apprenant se présente comme un sujet donné auquel il faut faire apprendre certains mécanismes, acquérir certaines connaissances et qu'il importe de se plier à certaines règles rigides de la société, de la vie. L'enseignant exerce sur le sujet apprenant une pression morale qui le façonne et l'amène à ne pas exercer correctement son métier d'élève (Berbaum, 2005). Leif et Rustin (1999) expliquent cet état de fait en écrivant que le silence et l'obéissance passive érigée en règle constante, empêchent les élèves de révéler leur nature. Ce silence et l'obéissance passive renforcent l'uniformité artificielle des enfants dans la classe. Ils accordent le primat aux apparences de l'attention au décor et à l'obéissance. Cet enseignement par la contrainte est fait de cours magistral qui se traduit par l'absence de dialogue enseignant - enseigné, où les élèves sont craintifs et soumis et où il n'y a pas d'initiative personnelle de la part de ceux-ci est une attitude contraire à la société d'aujourd'hui (Inanan, 1989). Dans cette dernière on prend des initiatives, on travaille en groupe, on fait des recherches personnelles et on responsabilise le sujet apprenant en vue du futur. Aussi faut-il le souligner encore, cet enseignement traditionnel visiblement fondé non pas sur la compréhension et l'entraînement aux techniques d'acquisition des savoirs (question de méthodologie) constitue un lourd handicap pour l'élève quant à l'assimilation proprement dite. L'enseignant est détenteur d'un prestige et d'un savoir qu'il impose. L'action de l'enseignant, pousse l'élève au mutisme, à un repli sur lui-même. Son attitude qui refuse objectivement la libération de l'élève, est ce que Carl Rogers cité par Hanoun (1976) appelle une pédagogie de la sujétion plutôt qu'une pédagogie traditionnelle. La relation enseignant - enseigné, dans le cadre d'une pédagogie de la sujétion suppose que ce qui est enseigné est appris. Cette pédagogie se caractérise par la négation plus ou moins évidente de l'importance des relations interindividuelles et généralement de l'affectivité. Les enseignants dans leurs pratiques font montre d'une insuffisance réelle en pédagogie. Et pourtant comme l'affirme Avanzini (1975) la formation pédagogique correspond à un type d'étude où la qualité de la relation enseignant - enseigné passe bien avant la distribution du savoir. C'est ce qui fait défaut chez les enseignants ivoiriens des années 1960-1980. Comment peut-on évaluer un enseignement dispensé dans les conditions de sujétion puisque la formation se fait dans un climat de crainte, de passivité chez l'élève d'une part et d'autre part dans une attitude de volonté de puissance chez l'enseignant ? Or selon Hanoun (1976), l'acte de transmission, un des composants essentiels de l'acte éducatif, suppose une coordination, une

correspondance au moins des contextes affectifs de l'émetteur et du récepteur. Il s'agit donc, de connaître, de savoir écouter, aimer l'élève que l'on forme à un certain niveau d'apprentissage ou de scolarisation. La prise en compte du sujet apprenant au cours de la formation permet une meilleure préparation à la vie.

La Côte d'Ivoire n'est pas en reste, en matière d'évolution du système scolaire. Elle subit à l'instar de tous les pays du continent africain des changements sur le plan pédagogique. L'emploi de nouvelles méthodes pédagogiques devient plus que nécessaire. Aussi Hanoun (1976) cite-t-il Dewey (1938) en ces termes en stipulant que les nouvelles méthodes tiennent compte de la nature de l'enfant, de son activité psychique et de son milieu. C'est grâce à lui qu'il se meut, s'adapte. De 1977 à 2002, est produit le programme rénové dit «de souveraineté », fondé sur la méthode active à travers la Pédagogie Par Objectif (PPO). Cette approche est née aux Etats-Unis dans l'enseignement technique, dans un contexte socio-économique de rationalisation des processus de production industrielle (Taylor), notamment dans l'industrie automobile. La Pédagogie Par Objectif trouve également son origine dans le contexte théorique du béhaviorisme. Cette conception postule qu'il faut se centrer sur les comportements observables et mesurables que l'apprentissage permet de produire, à condition d'utiliser les techniques adéquates. Comme méthode d'enseignement, la Pédagogie Par Objectif a produit des richesses. Elle construit la programmation et la progression autour de l'activité de l'apprenant (Tyler, 1935). Elle représente un guide dans l'action pédagogique contrairement à la pédagogie traditionnelle. La précision des critères d'évaluation qu'elle indique, permet de réduire l'impact des valeurs. Par ailleurs, elle fournit une base rationnelle pour l'évaluation formative et établit les bases d'un apprentissage individualisé. Cette pédagogie présente des limites au regard de l'actualisation dans le contexte économique contemporain. L'apprenant est soumis aux objectifs de l'enseignant qui ne fait aucune place à l'imprévu. En outre, celui-ci occupe une place d'exécutant ; il ne prend pas part à la découverte progressive des contenus en suivant sa propre expérience. Cette approche rencontre des difficultés pour s'adapter aux exigences d'un environnement dénaturé et fortement handicapé de formation de cadres et des exécutants, surtout en Côte d'Ivoire. Cette approche pédagogique place l'apprenant(e) au centre du processus d'enseignement apprentissage et privilégie son activité à travers l'observation et la manipulation. Introduite à l'Ecole Normale Supérieure à partir des années 1975, 76 et 80, la Pédagogie Par Objectifs (PPO) comme méthode d'enseignement est utilisée pour la formation des futurs enseignants du secteur Education/Formation. Aujourd'hui, la Pédagogie Par Objectif (PPO) consiste à définir précisément les objectifs attendus d'une séquence d'apprentissage et les décliner en sous-objectifs de savoir, savoir-faire et savoir-être que doit

atteindre le sujet apprenant ; de contenus liés à ces sous objectifs, de méthodes et outils mis en œuvre pour parvenir à l'objectif; de validation et évaluation des objectifs. Les insuffisances de la PPO ont conduit les décideurs à adopter un autre mode pédagogique qui est la Formation Par Compétences (FPC). De 2002 à 2011, la FPC a été l'approche pédagogique en usage en Côte d'Ivoire de l'enseignement primaire à l'enseignement secondaire premier cycle. Cette nouvelle approche devrait pallier les insuffisances de la Pédagogie Par Objectif et permettre aux élèves d'améliorer leurs résultats scolaires. L'élève est appelé à expliciter ses raisonnements, à prendre conscience de ses façons de mémoriser, à faire des essais et des erreurs. Le diagnostic du Rapport d'État du Système Éducatif National [RESEN] (Ministère de l'Éducation nationale et de la Fonction Publique, 2011) a montré que les élèves font face à d'énormes difficultés après le premier cycle de l'enseignement secondaire au niveau de l'acquisition des connaissances et dans le développement des compétences. Le Rapport UNESCO (2013) pour la Côte d'Ivoire sur la période 2005 à 2010 relève que le taux moyen d'obtention de diplômes en fin de cycle est de 30%; pour les années 2011 et 2012 celui-ci a chuté de 17%. Ce constat a amené les décideurs du système éducatif ivoirien à se pencher sur la problématique du décrochage scolaire. Les réalités différentes entre les régions et les établissements scolaires sur le terrain ont conduit à la non-conformité de l'implantation. Ces programmes présentent une certaine complexité que les enseignants n'interprètent pas nécessairement dans les directives du programme (Jonnaert, 2012).

Pour la Côte d'Ivoire, il s'agit de s'adapter aux bouleversements qui affectent le monde notamment dans le domaine de l'éducation et de la formation. Aussi a-t-elle dû recourir à une nouvelle méthode pédagogique qui lui serait plus adaptée. D'où le recours à la méthode dite l'Approche Par Compétences (APC) qui est un recadrage de la Formation par compétences (FPC) [Fofana, 2017]. Celle-ci est une méthode pédagogique qui instaure un contrat didactique dans lequel l'élève est appelé à s'impliquer, à participer à un effort collectif pour réaliser de nouvelles compétences. Par l'évaluation de la nouvelle approche en vigueur, l'Approche Par Compétences est mise en application dans l'enseignement secondaire pendant l'année scolaire 2012/2013 en vue de prévenir ce décrochage. L'accent est mis sur l'implication des élèves dans le travail mené en classe en suscitant son intérêt afin d'obtenir une adhésion sincère à la construction du savoir. L'Approche Par Compétences (APC) consiste donc en un apprentissage plus concret, plus actif et plus durable que par le passé. Elle constitue un progrès par rapport à l'approche dite par les objectifs mais n'est pas une rupture avec elle ; car l'Approche Par Compétences (APC) utilise les acquis de la Pédagogie Par Objectifs (PPO). L'APC situe les sujets apprenants en référence à une situation de classe. Les choix actuels de la Côte d'Ivoire en matière de pédagogie

s'articulent autour du principe qui met l'apprenant/l'apprenante au centre de ses propres apprentissages. Il s'agit des pédagogies actives qui s'appuient sur le constructivisme. En effet, l'approche constructiviste de l'apprentissage met l'accent sur l'activité de l'apprenant/l'apprenante pour appréhender les phénomènes. Ainsi l'apprenant/l'apprenante construit ses propres savoirs en les rattachant à ce qu'il (elle) sait déjà. L'enseignement constructiviste est fondé sur le principe selon lequel les élèves apprennent mieux quand ils s'approprient la connaissance par l'exploration et l'apprentissage actif (Kourouma et Kouakoussui, 2015). Le socioconstructivisme qui traduit l'idée que toute connaissance relève d'un processus de construction, dont le principal acteur est l'apprenant/l'apprenante. Il souligne l'importance des interactions sociales qui influent sur ce processus et postule que les individus participent activement à la création de leurs propres connaissances.

Le socioconstructivisme se réfère donc à la construction de connaissances et de compétences par l'apprenant/l'apprenante en situation d'apprentissage dans un contexte social déterminé (Bruner, 1987). L'objectif de tout exercice d'enseignement socioconstructiviste est de développer des compétences entre autres en matière de résolution heuristique de problèmes, de connaissances métacognitives etc. L'Approche Par Compétences selon Masciotra et Medzo (2009) ; Jonnaert et Masciotra (2004), est basée sur une épistémologie constructiviste et socioconstructiviste. Jonnaert et al., 2005; Barrette et al., (2005) dans leurs études montrent que l'approche constructiviste a pour but la construction des connaissances et le développement des compétences par un apprenant actif. Mais toutefois les programmes d'enseignement/apprentissage sont jusqu'ici développés selon une organisation des contenus d'apprentissage par objectifs et la transmission de savoirs (Jonnaert, 2007). C'est la raison pour laquelle les travaux de Jonnaert et collaborateurs [Jonnaert et al. 2005; Barrette et al. 2005) ; Jonnaert (2007)] proposent l'approche située de la compétence pour concevoir les programmes d'études afin d'éviter un glissement épistémologique. Une approche située signifie que l'individu, ses actions et les circonstances forment un ensemble indissociable ; ainsi durant la conception de l'apprentissage, la compétence se développe « en action et en situation ». Elle est constatée quand le traitement de la situation est réussi et acceptable. Alors la compétence, selon Masciotra et Medzo (2009), se comprend dans l'action d'un individu qui solutionne avec succès une situation. A contrario l'Approche de Formation par Compétences en donnant un profil de sortie décrit des connaissances, des habiletés et des attitudes essentielles en regard d'objectifs ou de compétences à atteindre (Jonnaert et al., 2005).

Dans cette étude, nous avons trois (3) objectifs : le premier objectif est d'évaluer le niveau de connaissances et de compréhension des étudiants stagiaires de l'Approche Par Compétences (APC), le deuxième est d'analyser

la perception que ces étudiants stagiaires ont de l'APC et la troisième est de déterminer les obstacles à l'utilisation de l'APC dans les classes.

II. Methodologie

Le milieu d'étude de notre recherche est une institution d'enseignement supérieur : l'Ecole Normale Supérieure d'Abidjan. La population concernée se compose des étudiants normaliens et du personnel enseignant. Le questionnaire et l'entretien semi-directif constituent les instruments de recueil des données utilisés. Cette enquête de terrain a combiné l'étude quantitative et l'étude qualitative. L'échantillon de l'enquête est constitué, d'une part, de quatre-vingt-neuf (89) étudiants normaliens et dix (10) enseignants. Pour l'étude quantitative le questionnaire a été distribué aux étudiants dans leur salle lors de leur pause. Les différents points abordés dans le questionnaire sont : le niveau de connaissances et de compréhension de l'Approche Par Compétences (APC), la perception que les étudiants stagiaires ont de l'APC, les obstacles à l'utilisation de l'APC dans les classes et les suggestions pour une meilleure application de cette Approche pédagogique. Ceci a permis de recueillir des données quantitatives. Pour l'entretien semi-directif, un guide d'entretien pour le personnel enseignant a été élaboré pour l'enquête qualitative. Les sujets de discussion ont porté sur les différentes méthodes pédagogiques qui ont été appliquées et leur influence sur le système d'enseignement ivoirien ainsi que les pistes de solutions pour une meilleure application de l'Approche Par Compétences. Ceci a servi d'instrument pour la collecte d'informations complémentaires aidant à l'interprétation des données quantitatives.

III. Resultats et Discussion

3.1 Resultats

3.1.1. Niveau de connaissances et de compréhension de l'Approche Par Compétences (APC)

Tableau 1 : Points de vue des étudiants stagiaires sur les programmes d'enseignement des lycées et collèges en CI

Avis	Effectif	Pourcentage (%)
Les programmes d'enseignement des lycées et collèges en CI sont inadaptés aux réalités sur le terrain	48	53,93
Les programmes d'enseignement des lycées et collèges en CI sont trop longs ce qui entraînent des difficultés pour les achever	24	26,97
Les programmes d'enseignement des lycées et collèges sont adaptés aux besoins d'apprentissage des élèves	17	19,01
Total	89	100

Source : Enquête sur le terrain

Les avis des étudiants stagiaires à travers ce tableau montrent que 80,90% des enquêtés trouvent les programmes d'enseignements inadaptés aux réalités socioéconomiques ivoiriennes et trop long pour être achevés dans le temps imparti contre 19,01% qui disent que ces programmes sont en adéquation avec les besoins d'apprentissage des élèves.

Tableau 2 : Connaissance de la définition de l'APC (Approche Par Compétence)

Définition de l'Approche Par Compétence	Réponses	Effectif	Pourcentage (%)
C'est une méthode qui met l'élève au centre de l'apprentissage	Oui	60	67,42
Méthode qui renforce plus la connaissance de l'enseignant	Non	29	32,58
Total		89	100

Source : Enquête sur le terrain

Le tableau 2 révèle que 67,42% des étudiants stagiaires donnent une définition correcte de l'Approche Par Compétences contre 32,58% qui ne savent pas ce qu'est l'APC.

