

Improving The Performance Of Industrial-Technical Schools In Egypt In The Light Of Corporate Schools Model: A Qualitative Study

Omar Mohamed M. Morsi, PhD

Associate professor of Foundations of Education
Faculty of Education, Assiut University, Egypt

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Abstract

Corporate schools are no longer a new phenomenon since more organizations are currently moving towards this model for workplace learning. Therefore, the current study aimed at setting a suggested proposal to improve the performance of the industrial technical schools in Egypt in the light of the corporate schools model. This involves examining both the real goals and the problems encountered in the Egyptian industrial-technical education. Moreover, the study examines the corporate school phenomenon by analyzing one example of corporate schools. The current study used a qualitative-analytic method as it suits the nature of the study. The study came down to some results, most important of which are: (1) corporate schools can contribute to overcoming the problems which face the industrial schools; (2) corporate schools are educational entities that serve business strategy. Based on this, the paper concludes with a suggested proposal to improve the performance of the industrial-technical schools in Egypt

Keywords: Industrial-Technical Education, Corporate Schools, School performance, Qualitative Analysis.

Introduction

Technical education is considered a strategic element in the educational policy. It is the basic component of education as it relates to economic skills and knowledge that technicians at different economic sectors need. Thus, technical education is mainly related to training and development in general, and human development in particular (Salem, 2005). Industrial education is a type of technical education. Nowadays, corporate education is considered an educational form in which theory is linked to practice.

The *research problem* revolves around the problems and challenges that hinder the improvement of industrial schools due to the importance of industrial education as the backbone of economic development and a tool for

progress. More specifically, there are many problems and challenges which affect the quality of the industrial schools performance, which need to be resolved and overcome. These include: problems of admission policies and materialistic devices and equipment, and problems related to the absence of curriculum correlation to labor market.. This involves examining both the real goals and the problems encountered in the Egyptian industrial-technical education. Moreover, the study examines the corporate school phenomenon by analyzing one instance of corporate schools.

Significance of the study stems from the fact that industrial education forms a basis for progress in general and economic progress in particular. It also stems from the modernism and relation of the issue of qualified workforce preparation. Additionally, this topic is considered one of the vital matters which need much attention.

The current paper aims at improving the industrial schools performance through adopting the corporate schools model. This mainly includes setting a suggested proposal to improve the performance of the industrial-technical schools in Egypt in the light of the corporate schools model.

Many *previous studies* handled this topic (e.g. Ibrahim, 2001; Gamel, 2011; Asem, 2014)For example, Ibrahim's (2001) study indicated that the problems of industrial education are represented in the admission policies and the bad status of machines and equipment, Additionally, the training efficiency is very low at industrial schools which resulted in a type of graduates not aware of their industrial specification – which was also indicated by the study of Gamel (2011).Furthermore, the study of Asem (2014) concludes that industrial secondary education outcomes do not match up with the labor market requirements.

Thus, the *questions* of the study are:

1. What is meant by the industrial technical education, its goals and problems?
2. What are the main characteristics of the corporate education and corporate schools as one of its recent models?
3. What are the main features of the GE corporate school as a case study?
4. What is the suggested proposal to improve the performance of the industrial technical schools in Egypt in the light of the corporate schools model?

As for *study limits*, the study handled only industrial schools and one example of corporate schools, this example included the most important features of this model in relation to the problems of industrial schools.

For this reason, the research was to study the problems that face industrial education in general and industrial schools in particular. In the

present paper, the researcher presents the definition of industrial education, its goals, importance and problems. Then, the researcher sheds light on corporate schools model as a form of workplace learning to overcome the industrial education problems.

Industrial-Technical Education

Industrial education is one of the most important tracks of technical education, which is concerned with the achievement of progress and development. It is related to the industrial development and preparing the qualified workers and technicians who are trained in the latest ways of manufacturing and production.

Industrial education represents a natural approach of preparing the human workforce required for providing institutions with various services and products, including pioneer workers at different sectors. Consequently, technical education is directly related in formal ways to the composition of education in Egypt. It is done and carried out inside institutions which are prepared and provided with equipment, devices and tools (Hamad, 2005)

Importance of Industrial-Technical Education

Industrial-technical education is considered of the most important forms of technical education in Egypt as it is related to training and providing students with skills and knowledge to perform their roles in a professional style.