Un enquêté s'exprime ainsi sur l'APC en ces termes:

«l'élève n'est plus un vase vide à remplir. L'enseignant l'amène à avoir confiance en lui-même car il participe à la construction de son savoir». (Enquêté, TS)

Tableau 3: Compréhension de l'APC

Compréhension de l'APC par les enseignants	Effectif	Pourcentage (%)
Non	85	95,51
Oui	4	4,49
Total	89	100

Source : Enquête sur le terrain

En ce qui concerne la compréhension de l'APC par les enseignants 95,51% des enquêtés n'ont pas compris cette approche pédagogique en raison de l'insuffisance de formation dans cette nouvelle approche pédagogique contre 4,49% qui l'ont compris. Un enquêté se prononce sur les raisons de la non-compréhension de l'APC en ces termes:

«on note une non adhésion d'une grande partie (75%) des enseignants de Côte d'Ivoire car les initiateurs n'ont pas fait de formation correcte en s'appuyant sur l'ENS. Les enseignements refusent d'y adhérer et continuent leurs enseignements en PPO.» (Enquêté, QA)

Un autre enquêté ajoute ceci :

«L'APC n'est pas enseignée par les professeurs de l'ENS mais plutôt par des conseillers pédagogiques du MENETP expliquent pourquoi elle ne soit pas comprise par la quasi-totalité des enseignants.»
(Enquêté YF)

3.2. Perception que les étudiants stagiaires ont de l'APC

Tableau 4: Perception positive de l'APC

Perception positive	Effectif	Pourcentage (%)
L'APC favorise la participation effective de l'élève au cours de l'enseignement	51	57,3
L'APC incite l'enseignant et l'enseigné à s'impliquer dans la construction du savoir	22	24,72
L'APC incite les élèves à une recherche personnelle du savoir	16	17,98
Total	89	100

Source : Enquête sur le terrain

A travers le tableau 4, on remarque que 57,3% trouve que l'APC favorise la participation effective de l'élève au cours de l'enseignement ; 24,72% disent que l'APC incite l'enseignant et l'enseigné à s'impliquer dans la construction du savoir et 17,98% énonce que l'APC incite les élèves à une recherche personnelle du savoir. Dans les lignes suivantes, nous donnons certains verbatims des enquêtés, s'exprimant sur l'APC :

«l'APC est une méthode de formation se repose sur l'acquisition des compétences en termes de savoir-agir qui fait suite à l'intervention et à la mobilisation d'un ensemble d'enseignement. L'utilité de cette approche pédagogique du point de vue théorique est que celle-ci mobilise le constructivisme et le socioconstructivisme. C'est une méthode active qui permet à l'enseignant de construire la formation des apprenants par des compétences pour résoudre les problèmes de la vie courante. L'APC met l'accent sur l'enseignement interactif c'est-à-dire centré à la fois sur les activités d'apprentissage et l'évaluation formative dans une approche plus globale qu'analytique.» (Enquêté GH).

Quant à un autre enquêté :

«Les informations relatives à l'APC sont diluées dans les différents documents dont le programme éducatif (les progressions dans les différentes disciplines au niveau secondaire). L'APC est une question de développement de connaissances en éducation qui entraîne le changement de paradigme, c'est une question d'évolution des sciences de l'éducation. Pour moi, le système scolaire ivoirien avait une

approche à un moment donné et voulait former un citoyen modèle de demain. Celui-ci doit prendre en compte dans l'enseignement l'évolution d'un type d'apprenant. Il faut négocier avec les changements socio-économiques et politiques qui affectent les sociétés actuelles, l'on veut former les têtes plutôt bien faites que bien pleines (PPO). L'APC veut former des individus compétents chez lesquels l'on retrouve à la fois le savoir, le savoir-faire et le savoir être ». (Enquête DT).

Pour sa part, selon un enquêteur enseignant de l'Ecole Normale Supérieure :
«L'APC est une adaptation de la manière d'enseigner copiée sur l'enseignement professionnel (par exemple le maçon, le soudeur, le menuisier etc. qui acquièrent des compétences). Le monde se globalisant la manière d'enseigner se globalise aussi, il va falloir pour les enseignants s'adapter aux rythmes de l'évolution du monde. Un élément clé de l'APC : le travail de groupe des élèves qui participent à la construction de leur savoir de manière active. Il y a un changement de paradigme au niveau de l'enseignant qui change de fonction. Il n'est plus le tout sachant mais il est le facilitateur, le guide qui amène les élèves à avoir un ensemble d'habiletés. » (Enquête ZE)

Tableau 5: Perception négative de l'APC

Perception négative	Effectif	Pourcentage (%)
Insuffisance de matériels didactiques à l'application de la méthode APC, les supports de cours sont inadaptés à l'application de la méthode APC	75	84,27
La méthode APC rend les élèves paresseux	14	15,73
Total	89	100

Source : Enquête sur le terrain

La lecture de ce tableau montre que 84,27% des enquêtés trouve qu'il y a une insuffisance de matériel didactique à l'application de l'APC et que les supports de cours sont inadaptés à l'application de celle-ci contre 15,73% qui trouvent que l'APC rend les élèves paresseux.

En outre, pour un des enquêteurs enseignants de l'Ecole Normale Supérieure ce qui rend l'application de l'APC difficile sur le terrain est que:

«l'on note la non maîtrise de l'APC, le manque de formation des enseignants, le manque de support didactique». (Enquête DT)

3.3. Obstacles à l'utilisation de l'APC dans les classes

Tableau 6: Obstacles à l'utilisation de l'APC

Obstacles à l'utilisation de l'APC	Effectif	Pourcentage (%)
Effectif pléthorique dans les salles de classe	14	15,73
Quasi absence de formation dans cette approche pédagogique	27	30,34
Manque de documents pour les enseignants	48	53,93
Total	89	100

Source : Enquête sur le terrain

La lecture du tableau 6 révèle que 53,93% insiste sur le manque de documents pour les enseignants comme un obstacle majeur à l'utilisation de l'APC en Côte d'Ivoire; 30,34% évoque la quasi absence de formation dans l'APC et 15,73% donne l'effectif pléthorique dans les salles de classe comme étant aussi des obstacles à l'utilisation de cette approche pédagogique.

3.4. Suggestions pour une meilleure application de l'APC

Tableau 7: Pistes de solutions pour une meilleure application de l'APC

Suggestions	Effectif	Pourcentage (%)
Adaptation des programmes de formation aux réalités ivoiriennes	27	30,34
Mettre plus d'accent sur la formation continue de l'enseignant	42	47,19
Rendre plus accessible les documents de formation aux enseignants	20	22,47
Total	89	100

Source : Enquête sur le terrain

Les données de ce tableau montrent que 47,19% insiste sur la formation continue des enseignants qui demeure la voie salutaire pour la vulgarisation et la compréhension de cette approche pédagogique afin de mieux former les élèves. Aussi 30,34% plaide-t-il pour l'adaptation des programmes de formation aux réalités ivoiriennes et 22,47% opte pour l'accessibilité des documents de formation aux enseignants.

Un enquêté suggère ceci :

«au niveau de la conception du matériel de l'APC, il faut formuler des objectifs clairs ; au niveau de l'apprenant étant donné que la formation part d'une motivation intrinsèque, elle est plus importante sauf que cela crée de l'insécurité en début d'apprentissage mais avec la mise en confiance l'apprenant retrouve son équilibre pour un meilleur apprentissage. » (Enquête SZ)

Pour un enquêteur enseignant de l'École Normale Supérieure:

«L'APC premièrement laisse penser qu'elle est en rupture avec la Pédagogie Par Objectif ; c'est une question de méconnaissance. Pour avoir des compétences et les développer, il faut nécessairement formuler les objectifs de façon explicite ou implicite. Deuxièmement le manque de formation en outils et le manuel est construit sur la base des compétences mais l'enseignant n'est pas formé sur cette même base. Troisièmement au niveau de l'évaluation ; l'évaluation en APC paraît plus subjective que celle de la PPO, la mesure est plus subjective. Quatrièmement le manque de matériel didactique n'aide pas à la mise en œuvre des compétences. Ce qui conduit au retour à la PPO. Alors il faut une adaptation des programmes de formation aux réalités du terrain, ensuite rendre accessible les documents de formation et enfin mettre l'accent sur la formation des formateurs» (Enquête DL) .

3.2. Discussion

Dans cette étude trois (3) objectifs ont été retenus : le premier objectif est d'évaluer le niveau de connaissances et de compréhension des étudiants stagiaires de l'Approche Par Compétences (APC), le deuxième est d'analyser la perception que ces étudiants stagiaires ont de l'APC et la troisième est de déterminer les obstacles à l'utilisation de l'APC dans les classes. Les résultats ont montré que les étudiants stagiaires ont peu de connaissances et de compréhension de l'APC, des perceptions sont plus négatives que positives. En effet, l'APC la dernière approche en vigueur n'est pas comprise par tous les étudiants stagiaires, il leur manque une formation continue dans cette approche pour dispenser un enseignement de qualité. Aussi nos résultats indiquent-ils que le manque de formation en APC constitue un handicap dans la compréhension et la vulgarisation de cette approche pédagogique. Ces résultats concordent avec ceux de Koffi (2017) qui affirme que le développement des compétences chez l'élève se trouve entravé par les difficultés de l'enseignant à maîtriser les concepts, à formuler des situations d'apprentissage. Alors aussi bien en formation initiale qu'en formation continue, il faut adapter les programmes de formation aux réalités ivoiriennes, mettre l'accent sur la formation continue des enseignants et vulgariser les documents de formation. L'APC amène l'apprenant à participer effectivement au cours ; l'enseignant et l'enseigné sont tous les deux impliqués dans la construction du savoir. En outre, cette approche pédagogique incite les apprenants à une recherche personnelle du savoir. Ces résultats sont en concordance avec les recherches de Masciotra et Medzo, 2009 ; Jonnaert et Masciotra, 2004 ; Jonnaert et al., Barrette et al., 2005). N'Guessan Lavri (2014) aborde dans le même sens en avançant que l'APC est une méthode

pédagogique qui instaure un contrat didactique dans lequel l'apprenant est appelé à s'impliquer dans un effort collectif pour réaliser de nouvelles compétences. L'apprenant est invité à faire part de ses doutes, à expliciter ses raisonnements, à prendre conscience de ses façons de comprendre, de mémoriser et de communiquer. Comme le mentionne aussi Villa (2017), l'APC donne du sens aux apprentissages et favorise la participation active des apprenants ; elle permet de résoudre des problèmes pratiques de la vie courante. L'élève constitue l'acteur principal qui polarise l'attention des enseignants dans cette méthode pédagogique. Ainsi, l'adhésion totale des acteurs du Système Educatif Ivoirien est indispensable car l'APC présente un atout incontestable pour réussir son implantation dans la formation des formateurs.

Conclusion

Les objectifs de cette étude sont : évaluer le niveau de connaissances et de compréhension des étudiants stagiaires de l'Approche Par Compétences (APC), analyser la perception que ces étudiants stagiaires ont de l'APC et déterminer les obstacles à l'utilisation de l'APC dans les classes. Ces objectifs sont atteints car les résultats ont montré que les étudiants stagiaires ont peu de connaissances et de compréhension de l'APC. Les perceptions que les étudiants stagiaires ont de l'Approche Par Compétences sont plus négatives que positives. En outre, l'APC, la dernière approche en vigueur n'est pas comprise par tous les étudiants stagiaires, car il y a un manque de formation continue. Ceci constitue un frein pour la compréhension et la vulgarisation de cette approche pédagogique. C'est la raison pour laquelle son application par les enseignants rencontre de nombreux obstacles. Il est important que le Ministère de tutelle MENETFP devenu MENA responsabilise les enseignants de l'Ecole Normale Supérieure pour la formation de l'APC afin que ceux-ci puissent contribuer effectivement et efficacement à la formation des enseignants de l'enseignement secondaire en Côte d'Ivoire. En effet, il faut opter pour la formation continue des formateurs, comme une piste de solution, en y mettant les moyens, organiser des séances de formation effective et sensibiliser les enseignants sur l'application effective de l'APC. Aussi faut-il que les contenus de l'APC fassent partie des contenus d'enseignement à l'Ecole Normale Supérieure qui demeure la seule voie pour amener les enseignants à mieux maîtriser cette approche pédagogique pour mener à bien leur métier d'enseignant. La non-vulgarisation de cette approche auprès des enseignants constitue un sérieux handicap à son utilisation. L'APC permet les échanges entre enseignants et enseignés, permet aux apprenants d'être plus autonomes dans la quête du savoir afin d'acquérir des compétences durables susceptibles de les aider dans leur cursus éducatif et dans la vie quotidienne.

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Enseignement et Formation : Deux Concepts Différents

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Resume

Cet article, qui s'inscrit dans le cadre des Sciences de l'éducation, tente de recenser les caractéristiques de l'enseignement et de la formation. Il met à la disposition des enseignants et des formateurs des connaissances nécessaires, afin d'éviter toute confusion entre les deux concepts. Pour réaliser les objectifs de cette étude, nous adoptons une méthode qualitative, suivant une démarche compréhensive, qui se base principalement sur la distinction pour nourrir la compréhension. Cette étude mobilise une recherche documentaire qui se base essentiellement sur les publications (ouvrages et articles scientifiques) qui traitent le sujet de cet article. Les données collectées sont traitées suivant une analyse inductive, guidée par les objectifs de la recherche. Cette méthode permet de définir et de comparer les sens, les pratiquants, les cibles, les modèles, les milieux de pratiques, les types, les méthodes et les outils d'enseignement et de formation. Les résultats de ce travail montrent que l'enseignement et la formation sont deux concepts différents, même si les praticiens les associent.

Mots-clés : Enseignement, Formation, Éducation, apprentissage

Teaching and Training: Two Different Concepts

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Abstract

This article, which falls within the framework of the Sciences of Education, attempts to identify the characteristics of teaching and training. It makes available to teachers and trainers the necessary knowledge to avoid any confusion between the two concepts. In order to achieve the objectives of this study, we adopt a qualitative method, following a comprehensive approach, which is mainly based on the distinction in order to nourish comprehension. This study mobilizes a documentary research which is essentially based on the publications (books and scientific articles) which deal with the subject of this article. The data collected are processed according to an inductive analysis, guided by the research objectives. This method makes it possible to define and compare the meanings, practitioners, targets, models, practice environments, types, methods and tools of teaching and training. The results of this work show that teaching and training are two different concepts, even if practitioners associate them.

Keywords: Teaching, Training, Education, learning

Introduction

Dans une ère de globalisation des échanges, les entreprises recourent aux formations, comme moyen de renforcer la performance, pour faire face à la concurrence, et aux exigences qui leur sont imposées. Aux pays développés, l'expression « la formation du personnel » est substituée par « la formation des compétences ». Dans des économies concurrentielles, en perpétuelle évolution, les organisations exploitent leurs compétences pour assurer leurs performances. Elles investissent dans la formation des employés afin d'assurer la réalisation de leurs objectifs stratégiques. Au Maroc, il paraît que la situation est différente, notamment au secteur public, malgré les sommes colossales accordées à cette activité, qui s'inscrit dans le cadre de la gestion des ressources humaines. Il semble que les politiques gouvernementales n'accordent pas grande importance au développement des compétences des cadres. Les formations ne sont traitées que dans l'angle de l'exécution budgétaire. Leur qualité semble être le dernier souci des responsables. Au secteur d'éducation nationale, un grand nombre de formations est assuré, chaque année, par des personnes qui ne distinguent pas la formation de l'enseignement.

I. Les contours de la recherche

I.1. Problématique

Aujourd'hui, nous vivons dans une société de savoir. L'information est abondante, ce qui dévoile le niveau des formateurs dans les domaines du savoir et du savoir-faire. Les bénéficiaires formés se sentent souvent insatisfaits. Ce qui justifie les faibles taux de réalisation des objectifs des formations, notamment dans le domaine de l'éducation. Les formations des éducateurs et éducatrices de l'enseignement préscolaire, organisées en 2020 et 2021, par le ministère de tutelle, ne présentent qu'un seul exemple de cette crise. Les conditions exigées pour réaliser les objectifs ne sont accomplies ni par les formateurs ni par les bénéficiaires. D'un côté, la plupart des formateurs sont obligés d'accomplir cette mission, n'ont bénéficié d'aucune formation dans ce domaine. De l'autre côté, les bénéficiaires recrutés par les associations, chargées de la gestion des classes de cet enseignement dans les écoles publiques, ne répondent pas aux conditions exigées par la loi, dans leur majorité. En conséquence de cette situation, certains formateurs ont été obligés de présenter des cours d'enseignement théorique, sous forme de PowerPoint, afin de passer les cinq longues journées de formation.

Ce qui précède nous incite à interroger les deux concepts : enseignement et formation. La pratique les associe, et les dictionnaires les différencient. Ils sont d'une importance égale. Ils renvoient à l'éducation et au développement des compétences. Ils se confondent au point où il est difficile de distinguer un cours présenté aux élèves, dans une classe, par un enseignant, d'un côté, d'une séance de formation présentée à un groupe de stagiaires, par un formateur, dans un centre de formation, de l'autre côté. Afin de mettre en lumière les deux concepts, cet article tente de répondre aux questions principales suivantes : que signifient l'enseignement et la formation ? Quels sont les acteurs, les types, les objectifs, les programmes, les méthodes, et les outils d'enseignement et de formation ?

I.2. Hypothèses

Afin de répondre aux questions posées, nous avançons les hypothèses suivantes :

- la définition de l'enseignement est différente de celle de la formation ;
- l'enseignement transmet des connaissances théoriques et la formation transmet des compétences pratiques ;
- les acteurs, les méthodes, les outils et les types de l'enseignement sont différents de ceux de la formation.

I.3. Objectifs de la recherche

Cet article, qui s'inscrit dans le cadre des Sciences de l'Éducation, vise à distinguer les concepts : enseignement et formation. Son but ultime est de

mettre à la disposition des formateurs, les connaissances essentielles relatives à ces deux concepts, d'une manière simple, et détaillée, afin d'éviter d'éventuelles confusions conceptuelles. Il recense les caractéristiques de chacun des deux processus. Il présente les définitions, les acteurs, l'environnement des pratiques, les objectifs, les méthodes, les outils et les types d'enseignement et de formation.

I.4. Méthodes et outils de collecte de données

Pour réaliser ce travail, nous adoptons une méthode qualitative, suivant une démarche compréhensive. Cette méthode permet, d'une part, d'éviter les tensions entre la théorie et la pratique. De l'autre part, elle se base sur la distinction pour nourrir la compréhension.

Afin de collecter les données nécessaires pour mener à terme cet article, nous mobilisons une recherche documentaire, qui se base essentiellement sur les publications (ouvrages, articles scientifiques, etc.), traitant l'objet de l'étude.

Les données qualitatives collectées sont traitées suivant une analyse inductive, guidée par les objectifs de la recherche. Cette stratégie permet, à la fois, de définir et de comparer les sens, les pratiquants, les cibles, les modèles, les milieux de pratiques, les types, les méthodes et les outils d'enseignement et de formation.

I.5. Le plan

Nous commençons notre analyse par l'exposition des données globales collectées relatives à l'enseignement, qui concernent ses définitions, ses modèles, ses styles, ses méthodes, ses techniques et ses outils.

Nous enchaînons, ensuite, par la mise en lumière des éléments assemblés relatifs à la formation, qui présentent sa définition, ses contenus, ses milieux de pratiques, ses types, ses méthodes et ses outils.

Enfin, la conclusion présente un tableau de synthèse de la comparaison entre enseignement et formation.

II. L'enseignement

Dans ce qui suit, nous présentons des éclairages quant aux définitions, pratiquants, cibles, modèles, styles, méthodes et techniques d'enseignement.

II.1. Quelques définitions

« *L'enseignement est un phénomène complexe* » (Conseil de l'Europe, 2010, p. 95), et une activité sociale et éducative. Il différencie de l'éducation. Ses définitions, qui sont multiples, s'accordent sur ses caractères : « mutuel », « interactif », et « intentionnel ». Elles se basent sur l'implication des enseignants et des élèves dans une relation « sociale », « éducative » et

« interpersonnelle », de « communication », d'« apprentissage » et de « transmission ». Dans la conception classique, enseigner c'est faire des hommes, transmettre un message, transmettre un savoir. Enseigner c'est aussi apprendre, et créer des adultes dynamiques (LEM, s.d).

Généralement, sur le plan scientifique et conventionnel, « *l'enseignement est un système d'actions visant à induire l'apprentissage* » (Briguet, 2012, p. 141). Cette définition présente l'enseignement comme un système, composé d'un ensemble d'actions coordonnées et organisées à la fois de l'enseignant et de l'apprenant. Dans ce sens, J. Dewey, définit l'enseignement comme une « *action entreprise avec intention d'apporter l'apprentissage à l'autre* » (Briguet, Y-D, 2012). Sur le plan pratique, « *l'enseignement est un art au sens où il n'est pas dominé par des prescriptions et des routines, mais est influencé par des qualités et des contingences qui ne sont pas anticipées et se manifestent au cours de l'action* » (OCDE, 2010, p. 48). Selon le dictionnaire de l'éducation de Legendre Larousse 1988, l'enseignement est un « *processus de communication en vue de susciter l'apprentissage* ». Il se définit également comme un processus institutionnalisé d'éducation et d'apprentissage systématique d'une première personne, qui s'appelle « enseigné » ou « élève », par une deuxième personne, présentée par l'enseignant. Il vise le développement des aptitudes, des habitudes et des attitudes des apprenants (Photios et al., 2002). Il est généralement théorique et s'appuie sur la transmission des connaissances et des concepts. Pour certains chercheurs, tels Amidon et Hunter, « *l'enseignement est un processus interactif impliquant principalement l'interaction verbale qui a lieu en classe entre l'enseignant et les élèves, et ce, pendant certaines activités bien définies* » (Briguet, 2012, p. 141). Cette définition présente l'enseignement comme un « processus ». Il est aussi une activité interpersonnelle et interactive liant l'enseignant et les élèves, dans une salle. Ces dernières définitions présentent la conception moderne de ce terme. Elles le traitent comme un concept plus large, qui intègre « *l'organisation* », « *la facilitation* » et « *la gestion des apprentissages* » (LEM, s.d).

À ces définitions, s'ajoutent celles d'Anderson et Burns, qui précisent que l'enseignement est une activité interactive interpersonnelle, qui implique une communication verbale, ayant comme finalité l'aide d'un ou plusieurs élèves à apprendre (Briguet, 2012).

II.2. Pratiquant et ciblés d'enseignement

Dans le système scolaire, les professeurs et les instituteurs sont des fonctionnaires qui forment le corps enseignant. L'enseignant est une personne, un agent et un travailleur et un maître qui maîtrise les techniques d'enseignement. Il est un spécialiste de l'analyse qui arrive à développer chez les élèves les habiletés spécifiques attendues. Il est censé transmettre les

apprentissages fondamentaux que les élèves doivent posséder. Il est un observateur, un évaluateur, et un animateur, qui aide, encourage, et accompagne ses apprenants. Les enseignants sont formés pour enseigner dans des classes de cours. Enseigner nécessite l'expertise d'un professionnel qualifié. « *L'enseignant est un sujet-supposé-savoir et qu'il a un travail de transmission du savoir* ». (Idrissi, 1982, p. 42). Il présente les caractéristiques de l'exemplarité d'un adulte. Il se présente comme un planificateur des conditions d'apprentissage, un facilitateur et un médiateur, qui assure l'accompagnement de ses élèves aux niveaux : psychologique et intellectuel.

Quant à l'élève, c'est un disciple qui reçoit l'enseignement. Il est un agent actif. « *Il pense, il parle et il agit* » (Collard, 1893, p. 532). Sa présence est souvent obligatoire.

II.3. Milieu de pratique d'enseignement

L'enseignement se déroule, souvent, dans un espace spécifique. Il s'exerce dans des salles de classe. Il se situe habituellement, dans le contexte de l'univers scolaire et universitaire. C'est ainsi qu'« *il se réalise au sein d'une institution, l'école, qui se caractérise par plusieurs traits : hiérarchie des cycles de formation, séparation de la production, corps spécialisé d'enseignants, sanction de l'acquisition des savoirs par des promotions et par des diplômes.* » (Photios et al., 2002, p. 264).

II.4. Contenus d'enseignement

Ce sont les enseignants qui éduquent les enfants à devenir de bons citoyens. Ils enseignent les contenus scolaires afin de stimuler l'apprentissage. Grâce aux concepts théoriques et connaissances transmises, les élèves peuvent faire face aux défis de leur entourage, et arrivent à intégrer leur société. Dans le contexte scolaire, « *le programme scolaire est un instrument de contrôle des processus d'apprentissage institutionnalisés dans le cadre des établissements scolaires et comprend les objectifs, le contenu et les méthodes d'apprentissage* » (Marques, 1979, p. 1). Il se définit aussi comme « *un ensemble des matières et des sujets sur lesquels doit porter un enseignement. Nous le considérons comme un texte réglementaire et officiel qui sert de référence nationale pour fonder dans chaque discipline* » (Guimfac, 2010, p. 27). Ce programme académique officiel est aussi appelé « *curriculum* ». C'est un contenu et un produit social, historique, standardisé et organisé. Il englobe des connaissances, des valeurs, des attitudes, des habiletés et des capacités qu'un apprenant est censé acquérir. Il met en relation les élèves et la société (Belinga, 2005).

II.5. Objectifs d'enseignement

L'enseignement n'a pas pour objectif de rendre les apprenants performants. Il vise en plus du développement des aptitudes, des habitudes et attitudes des apprenants, l'enrichissement d'esprit, l'évaluation des acquis, la présentation d'un apprentissage de qualité, et la planification du soutien. Sur le plan économique, il fournit les travailleurs qualifiés (Touré, 2020), et crée les conditions propices à la créativité et au développement.

II.6. Modèles d'enseignement

Les modèles constituent le niveau le plus général de l'enseignement. Ils représentent ses orientations philosophiques. Ils permettent le choix de ses stratégies, ses méthodes, ses techniques, ses activités et ses situations pédagogiques appropriées (MAS, 1993, p.18).

Les modèles d'enseignement, les plus connus, sont :

- **le modèle transmissif** : il s'appuie sur l'hypothèse que l'apprenant ne sait rien du contenu enseigné, ou ne le connaît que de façon incomplète. L'enseignant cherche à remplir sa « tête vide », en lui expliquant un savoir, ou un savoir-faire. Ce modèle permet de gagner du temps. L'enseignant peut enseigner un groupe de personnes simultanément (Vianin, P, 2019, p. 230).
- **le modèle « maïeutique scolaire »** : il a été développé par le philosophe Socrate. Il se base sur l'hypothèse que toute personne a en elle-même la connaissance, car son âme a traversé le monde de la connaissance. L'enseignant aide l'élève à « accoucher » de la connaissance par un questionnement. Ce modèle présente des inconvénients au niveau de la gestion de la classe (Jacquet et Kambouchner, D. 2005, p.95).
- **le modèle béhavioriste** : il s'appuie sur les théories de psychologie, développées au début du XXe siècle. Il s'intéresse aux comportements observables, et correspond au conditionnement. Ce modèle a donné naissance à la « pédagogie par objectifs ». Il est centré sur l'apprenant (Le Thành, K, 1991, p.231).
- **le modèle socioconstructiviste** : ce modèle s'est développé contre le courant béhavioriste, amenant l'hypothèse que les comportements mentaux jouent un rôle fondamental dans l'étude du comportement humain et en particulier dans l'apprentissage. Il se concentre sur les compétences et les acquisitions des apprenants (Rege et Romainville, 2006, p. 217).
- **le modèle de l'« apprentissage abstraction »** : il est fondé par Brait-Mari Barth, s'inspire des recherches de Piaget et Bruner. Il est adapté aux concepts « classificateurs » seulement. Il met l'élève dans des situations complexes, ce qui lui permet de développer une démarche

de recherche. Il rend l'acquisition des concepts possibles à travers l'appropriation de leurs caractéristiques. Quant à cette appropriation, elle s'effectue en trois étapes suivantes: la recherche des caractéristiques du concept enseigné, la représentation mentale et l'abstraction (Barth, 2013).

II.7. Styles d'enseignement

Selon le dictionnaire « ROBERT », le « style », est la « *manière personnelle d'agir, de se comporter...* ». Le style d'enseignement approprié est identifié à partir du modèle adopté. Il montre la manière personnelle de l'enseignant de gérer sa relation avec ses élèves. En s'inspirant des travaux de Blake et Mouton (1964) en matière de management, Therer et Illemart distinguent quatre styles d'enseignement, qui sont :

- **le style transmissif** : il se centre uniquement sur la matière enseignée.
- **le style incitatif** : il se centre à la fois sur la matière et sur les apprenants.
- **le style associatif** : il se centre uniquement sur les élèves.
- **le style permissif** : il se centre beaucoup plus sur la matière que les apprenants.

Ces définitions combinent entre deux attitudes de l'enseignant. D'un côté, son attitude vis-à-vis de la matière, et de l'autre côté, son attitude vis-à-vis des apprenants.