The importance of industrial-technical education lies in the fact that it acquaints the individual students with the culture, information, skills and practical knowledge of their specification or major (Gouda, 2007).

The goals of industrial technical education

The goals of industrial education are derived from the aims of the general technical education stream. (Ministry of Education 2001) identified the goals of industrial-technical education as follows:

- Providing production sites with labor needed at different levels.
- Preparing the trained and qualified human workforce according to the available industrial production fields.
- Preparing students in a way that enables them to cope up with the latest technological devices as well as new literacies needed for dealing with modern equipment.
- Training students on the practical aspects of their specialization. .
- Mastering the industrial processes which require mastering specific skills.
- Helping students to acquire ability to perform the industrial processes according to a set of technical rules.

- Helping students to deal with information technology and how to employ them into their specific fields of study.
- Improving competencies and skills required for dealing with labor market and its requirements.

It can be concluded from above lines that the point of departure for the present study generates from the weaknesses existing in industrial-technical education. In this regard, some points of weakness involved in industrial technical education were identified as follows:

- The goals of industrial-technical education are far away from preparing students in the practical aspects.
- The aims of industrial technology are not modernized enough to cope with present technological changes and advancements.
- The philosophy of industrial-technical education is not based upon the realistic requirements of the labor market.
- There is no balance between the curricular goals/standards of this educational stage and the actual needs of society for different aspects of economy.
- There are no rules for human resource development within the plan of industrial technical education.
- The curriculum is theoretical as it focuses more on abstract knowledge and information, not on concrete skills and values.
- Curriculum does not cope up with the technological variables and recent trends.
- The methodology in industrial-technical education does not cope up with the requirements for the labor market and modern strategies (Ali, 2007).

From what mentioned previously, we can say that industrial schools face many problems at all the sides and aspects of the educational composition. Accordingly, The goals of industrial-technical education are far away from preparing students in the practical aspects. Thus, all things based upon these goals will be weak and they will lack any form of progress.

Problems Associated with Industrial Schools:

Problems related to admission policies:

The admission policy at industrial school is done by a wrong way as it was carried out in a dynamic way according to the total marks which the student get at the final year of preparatory stages, the neglecting of student's readiness, tendencies and abilities are among the problems related to this point Also, the industrial schools open their doors for students who get less cognitive abilities as there are not standards upon which the process of admission is based (Ibrahim A., 2001).

It can be said from the above lines that there are not any defined admission policies and absence of the principles that should be followed in

accepting the students at industrial schools. It is clear that these industrial schools depend only on the marks which the students get at preparatory stage.

Problem related to the materialistic capacities devices and equipment:

There is no doubt that the materialistic capacities weather devices, tools and equipment from the main structure of industrial schools. However, the actual reality refers to the existence of outdate equipment and devices which do not cape up with recent technological progress.

The number of devices and equipment do not equal the number of students, thus a great number of students stand on one machine look at it without doing any work (Ibrahim A., 2001).

Additionally, the training efficiency is very low at industrial schools which resulted in a type of graduates who are not aware of their industrial specification. (Gamel Al-Sayed, 2011).

We can say that there are diversity of industrial education problems and weakness points. These problems range from problems related to goals to problems related to curriculum, techniques and methods of teaching and evaluation in addition to the overcrowdings at classes.

Problems related to teachers' preparation

There are many problems related to the process of industrial schools teachers and their academic preparation. Among these problems is that the time defined for teachers supposed to be qualified in service, is not enough as teachers are puzzled and distracted between their main work and the requirements of college program of study, in addition to the existence of some teachers at very far areas and training centers. This leads the teachers to cancel this training (The World Bank& European union, 2003).

There is a specific and clear system which is concerned with the process of training and qualifications for in-service industrial teachers, however the training process is not accurate and modern and it is done by educational administration which differs from one area to another in a great way (World Bank and European Union, 2003).

We can conclude from the previous study that the most important problem that face industrial schools is the absence of defined standards for training teachers besides to the routine criteria in their selection and distribution at training centers.

The study of Asem, (2014) Indicated that the industrial secondary education outcomes do not cape up with the labor market requirements. The researcher indicated that the industrial graduates skills and the training and cognitive levels are very weak. Additionally, the poor outcomes of industrial secondary education, especially at the level of graduates who are not qualified for labor market.