II.8. Méthodes d'enseignement

Elles se catégorisent en cinq groupes, qui sont :

- **l'enseignement direct** : c'est une méthode d'enseignement dirigée par l'enseignant, qui présente des informations, sous forme de cours magistraux, explicites et guidés aux élèves, dans une salle de classe.
- **l'enseignement indirect** : c'est un processus d'apprentissage centré sur les élèves. Ces derniers participent activement à ce processus en réalisant des recherches qui leur permettent de penser de manière critique, de prendre des décisions et de résoudre des problèmes. Ce type d'enseignement développe les compétences des élèves liées aux concepts enseignés.
- **l'enseignement interactif** : cette méthode est développée dans les années 1980, à l'Université de Waikato, dans le cadre du projet Learning in Science. Elle encourage la participation active des apprenants dans le processus d'apprentissage par le biais d'une interaction régulière (enseignant/élève, élève/élève), et en utilisant les moyens audiovisuels et des démonstrations pratiques. Elle offre des

conditions de la compréhension et de l'utilisation de la mémoire à long terme.

- **l'apprentissage expérientiel ou l'étude indépendante** : cette méthode se base sur la théorie de l'apprentissage expérimental de Kob (1984). Elle traite les éléments clés de l'apprentissage contribuant à une pratique significative. Les enseignants l'utilisent pour soutenir la pratique de l'enseignement et les expériences des élèves. Il comprend quatre phases (l'expérimentation, l'observation réfléchie, la conceptualisation, et l'émission d'hypothèse).

II.9. Techniques d'enseignement

Les techniques représentent le niveau le plus spécifique des comportements d'un enseignant. Parmi ces techniques, nous citons : le questionnement, la discussion, les directives, les explications et les démonstrations. Il s'ajoute à ces techniques : la planification, la structuration, la focalisation, et la gestion.

III. La formation

Dans ce qui suit, nous mettons des lumières sur la définition, les pratiquants, les bénéficiaires, le contenu, le milieu de pratique, les types et les méthodes de la formation.

III.1. Quelques définitions

Le mot « formation » est employé en langue française depuis le XI^e siècle, pour désigner le processus de transformation naturelle ou culturelle, permettant aux choses de prendre leurs formes finales, ainsi que les résultats de ces changements (Fabre, 1992). Elle diffère des autres formes d'apprentissage. Au domaine éducatif, « *la formation englobe toutes les activités éducatives auxquelles pourrait s'adonner l'adulte, qu'il s'agisse d'études générales ou professionnelles, de recyclage ou de perfectionnement, de matières pertinentes à son travail comme à sa vie de citoyen* » (Ndilbe, 2016, p. 20). Elle est « *un processus continu et global qui se poursuit dans les activités diverses de la vie quotidienne* » (Ader, 1961, p. 45). Elle est toujours préparée et accompagnée, tant au niveau de l'individu, qu'au niveau de l'organisation. La formation est aussi définie comme l'action d'apprendre en faisant, et l'action de transmettre des compétences pratiques et des comportements spécifiques à une personne ou un groupe de personnes. Elle concerne l'individu dans ses côtés : psychologique, mentale, affective et somatique. Elle permet le passage d'un état à un autre (Besançon et al, 1994). Elle se base sur l'apprentissage et le partage, qui implique l'acquisition de connaissances, le perfectionnement de compétences, de concepts et de règles. C'est ainsi que « *la formation peut se définir comme l'ensemble des actions*

capables de mettre les individus et les groupes en état d'assurer avec compétence leurs tâches actuelles ou celles qui seront confiées dans leur futur pour la bonne marche de l'organisation » (Ndilbe, 2016, p.22).

Ces définitions considèrent la formation comme un ensemble d'actions, de moyens, de techniques et de supports planifiés qui visent l'amélioration des connaissances et des comportements, susceptibles de rendre les individus et les groupes capables d'assurer leurs fonctions avec compétence.

Au domaine du management, généralement, la formation est un ensemble de mesures adoptées en vue d'acquérir ou de perfectionner la qualification professionnelle des bénéficiaires (Aguinou, 2018). Elle est aussi un élément de la gestion des ressources humaines, qui est au service de l'amélioration du rendement, la mise en œuvre des stratégies de développement de la logique compétence de l'organisation. Elle anticipe l'évolution des métiers (Galambaud, 1993), en permettant le développement systématique de connaissances, aptitudes et compétences que demande l'exercice d'une tâche spécifique.

Dans le domaine économique, la formation est un moyen de résolution de problèmes (Hosdey et Rogester, 2009), de déblocage des situations (Palazzeschi, 1998)., d'ajustement, de perfectionnement et de promotion professionnelle par l'acquisition de nouvelles compétences, qui aide les chômeurs à retrouver des emplois. Elle permet aux bénéficiaires de satisfaire les exigences nécessaires pour exercer un métier. Elle aide également les employés à s'adapter au poste occupé, à évoluer vers d'autres fonctions, et à combler des retards de leur niveau, en général. Pour les entreprises, elle est un investissement (Camut, 1975), susceptible d'accroître la productivité et le rendement. Toute dépense visant l'amélioration des connaissances n'est pas une consommation. Cette thèse a été défendue par la théorie du capital humain, fondée par les économistes Schultz et Becker, au début des années 1960. Pour ces chercheurs, le niveau de formation des travailleurs d'un pays a un impact sur le niveau de ses richesses. La théorie des ressources internes a également encouragé les entreprises à investir dans le développement des stratégies de formation et de fédération des ressources humaines. Parmi les chercheurs qui ont appuyé cette théorie, nous citons : Cappelli, Crocker-Hefter, Lepak Wright et Snell.

III.2. Pratiquants et bénéficiaires de formation

La formation professionnelle, guidée par des formateurs émérites qualifiés et chevronnés, est susceptible de préparer les nouveaux employés à répondre aux exigences de l'emploi. Le formateur est un expert et un professionnel compétent qui a une compréhension approfondie des concepts théoriques et une expérience pratique. Il est un entraîneur qui facilite

l'apprentissage et l'auto-apprentissage. Il possède les concepts théoriques nécessaires à la mise en œuvre des situations concrètes. Il transmet des connaissances et partages des compétences pratiques. Il connaît le terrain et possède l'expertise nécessaire pour offrir une formation aux stagiaires et aux employés.

La formation peut être offerte aux chômeurs, employés et aux stagiaires sélectionnés, accomplissant les conditions exigées, par l'organisateur. Elle vise, d'une manière égale, toutes les catégories de personnes, sans distinction d'âge, de niveau ou de responsabilités. Chaque formation a ses propres visées, qui sont souvent volontaires.

III.3. Milieu de pratique de formation

La formation est associée à la pratique au monde d'emploi. Elle se déroule, généralement, dans un environnement spécifique, au milieu du travail, ou dans les centres de formation, en dehors de ce milieu.

III.4. Programmes de formation

La formation est une application pratique des savoirs. Elle a pour objet ultime de transmettre un savoir, et un savoir-faire, par un formateur, à une personne ou à un groupe de personnes. Le programme de formation est bien planifié par l'organisateur pour atteindre des objectifs précis, en se basant sur des compétences spécifiques, exigées par le travail.

III.5. Objectifs de formation

La formation prépare ses bénéficiaires à faire face aux changements. Elle améliore leurs employabilités grâce à la transmission des compétences pratiques nécessaires à l'intégration socioprofessionnelle. Elle développe leurs compétences techniques pour mener à bien leurs missions. Elle permet aux employés de conserver leur emploi et assure leur perfectionnement et leur progression au sein de leurs organisations. Sur le plan psychologique, la formation accroît la motivation des employés, qui se sentent reconnus par leur employeur. Elle procure également un sentiment de fierté après l'obtention du certificat ou du diplôme de formation (Hosdey et Rogester, 2009). Sur le plan économique, la formation, comme moyen de croissance économique, permet aux organisations d'améliorer leur efficacité et leur rentabilité en matière de production.

III.6. Types de formation

Les types de formation les plus connus sont :

- **la formation initiale** : elle se présente en présentiel et sans alternance, et constitue, habituellement, une continuité d'un parcours scolaire.

- **la formation continue** : elle s'oriente vers les personnes désireuses de changer d'emploi, ou de perfectionner leur expérience.
- **la formation professionnelle** : elle a pour objet d'acquérir de nouvelles compétences, susceptibles d'aider la personne formée à évoluer dans son parcours professionnel, ou à changer sa profession.
- **la formation en alternance** : son principe est d'alterner entre les périodes de cours et de formation théorique et périodes de travail. Elle permet aux stagiaires de se former gratuitement.
- **la formation en présentiel** : c'est une formation dont l'interaction du formateur et ses cibles se déroulent au sein du même lieu. Elle se caractérise par un accompagnement constant du formateur, qui répond directement aux besoins des apprenants.
- **la formation à distance** : elle est flexible et ne s'effectue pas en présentiel. Elle concerne les personnes désireuses de suivre les contenus de la formation, depuis chez elles. Les moyens utilisés par le formateur, dans son accompagnement, sont variés (téléphone, plates-formes en ligne, instruments numériques, réseaux sociaux, courriels, supports papier par voie postale, etc.).
- **la formation de type blende Learning** : elle associe les deux types de modalités pédagogiques (présentiel et à distance).
- **la formation en ligne** : elle correspond à la formation via internet, via les plates-formes.

III.7. Méthodes de formation

Les méthodes de formation sont celles employées pour communiquer les contenus et permettre les apprentissages. Qu'elles soient formelles ou informelles, elles ont toutes pour but de faciliter la transmission des savoirs, de savoir-faire et de savoir-être. Le choix de la méthode appropriée est conditionné par le choix du style d'apprentissage adopté (convergent, divergent, assimilateur ou accommodateur). Les travaux de : Bazin, Fernandez, Laflamme, Meignant, Mucchielli, et Sonntag distinguent trois groupes de méthodes de formation, qui sont :

- **les méthodes affirmatives** : elles se basent sur les formateurs qui détiennent le savoir.
- **les méthodes interrogatives** : elles considèrent les formateurs comme des maîtres. Ces derniers recourent au questionnement, considéré moyen de développement des connaissances et compétences des bénéficiaires. Ces derniers se situent dans des situations actives de recherche de réponses.
- **les méthodes actives** : elles se basent sur l'implication active des personnes formées dans le processus d'apprentissage, aux niveaux :

intellectuel, affectif et émotionnel. Elles n'exigent pas la possession du savoir par le formateur. Ce dernier ne joue que le rôle de guide et de facilitateur. Son intervention est très limitée.

III.8. Outils de formation

Ce sont des instruments techniques que les formateurs utilisent pour réussir leurs formations. Le choix de ces outils est conditionné par certains facteurs, tels que : les objectifs, le coût, l'interaction des intervenants, les activités planifiées de la formation. Généralement, les outils de formation se répartissent en quatre catégories suivantes :

- **outils visuels** : parmi ces outils, nous citons : le tableau, le rétroprojecteur et les notes de cours.
- **outils auditifs** : le magnétophone et le téléphone sont les outils de ce type les plus connus.
- **outils audiovisuels** : parmi ces moyens, nous citons : le diaporama, le film et le magnétoscope.
- **outils interactifs** : ce sont des outils qui permettent l'interaction, comme : l'ordinateur, le didacticiel et le simulateur.

Conclusion

Les résultats de notre recherche documentaire confirment toutes les hypothèses de la recherche. Ils montrent que la formation et l'enseignement sont deux concepts différents, même s'ils renvoient aux pratiques d'éducation, visant l'acquisition des connaissances et le développement des compétences des bénéficiaires, d'une manière académique.

Le tableau suivant résume les différences entre les deux concepts.

Tableau1 : Synthèse de la comparaison entre l'enseignement et la formation

	Enseignement	Formation
Définitions	- un phénomène complexe - une action sociale éducative interactive et intentionnelle - un système - un art - un processus de communication, de transmission et d'apprentissage.	- un élément de la GRH - un ensemble d'actions - un ensemble de mesures, de moyens, de techniques et de supports planifiés - un investissement - une solution des problèmes de l'organisation.
Acteurs	- les enseignants - les élèves	- les formateurs expérimentés - les experts- les entraîneurs- les stagiaires - les employés -les chômeurs- etc.
Environnements	- un espace spécifique et contrôle - une salle de classe	- le milieu du travail - les centres de formation - l'environnement qui garantit une certaine liberté

Objectifs	<ul style="list-style-type: none"> - l'apprentissage des concepts théoriques - le changement des représentations 	<ul style="list-style-type: none"> - la transmission des compétences pratique - le changement des pratiques - l'amélioration de l'employabilité - le perfectionnement et la progression au travail - l'amélioration de l'efficacité et de la rentabilité
Méthodes	<ul style="list-style-type: none"> - l'enseignement direct - l'enseignement indirect - l'enseignement interactif - l'apprentissage expérientiel - l'étude indépendante 	<ul style="list-style-type: none"> - les méthodes affirmatives - les méthodes interrogatives - les méthodes actives
Outils	<ul style="list-style-type: none"> - le questionnaire - la discussion - les directives - les explications - les démonstrations - la planification - la structuration - la focalisation - la gestion. 	<ul style="list-style-type: none"> - les outils visuels - les outils auditifs - les outils audiovisuels - les outils interactifs
Types	<ul style="list-style-type: none"> - le style transmissif - le style incitatif - le style associatif - le style permissif 	<ul style="list-style-type: none"> - la formation initiale - la formation continue - la formation professionnelle - la formation en alternance - la formation en présentiel - la formation à distance - la formation blende Learning - la formation en ligne

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Using Classical Test and Item Response Theories to Evaluate Psychometric Quality of Teacher-Made Test in Ghana

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Abstract

Teaching, learning, and assessment are key concepts in education and their relationship can be seen as participants of a three-legged race. In this regard, classroom assessment practices such as teacher-made tests are important and meaningful when they support students' learning. The purpose of this study was to establish the psychometric quality of a teacher-made mathematics test item used in one of the Senior High Schools in Ghana. This study employed quantitative descriptive design where 400 selected students' responses to a teacher-made Mathematics test were collected and analyzed through various psychometric techniques. The results showed that the Mathematics test had low but acceptable reliability coefficient of 0.61. Also out of the 40 multiple-choice items, 26 were of satisfactory difficulty levels with only one test item found to be too difficult and three test items being too easy. The findings of the discrimination indices suggest that 25 test items had bad or weak discrimination indices and four items showed negative discrimination indices. The study further indicated that 30.8 percent of the options were functioning distractors whereas the majority of the options (69.2%) were non-functioning distractors. It is therefore recommended that in-service training on effective ways of developing test items should be organized regularly for in-service teachers to help improve of the quality of teacher-made tests across Senior High Schools in Ghana.

Keywords: Item difficulty, discrimination indices, teacher-made test, classical test theory, item response theory

Introduction

Assessment is key when it comes to education, specifically teaching and learning. It is worth acknowledging that the aim for which any assessment is developed and also validated remains a critical component of assessment (Awoniyi, 2016). Whereas formative assessment seeks to discover areas which need to be improved during the process of teaching-learning, summative assessment takes place after the process has ended, that is, at the end of term, year, or program for purposive decision making regarding the ended task, or completed program (Mensah, 2014). According to Amoako (2018), utilization of formative assessments remains a common methodology advocated within educational literature for improving teachers' pedagogical practices, and for providing specialized instructional support for less performing students. Literature has demonstrated that using formative assessment helps to improve instructional practices, identifies the gaps within the curriculum, and also contributes to the enhanced performance of students (Asare, 2015; Dunn & Mulvenon, 2009).

The utilization of formative assessments has even become more necessary particularly in the Covid-19 era, whereby the situation necessitated that schools be closed down due to the pandemic. Nonetheless, because Ghana overly relies on summative assessments for assessing final year students, students had to return to school to write their final examinations for instance, the Basic Education Certificate Examination (BECE) for Junior High Schools and the West Africa Senior School Certificate Examination (WASSCE) for Senior High School students to enable them progress to the next educational level. However, more emphasis can be placed on formative assessments which can be used in place of summative assessment in case of emergency in assessing students. Thus, it would not have been necessary for the Junior High School (JHS) and the Senior High school (SHS) final year students to return to school to write their exit examinations during this COVID-19 era if Ghana had a robust and trusted formative assessment regimes in our schools. It is therefore imperative to pay more attention to formative assessment practices in our schools moving forward as a country.

According to Quaigrain and Arhin (2017), teachers use tests/assessments to understand the prowess of students regarding learning outcomes, whether they are affective, cognitive, or psychomotor. All teachers in whichever educational level they are, are responsible for preparing as well as administering numerous formalized teacher-made tests. According to Quaigrain and Arhin (2017), tests remain essential for providing feedback to teachers about their own performance and that of the students they teach. This makes test quality a crucial concern. Adhering strictly to the standards of test construction, administration, analysis, in addition to reporting remains

relevant, particularly when there is the development of norm-referenced tests for instructional purposes (Mozaffer & Farhan, 2012).

In Ghana, there exist two main test formats. They include objective and essay tests, although objective tests (usually multiple-choice) are used more frequently (Quaigrain & Arhin, 2017). Designing multiple-choice questions (MCQs) to evaluate comprehensively the knowledge of students after each semester/term is very complex as well as time-consuming (Mozaffer & Farhan, 2012). Upon administering a test, a teacher must be able to determine test items' quality, and whether the items reflected the performance of the students with regards to those particular learning objectives taught over a period. According to Odili (2010), the interest in psychometric analyses of tests is due to the fact that education remains a mechanism for attaining equality among individuals. The situation where some examinees fail while others pass the examinations due to the difficulty encountered in the test has distorted the probability of failed examinees gaining admissions or promotion. Thus increasing class differentiation and the rate of school dropouts. This means that psychometric analysis of teacher-made tests should be key in the teaching profession to ensure that students are assessed fairly and objectively.

However, little attention has been paid to conducting psychometric analysis of teacher-made tests in Ghana. The objective of this study is to evaluate the psychometric properties of the teacher-made test using both classical test theory and item response theory approaches. Specifically, this study was conducted to answer the research question: what are the psychometric properties of the teacher-made mathematics test used in the selected Senior High School?

The Concept of Educational Assessments

Educational assessment involves the procedure of detailing the acquisition as well as mastery of knowledge to help in informed decisions making regarding the steps to be followed within an educational process (Ravela et al., 2009). Within this process, there is the consideration of students' aptitudes, learning styles, attitudes, progressions as well as outcomes. Decisions to be taken after the outcome may differ; from the implementation of system-wide programmes to improvement in classroom teaching/learning to modifying classroom instruction, or assessment of students' admission to higher education level such as the university (Clarke, 2011).

According to Ravela et al. (2009), effective educational assessment systems aid in the acquisition of quality information to meet decision-making needs, and to support and improve the learning of students. Similarly, Hockings (2010) asserted that educational assessment systems can inform as

well as improve instruction and learning, assess progress, and offer partial accountability information. These objectives are anticipated to lead ultimately to improved educational quality. Salvia et al. (2012) recommended the involvement of students as associates in designing assessment so that engagement, as well as deep learning, will be increased among students. Also, Davies and Dempsey (2011) suggested the shifting away from the use of traditional assessment that undermines the capacity of students in judging their work to the implementation of research assessments which effectively prepare students for employment in future.

According to (Clarke, 2011) educational assessment could be categorized using the following distinctions: Classroom assessments, examinations, as well as large-scale assessments

Classroom Assessments

Classroom assessments are assessments that are undertaken by teachers and students as a daily activity (Heritage, 2010). They are made up of various standardized/non-standardized instruments as well as techniques for the gathering and interpretation of oral, written, and some other types of evidence for student learning/ achievement. Examples are; homework assignments, oral questions and feedback, diagnostic tests, student presentations, and quizzes. These assessments are aimed at providing ‘real-time’ data to assist in teaching and learning. According to Beziat and Coleman (2015), classroom assessment plays a very significant role in terms of how students learn, students’ motivation to learn, and how teachers teach. Again, classroom assessment enables teachers/instructors to gain knowledge about what students have learnt and their misconceptions that can be used to plan as well as guide instruction and offer useful formative feedback to students.

Examinations

Examinations, often qualified by expressions such as ‘end of cycle’, ‘public’, or ‘external’ help to gather information for decisions to be made on individual students. Whether they are school-based or administered externally, their standardized nature ensures that every student is provided with equal opportunity to prove their level of knowledge or ability according to the curriculum, or any other acknowledged body of knowledge (Black & Wiliam,2010).

For instance, the exit certification examinations taken after compulsory education at either the basic and secondary levels are seen as “high-stakes” due to their significant influence in terms of what is taught as well as learnt. They might also influence the knowledge profile of graduates (Downer et al., 2010). The tests used in the exit examinations may be discouraging for candidates who are unable to perform well, hence contribute

to them being excluded from their desired secondary schools or tertiary institutions. Disadvantaged groups of students are most vulnerable to these risks. Practices which create or promote inequities during these examinations occur in the form of scoring, exam registration fees, ranking, private tutoring, using certain language unfamiliar to the students and so on.

Forms of Assessment used in Ghana

Beside assessment in the classroom, popularly called the School-Based Assessment (SBA), and end of term or semester examinations, the various levels of grades (except Grade 9 and 12) including university and other tertiary levels have no external assessment scheme which evaluates the performance and achievement of students. For students in Grades 9 and 12, national examinations are conducted, these include the Basic Education Certificate Examination (BECE) after JHS 3 (Grade 9), and the West Africa Senior School Certificate Examination (WASSCE) after SHS 3 (Grade 12) (Mills & Mereku, 2016). Other assessments in Ghana, according to a report by the World Bank are large scale assessments conducted nationally. These include Early Grade Mathematics Assessment (EGMA), Early Grade Reading Assessment (EGRA) as well as international assessments conducted on a large scale – such as TIMSS (World Bank, 2013).

Quality of Teacher Made Test

Assessing students' learning is very essential in education. According to Bichi (2016), assessing students' academic skills, intellectual development, as well as cognitive abilities include some systems utilized in sampling students' performance with regards to a specific learning outcome. One of such systems is the test. A test is anticipated to illustrate students' performance (Gareis & Grant, 2015). Teacher-made tests are usually prepared and administered to measure the achievements of students in the classroom, evaluate the teaching method adopted by the teacher, in addition to other curricular programmes offered by the school. Teacher-made test thus remain one valuable instrument of the teacher in serving their purpose (O'Malley, 2010).

There are some principles that teachers should follow when designing teacher-made test. These include: the test items should be arranged based on levels of difficulty; the test is prepared by teachers that can be utilized for prognosis as well as diagnosis purpose; the test consists of the entire content area and is made up of several items; and item's preparation is done based on the blueprint (Gareis & Grant, 2015). This means that teacher-made tests are mostly used as instrument for formative assessment; and the teacher develops the test to determine the achievement as well as proficiency of the student in a particular subject.

In terms of preparation of the test, various forms of constructed response and objective test such as, short-answer, multiple-choice, and matching type could be constructed. After the construction, there should be a review of the test items by experts to ensure that the items are screened in terms of language, items' modalities, statements provided, accurate answers and distractors, in addition to other unintended errors. The recommendations from the experts would assist a test constructor to revise the items to make them much more acceptable and usable. After the test has been constructed, items must be organized from simple to complex order. In organizing the items, several approaches can be employed by the teacher, in terms of group, unit, topic and so on. There should also be the preparation of scoring key forthwith to prevent delay involved in the scoring. Furthermore, clear directions or instructions should be provided to prevent misunderstanding among the students (Gareis & Grant, 2015).

After careful planning, development, and administering the test, there is the need to conduct psychometric analysis on students test data to provide evidence to help evaluate and judge the quality of the test items. In this regard, there has been the development of testing theories that are helpful in evaluating tests with some indices. These indices mainly depend on two (2) common statistical frameworks. They are Classical Test Theory and Item Response Theory. These theories have a relationship with the item development process within the psychological and educational field to facilitate the quality of measuring instruments (Bichi, 2016).

Classical Test Theory (CTT)

CTT has been applied extensively over several years for determining reliability as well as additional features of measurement instruments. Hambleton and Russell (1993) asserted that CTT entails test scores that are made up of three concepts; test score (commonly known as observed score), true score; as well as error score. The fundamental equation of the CTT is:

$$X = T + E \quad (1)$$

This is a simple linear model that links the observable test score (X) to the sum of two unobservable variables, true score (T) and error score (E).

The main assumptions which underline CTT include true scores, as well as error scores, remain uncorrelated, examinees obtain a zero average error score, and there is no correlation between the error scores of parallel tests. Also, Magno (2009) asserted that CTT assumes that examinees obtain true scores (unobservable) supposing there are no measurement errors. Nevertheless, because of the imperfection of instruments deployed, the observed score for every individual may vary from the true ability of an individual. This variance between the two scores (observed and true scores) results from a measurement error.

The standard measurement error is calculated as:

$$SE_M = S_x \sqrt{1 - R_{xx}} \quad (2)$$

SE_M =standard error of measurement

S_x = standard deviation of test scores

R_{xx} = reliability coefficient

Small SE_M indicates high reliability (Kaplan & Saccuzo, 1997).

CTT Statistics and Item Analysis

a. Item Difficulty

Item difficulty indicates the overall proportion of examinees that accurately answered an item. An item is considered easy when a large proportion of examinees accurately answer an item. Calculating the difficulty index of an item is carried out by dividing the sum of examinees accurately answering the item by the sum of examinees responding to the item. An item accurately answered by 75% of examinees would possess a difficulty index of .75. Also, an item that was accurately answered by 40% of examinees would possess item difficulty of .40 (Matlock-Hetzel, 1997). The higher the p-value, the easier the item and the vice versa. The item difficulty is denoted as p and given as:

$$P = \frac{R}{N} \quad (3)$$

P = difficulty of an item

R = examinees who accurately respond to an item

N = sum of examinees

Guideline for interpreting item difficulty index is demonstrated in Table 1

Table 1. *Item Difficulty Indices Interpretation*

Difficulty Index (p)	Interpretation
$P < 0.20$	Very difficult
$0.20 \leq P \leq 0.40$	Difficult
$0.40 \leq p \leq 0.60$	Average
$0.60 < P < 0.80$	Easy
$P > 0.80$	Very Easy

Source: Hotui (2006)

b. Item Discrimination

It refers to a test item capability to discriminate between high and low ability examinees (Adegoke, 2013). Essentially, item discrimination aims at eliminating or dropping or modifying items which fail to function properly within a tested group (Courville, 2004).

The index of discrimination to ascertain an item's discriminating power could be calculated by two (2) indices: the item discrimination index (D), as well as the Item discrimination coefficient.

c. Item Discrimination Index (D)

This technique remains applicable in calculating the simple amount of an item's discriminating power by making use of the groups that are extreme (Matlock-Hetzel, 1997). To calculate D index, first of all, there is a rank order of students using their test scores. Secondly, 27% of students at the top, as well as 27 percent of students at the bottom are separated for analysis. According to Zubairi and Kassim (2006), "27 percent is used since evidence suggests that this value would maximize the differences in normal distributions, at the same time providing sufficient cases for analysis". D is given as:

$$D = \frac{P_u - P_l}{n} \quad (4)$$

P_u and P_l represent accurate responses in the upper and lower group respectively and "n" is the group with the highest number of students. Because the index is on a scale from -1 to +1, the results of a negative index imply that the greater part in the lower group correctly answered the item, whereas a positive index implies that a greater part in the upper group correctly answered the item (Courville,2004).

d. Discrimination coefficients

Item's discrimination effectiveness consists of two indicators; point biserial correlation, in addition to the biserial correlation coefficient. A correlation selection is dependent on the question type to be answered. One major limitation of D is that just 54 percent (which is 27% upper + 27% lower) is used for computing the item discrimination, hence ignoring 46 percent of examinees. Likewise, the benefit in using the discrimination coefficients is that each examinee is used in the computation of the coefficients.

The definition of a point-biserial correlation coefficient (r_{pbi}) is:

$$r_{pbi} = \frac{M_p - M_q}{S_t} \sqrt{pq} \quad (5)$$

M_p = whole-test mean of examinees who answered an item correctly,
 M_q = whole-test mean for examinees who answered an item incorrectly,
 S_t = standard deviation for the whole test,
 p = proportion of examinees answering correctly
 q = proportion of examinees answering incorrectly (Zubairi & Kassim, 2006).

Table 2. Interpretation of Discrimination Indices

Discrimination index	Quality of an item
$D \geq 0.40$	Item is functioning fairly satisfactory
$0.30 \leq D \leq 0.39$	Good item; therefore, less or no revision necessary
$0.20 \leq D \leq 0.29$	Item is marginal, hence should be revised
$D \leq 0.19$	Poor item: may have to be excluded or entirely changed

Source: Ebel (1979)

Item Response Theory (IRT)

Over the past years, IRT has increasingly become popular. IRT application is mainly found in psychological as well as educational testing, and more recently, it has become relevant for assessing health outcomes (Cai et al., 2016).

In the context of education, IRT emerged to resolve the shortcomings involved in the classic measurement theory of sample and test dependencies. IRT gives a theoretical framework which enables modeling of the relationship between the probability of answering an item correctly for an examinee of a given ability or trait.

$$P(X_i=c|\theta_n) = f(\theta_n) \quad (6)$$

- X_i represents the random variable symbolizing item i answer, with discrete varieties of response
- c represents the response which is observed
- If X is dichotomous, $c=0,1$ normally, 0 denotes inaccurate answers and 1 accurate answer.
- If X is polytomous, $c=0,1,m$ ($m>1$).
- θ_n =nth person's trait parameter.