It can be concluded from all what mentioned above concerning the industrial education schools problems that these problems are many and complicated. These problems are related to goals, curriculum, techniques of teaching, materialistic devices and equipment, teachers training, infrastructure, the absence of workplace learning besides to the extra numbers of students at classes and their admission policies. These problems may be solved if the corporate schools model was followed.

Corporate Schools Model

Corporate schools are considered one of the workplace learning forms. Workplace learning, as indicated by (Bratton, et al. 2004) "has become an established metaphor for capturing formal, non-formal, self-directed collective and even tacit informal learning activities". Thus, corporate education is considered as a form of workplace learning.

History of Corporate schools

Corporate schools model dates back to the mid-1800s with the appearance of the Industrial Revolution when manufacturing invaded agriculture in contributing to the gross national product. Early in the Industrial Revolution, machinery was correlatively simple to be partner with little requirement for a skilled workforce. With the simplicity of the machinery, the workforce did not require significant training to learn how to operate a particular piece of equipment. (Cummings & Parks, 1992.).

The need for additional and more formal education became apparent as time went by and processes and machinery became more complex. Through the advancements in organizational theory provided by main figures like Smith, Babbage, Taylor, Fayol, Weber, Follett, Mayo, Maslow, Drucker, and Herzberg, the importance of education and training as it relates to increased productivity, became increasingly important and more formal (Boone & Bowen, 1987). As suggested by (Townley 1989), education is a more significant factor in America's productivity than increased capital, economies of scale, or redistribution of resources.

As stated by Pulliam & Van Patten (1999) "tremendous growth in communication and the transportation system, together with an increased centralization in American life, also had an effect on the educational needs of the people". These advancements were very beneficial to industry but also created the need for additional and more detailed education to train workers on how to operate the new technology.

The growth in the Information Age and the knowledge required to operate the new equipment reinforced the need for an increasingly educated workforce. The durability life of technology is becoming shorter and shorter. What was state of the art six months ago has become slow and obsolete

today. As such, we have moved from a largely industrial society to a largely knowledge-based society (Ishoy, 2000). With the shortened shelf life of technology, the need to develop human knowledge at an increasing rate has grown rapidly.

In order to keep pace with the changes in technology, employers need to constantly reeducate their employees. Corporate organizations are realizing that their ability to be competitive rests on the corporation's ability to increase human capital and improve their employees' skills (Cummings & Park, 1992). One mechanism to accomplish these goals is the corporate schools model.

Thus, we can conclude that the corporate schools as a model of corporate education is not a recent phenomenon, but it dates back to the industrial revolution; it is clear that the changes in technology contributed in its rapid growth.

Corporate Schools Definition

The researcher defines *Corporate Schools* as an educational entity which is concerned to serve the corporation strategy and to prepare students and employees for labor market challenges. The best Corporate Schools share the following characteristics:

- (1) Assigning goals linked to key corporate strategic imperatives.
- (2) Providing training based on sophisticated competency models.
- (3) Development of a shared vision in the corporation as a key objective.
- (4) Functioning as a laboratory for creating and transforming individual learning into organizational knowledge.

In this regard, Meister (1998) identified the following ten key principles of the corporate education in general, and corporate school in particular:

1. Providing learning opportunities that support the organization's critical business issues.
2. Considering the corporate school model as a process rather than a place of learning.
3. Designing a curriculum to incorporate the three Cs: Corporate citizenship, Contextual framework, and Core competencies.
4. Educating the value chain, including customers, distributors, product suppliers, and the universities that provide prospective workers.
5. Moving from instructor-led training to multiple formats of delivering learning.
6. Encouraging leaders to facilitate (and get involved with) learning.
7. Moving from a corporate allocation-funding model to "self-funded" one by the business units.
8. Assuming a global focus in developing learning solutions.

9. Creating a measurement system to evaluate outputs as well as inputs.

10. Utilizing the corporate university for competitive advantage and entry into new markets.

From what mentioned above, we can say that these principles provide the foundation for the corporate school model. However, the level of importance of each principle varies from corporation to another, depending on the size, design, and type of product or service provided.