This represents the *item response function (IRF)*. IRF indicates a function relating the latent trait as well as the probability of responding accurately to an item and represented graphically by item characteristic curve.

Some popular unidimensional IRT models for determining dichotomously scored responses are described below.

The One Parameter Logistic Model (1PLM)

This type of IRF is called one-parameter logistic model as it includes just one (1) item parameter (ie. difficulty δ), with the functional form derived from the logistic function (Tendeiro, 2017). A special case of the 1PL is the Rasch Model. According to the 1PLM, an item i IRF is denoted by:

$$P(X_i = 1|\theta) = \frac{\exp(\theta - \delta_i)}{1 + \exp(\theta - \delta_i)} \quad (7)$$

- θ represents the individual's latent ability parameter.
- δ_i represents the item's *difficulty* or popularity.

Figure 1 presents three (3) IRFs based on the 1PLM for three (3) items with different levels of difficulty: $\delta=-1$ (blue), $\delta=0$ (red), $\delta=1.5$ (green).

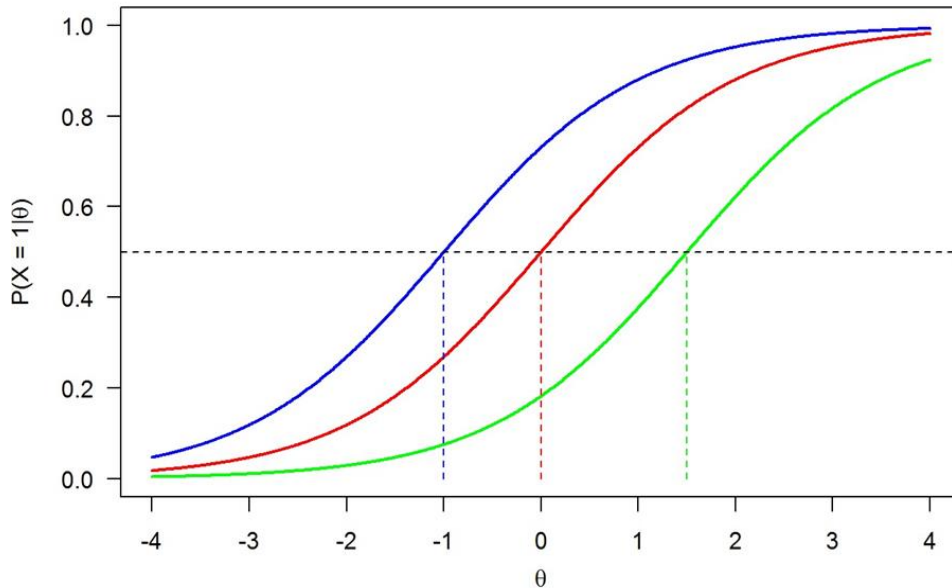


Figure 1. ICC for 1PLM

The 2PLM

The 2PLM extends the 1PLM by including another item parameter called the “*discrimination*” parameter. Based on the 2PLM, an item i IRF is:

$$P(X_i = 1|\theta) = \frac{\exp[\alpha_i(\theta - \delta_i)]}{1 + \exp[\alpha_i(\theta - \delta_i)]} \quad (8)$$

α_i represents discrimination parameter for item I , that's denoted by the slopes of the curves, such that the steeper the slope, the more discriminatory the item is. This parameter carries positive values, even though those greater than, for instance, 4 or 5 remain uncommon (Tendeiro, 2017).

Figure 2 presents 3 IRFs for three items based on 2PLM. The parameters of discrimination: $\alpha=2$ (blue), $\alpha=.5$ (red), whereas $\alpha=1$ (green).

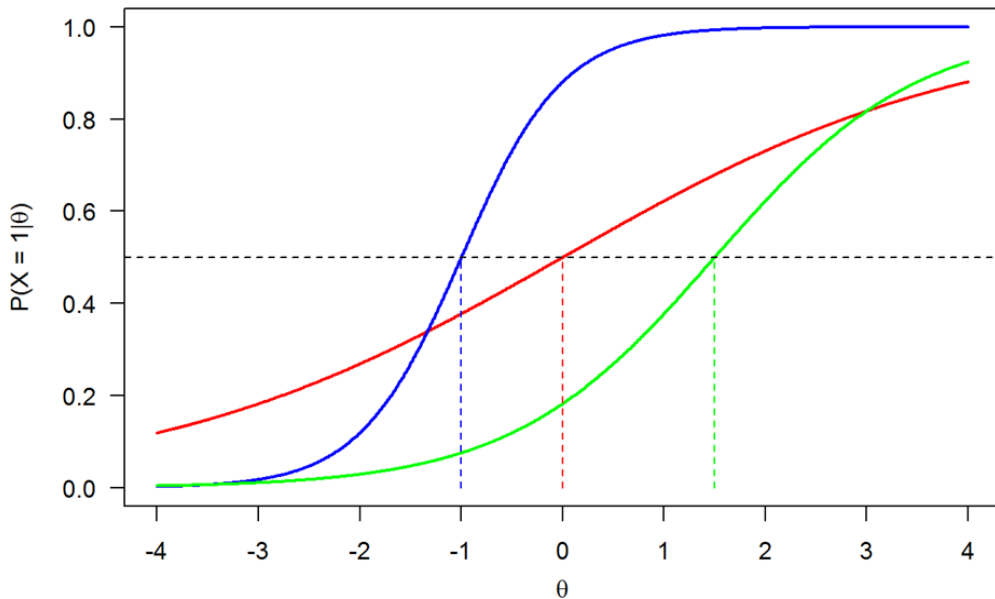


Figure 2. ICC for 2PLM

The 3PL model (3PLM)

The 3PLM extends the 2PLM by including another item parameter called the (*pseudo*)guessing parameter. Item *i* IRF is:

$$P(X_i = 1|\theta) = \frac{\gamma_i + (1 - \gamma_i) \exp[ai(\theta - \delta_i)]}{1 + (\theta - \delta_i)} \quad (12)$$

where γ_i represents the pseudo guessing parameter for item *i*. This carries 0 to 0.5 values. It assumes that even examinees with low ability possess the likelihood of correctly answering items merely using guessing randomly the right answer. For instance, γ_i is equivalent to .25 in a multiple-choice item having four-options, which suggests that an examinee who is only guessing an item's right answer will select the right response with $\frac{1}{4}$ probability (Tendeiro,2017).

Figure 3 illustrates three (3) examples of IRFs based on the 3PLM. The pseudo guessing parameters include $\gamma=0$ (blue), $\gamma=.25$ (red), while $\gamma=.20$ (green).

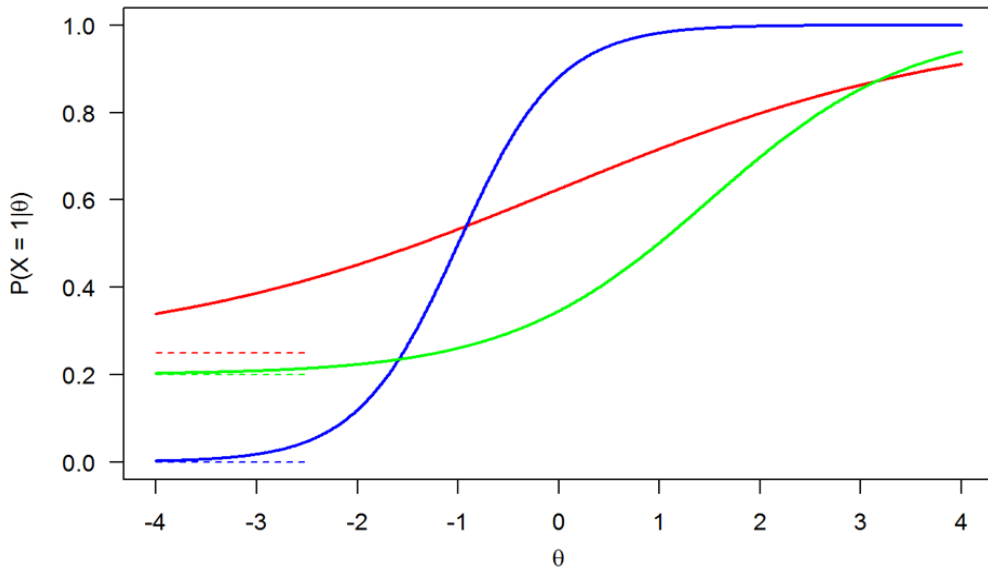


Figure 3. ICC for the 3PLM

Distractor Analysis

A traditional distractor analysis is usually performed with multiple-choice items. This type of analysis is based on CTT or IRT. Distractor analysis is aimed at eliminating non-functioning distractors and improving the discrimination power relating to multiple-choice items (MCIs) in differentiating between low as well as high ability examinees (Haladyna, 2016). Haladyna and Downing (1993) opined that if the number of examinees who select a distractor represents not more than 5 percent the distractor can be seen as low frequency.

According to Haladyna (2016), a trace plot is used in identifying non-discriminating as well as non-functioning distractors (see: Figure 4). For the horizontal axis, it implies the total score of examinees that is shared into 5 ordinal categories starting from the lowest group to the highest group. For the vertical axis, however, this signifies the overall percentage of examinees that selected the specific option. Thus, Option 'A' represents an accurate answer. Consequently, the overall percentage of examinees that choose Option 'A' rises when there is an increment in examinee's ability. For Option B, this portrays well-functioning distractor. There is a decline in the overall percentage of examinees that choose Option B as examinee ability upsurges. In terms of Option C, this signifies a non-discriminating distractor, with a relatively unbroken rate of selection in various levels of ability. For Option D, this represents a non-functioning distractor, with overall percentage selection lesser than 5 percent in the entire ability groups. The trace line omitted indicates examinees that choose nothing in the item.

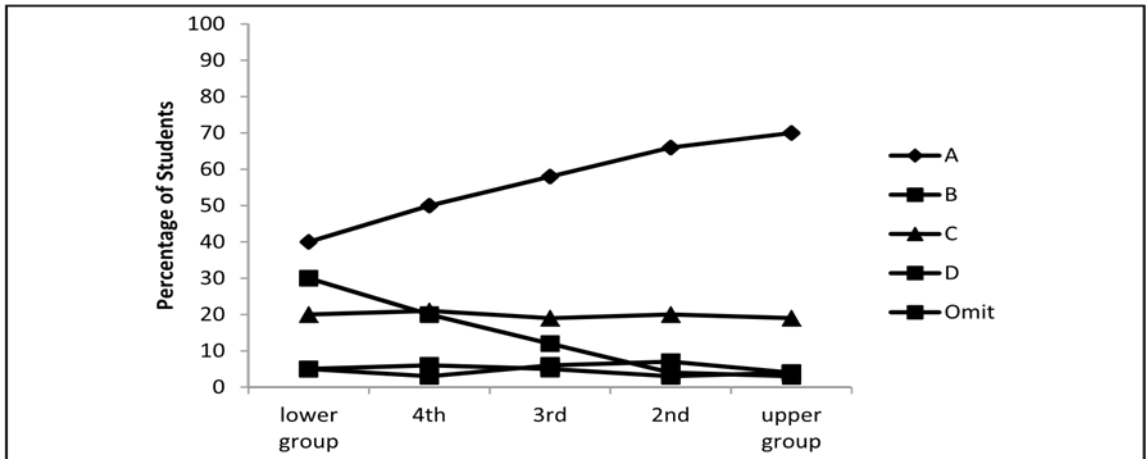


Figure 4. A trace plot for hypothetical Multiple-Choice Item (*Option A is the right answer*)

The choice mean of a distractor is another important tool which can be utilized to examine distractors (Haladyna & Rodriguez, 2013). In terms of an item that is well-discriminating, the choice mean in the accurate option is anticipated as higher than the choice mean of other distractors. When a distractor's choice mean remains higher than the accurate option's choice mean, there should be an assessment for content accuracy of that distractor. On the other hand, if there is a similarity in the choice means of the response options, the item then does not seem to be adequately discriminating.

The point-biserial correlation (correlation between continuous total test score and dichotomous item) or biserial correlation (correlation between continuous total test score and latent item score) is the most objective means of evaluating the choice mean of a distractor (Attali & Fraenkel, 2000). These scholars indicate that in calculating the point-biserial correlation to assess a distractor, there is the need for researchers to contrast examinees who select the distractor with examinees who select the right option, instead of the examinees who fail to select the distractor. The formula for the point-biserial is:

$$PBDC = \frac{M_D - M_{DC}}{S_{DC}} \frac{P_D}{P_C} \quad (6)$$

M_D represents distractor D 's choice mean; M_{DC} represents total scores mean of examinees that select either a distractor or right option; S_{DC} represents the standard deviation relating to those examinee group that selects a distractor or right option; while P_D , as well as P_C , indicate those examinees that chose a distractor as well as right option respectively.

Attali and Fraenkel (2000) indicate that an item having a $PBDC$ value to be higher than -0.05 is not adequately discriminating, whereas values less than -0.05 could be considered discriminately.

In comparing CTT distractor to IRT distractor analysis, the IRT distractor analysis does not just assess the proper functioning of a distractor, but it also enables the analyst to make use of distractors to estimate the abilities of students. There exist two (2) common IRT models in assessing distractor analysis. They include the nominal-response model (NRM) by Bock (1972), as well as the graded response model (GRM) by Samejima (1979).

Bock (1972) recommended the NRM for analysing distractors present in MCIs. Rather than the traditional IRT models which involve approximating the likelihood of answering items accurately, the NRM is associated with estimating the likelihood of selecting individual option devoid of assuming between the options. The NRM could be presented as:

$$P(X_j = k | \theta) = \frac{\exp(ak(\theta - bk))}{\sum_{h=1}^{m_j} \exp(ah(\theta - bh))} \quad (7)$$

$P(x_j = K | \theta)$ represents the probability that k in item j will be chosen assuming the examinee's ability is θ (usually between -4 and 4); a_k represents item discrimination for distractor k ; b_k represents the difficulty of distractor k ; while m_j represents the overall quantity of options in item j .

A major shortcoming of the NRM remains that, if a candidate's ability reduces, the likelihood of selecting one specific distractor increases. Nevertheless, this is not possible in reality as examinees having the low ability have the likelihood of guessing the right option randomly. In overcoming this shortcoming, Samejima (1979) suggested a variation of the NRM which considers the number of examinees who guess randomly the right option. The model presupposes the existence of a latent type of "don't know" (DK). Examinees belonging to the DK group would guess randomly, with the likelihood to guess seen by modelling the likelihood of choosing an individual option. The GRM is presented as:

$$P(X_j = k | \theta) = \frac{\exp(ak(\theta - bk))}{\sum_{h=1}^{m_j} \exp(ah(\theta - bh))} + dk \frac{\exp(ak(\theta - b_0))}{\sum_{h=1}^{m_j} \exp(ah(\theta - bh))}, \quad (8)$$

where d_k is fixed to $1/m_j$ to signify that examinee belonging to latent group DK will randomly guess.

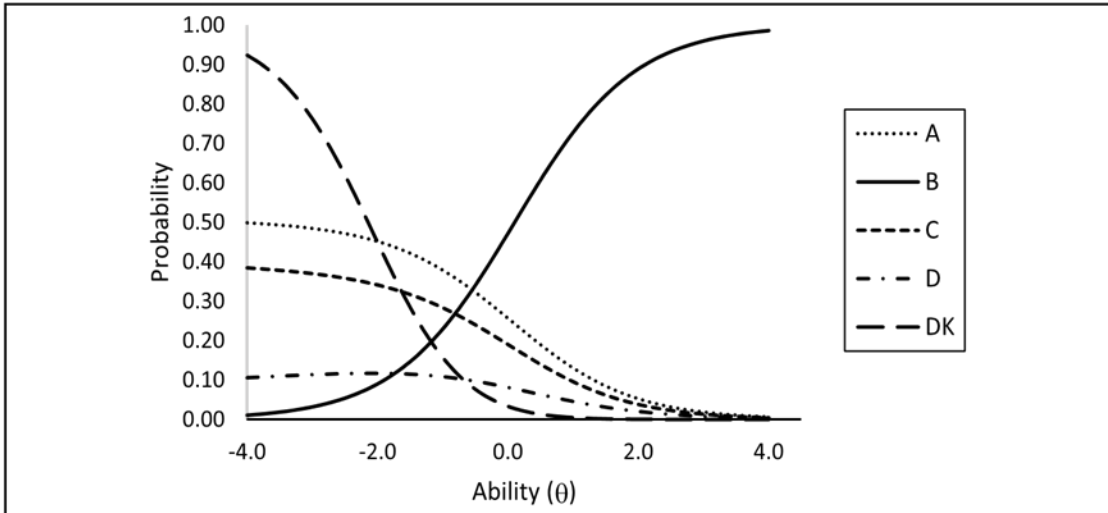


Figure 5. ICC for response options of MCQ (Note: The right response is Option B; DK: Don't know).

$$\frac{\exp(a_0(\theta - b_0))}{\sum_{h=1}^{m_j} \exp(a_h(\theta - b_h))} \tag{9}$$

This is the probability that a student belongs to the latent group DK.

The two (2) IRT models provided are seen as utilizing the item characteristic curve (ICC) plot as presented in Figure 2. Option B represents an accurate response. Based on Figure 2, as the student ability upsurges, the likelihood that Option B is selected upsurges. Option D represents the instance of a distractor attracting examinees with low ability. As ability upsurges, the likelihood that Option D will be chosen reduces. Option C represents the instance of a distractor attracting examinees possessing limited knowledge. The likelihood that Option C will be chosen increases at $\theta = -1$ but reduces for smaller or higher ability levels. Option A represents the instance of a distractor which is non-discriminating. The probability that Option A will be chosen remains constant across ability levels. For DK (latent group), as ability reduces, the likelihood of belonging to DK group approaches to 1.

Methodology

The current study adopted the quantitative descriptive research design to describe the psychometric properties of teacher-made mathematics test. The choice of this design was considered suitable because the study was concerned about the state of teachers' testing practices already existing in Senior High Schools without the manipulation of any variables.

The data for this study was mathematics test data of second year (grade 11) students from a popular Senior High School in Ghana. The test consisted

of 40 MCQs with 4 options. The test covered topics from the first and second years of mathematics syllabus (grades 10 and 11). The test was administered in the paper-and-pencil form in the second semester of 2021 academic year for a duration of an hour. The total number of students who participated in the test were 600, however, a simple random sample of 400 students were selected. This sample size was arrived at because most psychometric analysis techniques require a minimum sample size of 200 for effective calibration (Martin & Larkin, 2018). The test booklets of the sampled students were digitized for the analysis. Prior to the collection and use of the student's data, appropriate ethical clearance was sought from the appropriate institutions.

To achieve the main objective of this study, both CTT and IRT analysis techniques were employed. For the CTT and dichotomous IRT analysis, the test data were dichotomously scored. However, for the distractor analysis, the multiple-choice data indicating the specific options selected for each of the items were used.

The distractor analysis was done using the nominal-response model (Bock, 1972). The response frequency in which a non-functioning distractor is defined as <5% and examination of option characteristics curves (trace lines) (Haladyna & Downing, 1993) were used. Specifically, the trace lines graphically display the response patterns of the item options but typically require a large sample of examinees above 200 (Osterlind, 1998) in evaluating distractor quality.

Results

The first part includes the frequency distribution of gender of students who were selected for this study. Table 3 presents the frequency distribution of the students. The sample of students for the mathematics test was approximately distributed with 172 representing 43 percent being male students and 228 representing 57 percent being female students.

Table 3. *Frequency distribution of gender of students*

Gender of student	Number	Percentage (%)
Male	172	43
Female	228	57
Total	400	100

Further, the mean test score and the standard deviation were 23.13 and 4.29 respectively. The median score was 23 which is almost the same as the mean test score and Cronbach's alpha was 0.61. Teacher made test needs to demonstrate reliability coefficient of approximately 0.50 or 0.60 (Quaigrain & Arhin, 2017).

Classical Test and Item Response Theories

To examine the psychometric properties of the test, the difficulty (p), the standard deviation and discrimination indices of each item (D) were estimated using the CTT first followed by IRT, and then the distractor analysis. Table 5 presents the item difficulty, the standard deviation of items and item discrimination of the test items.

Table 5. Psychometric Result of Test Items

Item Number	Item difficulty(P)	SD	Item Discrimination (D)
1	0.482	0.500	0.077
2	0.584	0.493	0.181
3	0.825	0.380	-0.011
4	0.186	0.389	0.076
5	0.866	0.341	0.210
6	0.526	0.499	0.401
7	0.890	0.312	0.104
8	0.942	0.233	0.135
9	0.784	0.412	0.186
10	0.247	0.431	0.270
11	0.501	0.500	0.207
12	0.934	0.248	0.176
13	0.622	0.485	0.079
14	0.504	0.500	0.066
15	0.200	0.400	0.145
16	0.499	0.500	0.225
17	0.937	0.243	0.187
18	0.792	0.406	0.318
19	0.340	0.474	-0.021
20	0.759	0.428	0.320
21	0.882	0.322	0.193
22	0.427	0.495	0.033
23	0.523	0.499	0.284
24	0.233	0.423	0.095
25	0.877	0.329	0.075
26	0.482	0.500	0.023
27	0.871	0.335	0.169
28	0.340	0.474	-0.020
29	0.438	0.496	0.143
30	0.307	0.461	0.047
31	0.340	0.474	0.220
32	0.529	0.499	0.124
33	0.530	0.499	0.166
34	0.354	0.478	0.085
35	0.397	0.489	-0.058
36	0.548	0.498	0.199
37	0.542	0.498	0.088
38	0.800	0.400	0.339
39	0.682	0.466	0.232
40	0.605	0.489	0.222

Note. SD = Standard Deviation

The difficulty (p) indices ranges from 0.186 to 0.942. The p-value translates to a number when multiplied by 100, which is the percentage of students who got the item correct. The higher the p-value, the easier the items are, which means the higher the index of difficulty, the easier it is to respond correctly to the item. Based on Hotui (2006) guidelines, if $0.20 \leq p \leq 0.90$, then the item is considered as good and acceptable. The item is considered excellent if $0.40 \leq p \leq 0.60$. However, if $p < 0.20$, then the item is too difficult, and if $p > 0.90$, the item is classified as too easy.

As can be seen from Table 5, majority of items 37 representing 92.5 percent were of acceptable difficulty level with p-value within the range of 20-90 percent, while 14 items representing 35 percent with p-value range of 40-60 percent were excellent among them. Three items were found to be too difficult (7.5 percent) (p value < 20 percent) and only one item was found to be too straightforward or easy (p > 90 percent).

The test item's discriminating indices (D) were classified based on Ebel's (1979) guidelines on classical test theory item review: If $D \geq 0.40$, the item is functioning satisfactorily, if $0.20 \leq D \leq 0.29$, then the item is marginal and needs revision and if $D \leq 0.19$, then the item should be eliminated or completely revised.

The item with highest D was item 6 (0.40) which means that the item is functioning satisfactorily and the item with the lowest D was item 35(-0.058) which means that the item should be eliminated or completely revised. Three items representing 7.5% of the items 18, 20, 38 were good and needed little or no revision. Ten items representing 25% of the test items, that is items 5, 10, 11, 16, 23, 26, 31, 35, 39 and 40 are marginal and need revision. 25 items representing 65% of the items should be completely revised or replaced as they have very low discriminating power as presented by the table above. Four items had negative discrimination indices. Items with negative discrimination index are useless and can also reduce the validity of the test (Quaigrain & Arhin, 2017).

Table 6 shows the mean difficulty level and mean discrimination of the test with their respective standard deviation. The mean difficulty of the test was 0.58 which shows the mathematics test is of acceptable difficulty level for examinees. Mean discrimination of the test was 0.15 which shows majority of the test items has low discriminating power.

Table 6. Summary of test parameter

Parameter	Mean	Standard deviation
Difficulty index (p)	0.58	0.23
Discrimination index (DI)	0.15	0.10

For the dichotomous IRT model, the 3PLM fitted the data well as compared to the 1-and 2-PLMs. The difficulty (threshold or "b" parameter),

and the discrimination (slope or “a”) estimated for all the items did not depart so much from the CTT results. However, the average guessing parameter was 0.15, meaning that an ill-prepared examinee can guess and score correctly 15% of the 40 test items.

Distractor results

Bock nominal model 2.0.0 was used to conduct the analysis. Distractor analysis was performed in order to identify both functioning and non-functioning options. The response frequency and the option characteristics curves were used to evaluate distractor performance. The distractors serve as an indicator of the functionality of each option. Distractors which are chosen by one or more examinees are called functioning distractors and those not chosen by anyone are called non-functioning distractors. A non-functioning distractor is an option with a response frequency of <5% and a functioning distractor has a response frequency of ≥ 5 percent (Haladyna & Downing, 1993).

Table 7 presents the frequency distribution for all the 40 test items, which included 160 options made up of 120 distractors and 40 correct answers. 37 options representing 30.8 percent of the 120 distractors had a choice frequency of ≥ 5 percent out of all 120 distractors or non-correct choices evaluated. On the other hand, of the 120 distractors, 83 options representing 69.2 percent had a choice frequency of < 5 percent which indicate that 83 distractors are non-functioning and are perhaps implausible and of little use as distractors in multiple choice items and need to be replaced in future use of such items (Quaigrain & Arhin, 2017).

Table 7. Frequency Distribution of Test Options

Item	Options	Frequency			
		A	B	C	D
1		0.146	-0.198	0.022	0.030
2		-1.061	-1.458	-0.811	3.330
3		-0.230	-0.111	-0.323	0.664
4		0.312	0.317	-0.330	-0.300
5		-0.396	0.868	-0.352	-0.120
6		-0.273	-0.480	-0.466	-0.214
7		0.147	-0.155	0.182	-0.214
8		-0.347	0.241	0.391	-0.044
9		-0.643	0.389	0.563	-0.309
10		0.723	-0.311	-0.110	-0.302
11		-0.462	0.441	0.035	-0.015
12		0.061	0.063	-1.262	1.201
13		-0.347	0.041	0.084	0.221
14		-0.467	0.335	-0.014	0.146
15		0.652	-0.600	-0.504	0.453
16		-0.581	0.597	-0.141	0.125
17		-0.167	0.467	0.011	-0.310

18	-0.336	-0.375	0.871	-0.160
19	0.034	-0.437	0.391	0.012
20	0.069	0.776	-0.515	-0.331
21	1.229	-6.105	2.077	1.642
22	0.166	0.336	-0.515	0.013
23	-0.006	-0.237	-0.417	0.660
24	-0.223	0.330	-0.028	-0.079
25	-0.349	0.088	-0.069	0.330
26	-1.312	0.066	0.101	0.432
27	0.148	-0.533	0.151	0.234
28	0.317	-0.073	-0.090	-0.154
29	0.107	0.397	0.077	0.296
30	0.445	-0.331	-0.219	0.105
31	-0.752	0.005	-0.476	-0.268
32	-0.259	-0.098	0.346	0.010
33	0.064	0.321	-0.642	0.024
34	0.088	-0.201	-0.073	0.186
35	-0.311	-0.354	0.810	0.341
36	0.212	-0.288	0.458	-0.382
37	0.128	0.070	-0.102	-0.095
38	-0.206	-0.293	-0.545	1.044
39	0.604	-0.030	0.034	-0.608
40	0.423	-0.584	0.567	-0.406

Option characteristics curves for sample items are provided in figures 8-11. Figure 8 presents the option characteristics curve for test item 5. As illustrated in Figure 8 , option B represents the right answer. The overall percentage of examinees that choose option B increases when there is an increase in examinee’s ability. Based on the figure the likelihood that option B is selected increases. Option A, C and D portrays well-functioning distractors. Option A, C and D represent the instance of a distractor attracting low ability students. As ability increases, the likelihood that option A, C and D will be chosen reduces. Option A, C and D represents the instance of a distractor attracting examinees possessing limited knowledge, but however reduces for smaller or higher ability levels. Option A, C and D represent the instance of a distractor which is a discriminating or a functioning distractor.