Factors Shaping the Corporate Schools

Meister(1998a, p.1) identified the "broad forces that have supported" the corporate education in general, and corporate schools in particular as follows:

1. Emergence of the flat, flexible organization-human capital as the key to maintaining a competitive edge through cross-functional work teams which require new skill sets for changing roles in the expanding global marketplace.

2. Transformation of the economy into a "knowledge economy, and thus shifting from manual to knowledge work that increases the intellectual component of jobs, requiring knowledge/concepts to perform more efficiently to maintain a competitive edge.

3. Shortened shelf life of knowledge - the "knowledge economy" requires continuous learning to develop broader skills.

4. New focus on lifetime employability rather than lifetime employment-job security becomes the employee's responsibility, through employers' provision of opportunities to develop transferable job/life-related skills..

5. Fundamental shifts going on in the global education marketplace: i.e. corporations become educators.

Cantor (2000) explained the rise of corporate education or corporate schools and their move to the forefront of technical education by identifying six distinct - but interrelated – activities that underpin this movement:

1. The growth of training and human resource development as delivered by a firm for its employees and customers as a form of school education.

2. The growth of the corporate-school partnership training and human resource development delivered by a company for its employees and customers, often in cooperation and partnership with schools and colleges.

3. Schools' increasing use of computer-based technologies to deliver instruction to students.

4. Schools-developed training delivered on site to local business and industries.

5. The growth and proliferation of private and for-profit institutions of pre university education.

6. An increasing presence of nontraditional, nonprofit community-based organizations providing education and training in competition with traditional institutions of higher education.

From what mentioned at the above lines, we can say that the most important factors which contributed to shaping this model were revolved around the growth of training and human resource development as delivered by a firm for its employees and customers as a form of school education. Besides to that, Emergence of the flat, flexible organization-human capital as the key to maintaining a competitive edge through cross-functional work teams which require new skill sets for changing roles in the expanding global marketplace.

Roles of corporate schools

According to (Grippa, Di Giovanni & Passiante,2009), roles of corporate schools are represented as follows:

- Reinforcing and perpetuating behavior.
- Managing change.
- Driving and shaping the organization.

We can say that corporate schools model includes a lot of characteristics and features which are represented in its growth and the factors which underly this development. Also, it is clear that corporate schools do a lot of functions and roles in linking the performance at schools with the corporation to which they belong. Undoubtedly, corporate schools composition serves the strategy and goals of its corporation.

Corporate school Case study: General Electric (GE) corporate school Introduction

General Electric Company headquartered in Fairfield, Connecticut, consistently ranks among the top 10 in the Fortune 500 ranking of industrials. GE currently employs approximately 300,000 people in more than 300 locations worldwide".

Recently GE established an impressive corporate education center at Crotonville, New York, where many of the leadership and management development courses now take place (Corporate Education Catalog, 1990).In addition to providing educational opportunities for business leaders, GE has a long history in continuing- education for leaders in engineering. The Advanced Course in Engineering was originally established in 1923 to supply the company with engineers possessing sufficient breadth and depth of technical understanding in all departments to make basic contributions in the development of new or improved products. More recently, GE added an Advanced Course in Manufacturing and an Advanced Course in Computers.

The GE Advanced Course in Engineering is the only one of GE1s education programs to actually lead to a degree (Don Mack, 1987).

GE Corporate School: Origin, Training Programs and Degrees

Charles Steinmetz, an early supporter of Corporation Schools, was GE's original advocate for leadership education for young engineers. To be certain that Steinmetz's educational philosophy would be perpetuated, a young engineer by the name of Robert Doherty was commissioned in 1923 to set up the Advanced Course in Engineering and to set course goals which would fulfill the company's leadership needs in the Steinmetz tradition. The goals set then remain the goals of the Advanced Course in engineering today (Schank, 2007) which are represented as follows:

- The ability to identify and solve real engineering problems;
- Competence in writing engineering reports;
- An understanding of the use and misuse of mathematical analysis, and other ways of solving engineering problems; and
- The realization that the engineer's primary purpose is not mathematical virtuosity, but the improvement of methods and products.

Additionally, the learning environment can affect the students' abilities to think and create in an innovative way. It worth mentioning here that leaning environment within corporate education should include integrated items that foster learning. This can be clarified in the following diagram (Mark, 2002):



Figure 1: The learning life-cycle of business -driven learning organization.