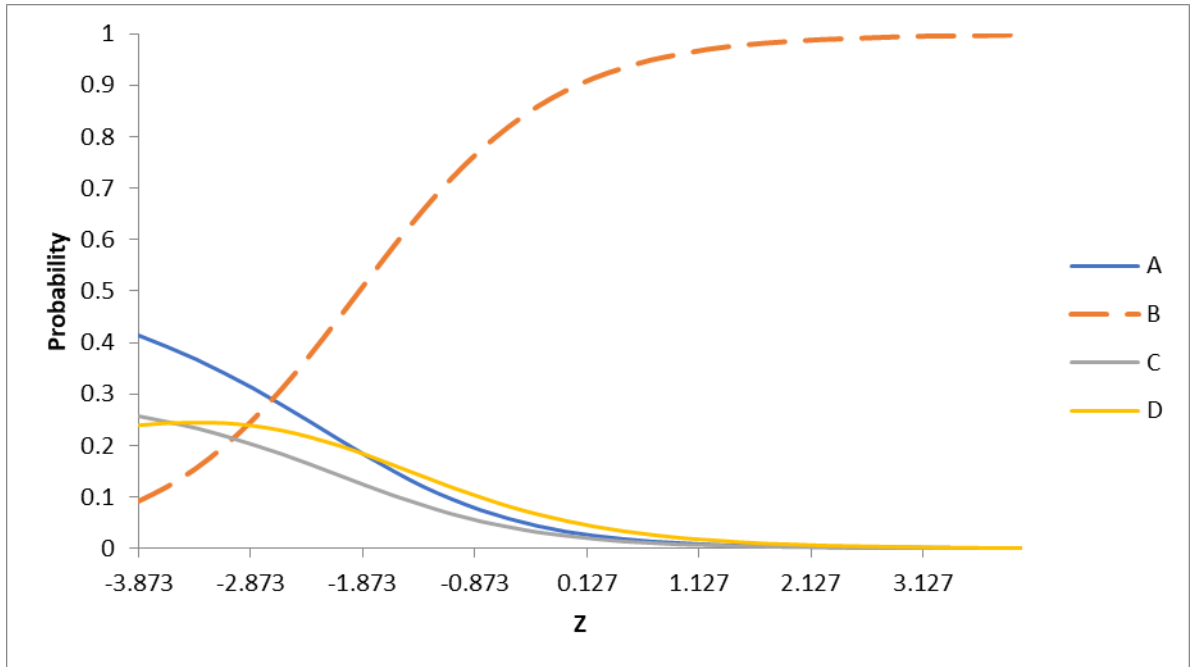


Figure 8. Item characteristics curve for every response option within multiple choice item 5
(Note. The right response is option B; Z: student's ability)

As illustrated in Figure 9 option, D represents the right answer for item 6. The overall percentage of examinees that choose option B increases when there is an increase in examinee's ability. Options A, B and C represent the instance of distractors attracting low ability students. As ability increases, the likelihood that option A, B and C will be chosen reduces. Option A, B and C represents the instance of a distractor attracting examinees possessing limited knowledge, but however reduces for smaller or higher ability levels. Option A, B and C represent the instance of a distractor which is a discriminating or a functioning distractor.

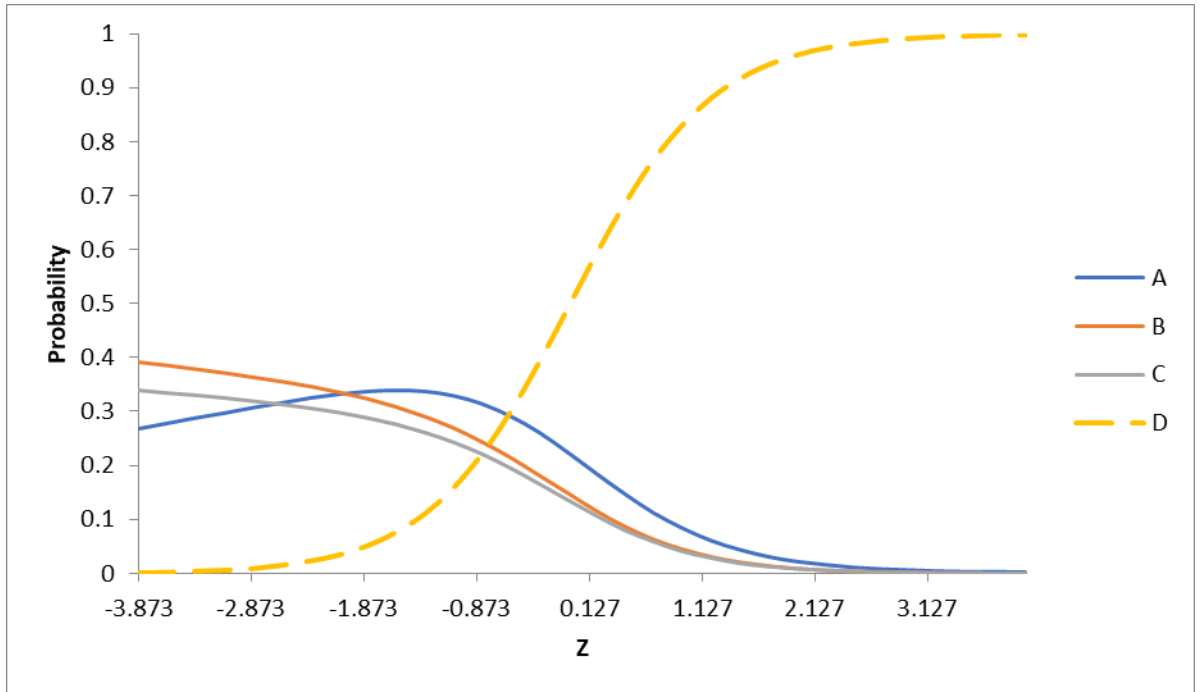


Figure 9. Item characteristics curve for every response option within multiple choice item 6
(Note. The right response is option D; Z. student's ability)

As illustrated in figure 10, Option D is the correct option for item 28. but as ability increases the probability of selecting non-correct option C increases and the probability of selecting correct option D decreases. Option C and D signifies a non-discriminating distractor. For options B and C represents a non-functioning distractor. Distracters should be able to distinguish between low scoring student who have not grasped the subject content. Correct option D and non-correct option A, failed to discriminate between the informed student and the uninformed students thus need to be revised.

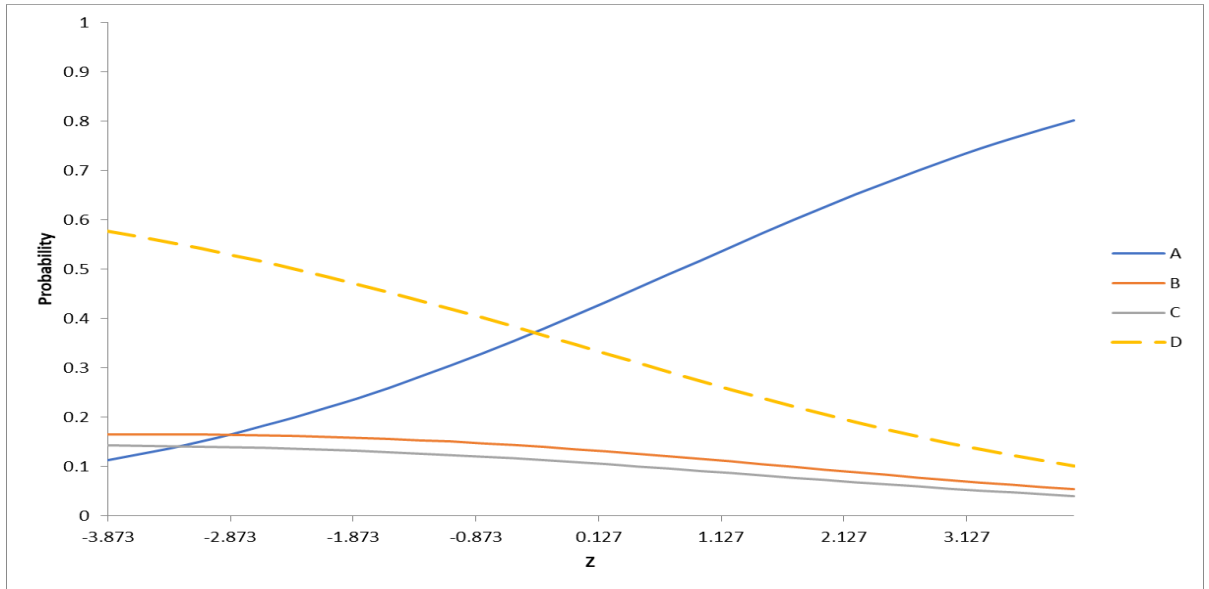
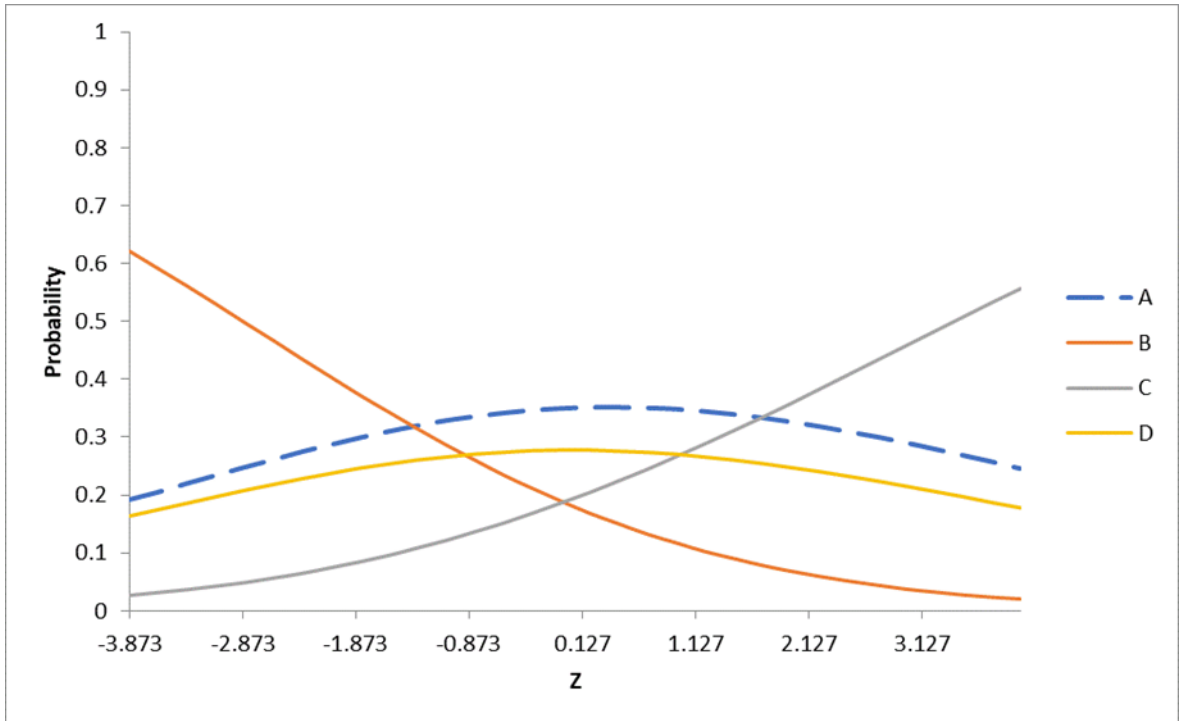


Figure 10. Item characteristics curve for every response option within multiple choice item 28 (*Note.* The right response is option D; Z. student's ability)

As illustrated in figure 11 Option A is the correct answer for item 19 and this signifies a non-discriminating option is the correct option. Option B portrays a well-functioning distractor. Option D and C represent non-functioning distractors. Distractors should be able to distinguish between low scoring student who have not grasped the subject content, and choose the distractors more often, whereas high scorers reject them more often while choosing the correct option.

Figure 11. Item characteristics curve for every response option within multiple choice item 19



Note. The right response is option A; Z. student's ability

Discussion of Results

Classroom instruction must align with the test items to attain instructional validity and this includes setting valid questions. Mozaffer and Farhan (2012) stressed the significance of instructors' test construction steps and by means of statistical analysis to strengthen their instructional approaches and test building skills. Indicators that teachers will utilize to verify whether or not test items are well designed are the difficulty index, discrimination indices and distractor analysis. Most of the test items (26) are of satisfactory to excellent difficulty levels with only one test item found to be too difficult and three test items being too easy as indicated from the results of the analysis.

The findings of the discrimination indices suggest that 25 test items should be entirely replaced and four items showing negative discrimination indices. The negative discrimination indices could be as a result of entering an incorrect key or unclear nature of the test items (Quaigrain & Arhin 2017). Distractors were also analysed in this study for their functionality. Distractors are analyzed according to Quaigrain and Arhin (2017) to show how important each option is in each test item and if test takers repeatedly do not choose such

options for multiple choices, these options may be implausible and hence of no use as distractors to students.

Constructing plausible and minimizing non-functioning distractors remains a significant feature of multiple-choice questions for framing consistency. The study indicates that 30.8percent of the options were functioning distractors whereas the majority of the options (69.2% of the options) were non-functioning distractors. The findings show that there are more non-functioning distractors as compared to functioning distractors. According to Tarrant et al. (2009), this small percentage of options with functioning options was not fully unexpected, reason being that when tests are created by teachers or examiners, some of whom have limited knowledge in item construction, a condition probably the same in most Senior High Schools in Ghana. This usually happens because studies indicate that there are rarely more than two functional distractors (Tarrant et al., 2009) in teacher-made test items and standardized exams. Research by Haladyna and Downing (1993) found that there were only one or two working distractors in items with four options they tested and items with five options had almost four non-functioning distractors. However, a test item with two probable distractors are suitable (Crehan et al., 1993) to a test question with more than two implausible distractors.

There is no psychometric explanation, on the other hand, that all test items must have the same number of choices as some test items will necessarily have more or less possible distractors than others (Tarrant et al., 2009). So, although three options would be appropriate in most circumstances, test developers must construct several better distractors given the subject field being evaluated (Haladyna & Downing, 1989). Nevertheless, many teacher-developed tests must comply with official procedures of the school as to how many test choices they must provide. These recommendations are rarely evidence-based (Haladyna & Downing,1989) and are probable to be founded on standard procedures and or proven procedures.

Conclusion

The findings of this study have demonstrated the relevance of evaluating the psychometric properties of test items after the administration of the test and using the results to improve or remove test items that have not functioned properly in order to enhance or improve the performance of the test items in future test administration. Item review and item analysis procedures should be used to measure the output of each question and their respective options. The method for item analysis includes the evaluation of test items relative to the distribution of responses (Tarrant et al., 2009).

According to Haladyna (2004), 50 percent or more of test items teachers and test developers write fail to perform as anticipated. So, it is

imperative for item analysis to be performed in order to obtain useful data for question enhancement and can be integrated into the test creation and review process. In this regard, this study, that is rare within the Ghanaian context, examined the level of difficulty, discrimination indices, and distractor functioning of mathematics multiple-choice test designed by a teacher.

The conclusion drawn from this study is that teacher-made mathematics test had acceptable psychometrics properties. Specifically, the average difficulty and discrimination indices of the test were within acceptable ranges according to the criteria adopted for this study. However, the majority of the distractors were not functioning as they should. That is, 69.2 percent of the options were non-functioning distractors.

Limitation

This study investigated only one senior high school in Ghana, so these results cannot be generalized to cover all test items within the country. Further studies are needed on a larger scale in order to generalize the results.

Recommendation

Based on the findings of this study, the following recommendations were suggested:

- Teachers responsible for developing, validating and administering test in Senior High Schools need to perform psychometric analysis before (pilot testing) and after administering the test to ensure or improve the quality of test items.
- In-service training should be organized for teachers to enable them to acquire and develop the basic psychometric analytic skills.

Conflict of Interest

The author has no conflict of interest to declare.

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