It can be shown from the previous figure that learning in corporate schools resembles life cycle as it contains many stages and fundamentals , these bases are completely integrated to foster learning and to accomplish the goals of both the school and corporation to which it belongs. This cycle of learning includes at its core the process of planning, controlling and evaluation as they form the basis for real learning at schools besides to human resources development and content development which they come around this cycle core. to achieve distinguished outcomes, corporate schools have to carry out some tasks and duties related to the administrative, financial, governing body and educational aspects

Training programs and degrees

For the first 40 years, these goals were met through a three-year in-house certificate program. The curriculum - called the A, B, and C-Courses- covered a variety of topics in electrical and mechanical engineering. In the early 1960's, however, young engineers recognized the importance of graduate degrees and began to push for graduate credit. To accommodate their requests, and to attract well qualified engineering graduates to the GE program, the Advanced Courses staff initiated a cooperative agreement in 1963 with the Polytechnic Institute of Brooklyn so that students could earn a graduate degree as well as a certificate (Kiely, 2002).

Curriculum and Degree Requirements

The Advanced Course in Engineering (ACE) is still three-academic years or six-semester long. The first three semesters typically consist of a two-semester A Course and a one-semester B Course taught at GE, and the final three semesters consist of university courses and an engineering project.

The A-Course continues in the tradition established by Doherty and covers a variety of topics: engineering analysis, vibrational analysis, electricity and magnetism, control theory, probability and random variables, heat transfer, and structure analysis. The classes meet once each week for approximately four hours during company time. The lecture serves as a refresher for students who have covered the topic before, or as new instruction for other students, and provides them with the background knowledge necessary to solve the homework assignment. Each week the students have a realistic engineering problem to solve that requires on the average of 20 hours completing. This time is in addition to the regular work week. The intention is to encourage the students to brainstorm in small groups and then to work alone on writing up the solution of the problem in the form of an engineering report (Buck,, 2000).

The A Course is basically the same at each GE location, and primarily addresses fundamentals of general usefulness throughout the

company. Similarly, The B Course, taken in the first semester of the second year, involves meeting for four hours per week and requires a weekly engineering report, but covers topics of specific interest to the local GE site. Examples of typical B-Course topics are digital circuits and computers, finite- element analysis, and fiber optics. After completion of the B-Course, the students generally study 4-6 courses at the local university that had entered into the cooperative arrangement with GE. Each arrangement with a local university is made separately and some may allow the GE students more credit for the A and B courses than others.

Students must also complete a job-related engineering project similar to a master's thesis in terms of nature, range and size. They then receive a master's degree, usually in electrical or mechanical engineering along with the C-Course certificate which indicates completion of the advanced courses (Buck., 2000).

From what mentioned above, we can say that corporate schools model (GE corporate school as a case study) can contribute in overcoming the problem of the industrial schools and improve its performance. Accordingly, the curriculum of industrial schools should be designed according to society and environment needs, as well as it should be prepared by all stakeholders and society members through activating their participation. Furthermore, learning and training should be correlative as students should study theoretical courses besides to going to workplace, for example at corporation of their specification.

Conclusion

The suggested proposal

In the next lines, the researcher introduces a suggested proposal based on the qualitative framework of the current research.

The suggested proposal

The research indicates the existence of some problems and obstacles related to the educational process components at industrial education. These can be shown in: (1) limited human resources and materials; (2) problems related to teachers; (3) insufficient school management and accountability system; (4) inappropriateness of the curriculum and teaching methods with the requirements of labor market; and (5) rapid changes of the knowledge-based economy. Consequently, it is suggested that the adoption of corporate schools can contribute in overcoming those problems. The corporate school can be applied in the Egyptian environment as a model according to the following suggested proposal which includes: resources, philosophy, fundamentals, goals, procedures and guarantees.

- A- Previous studies and their results.
- B- The theoretical framework of research.

Main Philosophy of the Suggested Proposal

The main philosophy of the suggested proposal stems from the importance of developing industrial education in Egypt in order to make it able to cope up with the rapid changed occurring in all fields of life all over the world. This philosophy is based on the result of the current study which are consistent with the advantages of the corporate schools model asserting its merits and benefits in overcoming industrial education problems.

The bases and fundamentals of the suggested proposal

(A) Industrial education represents a fundamental basis of progress in Egypt, and thus it is necessary to improve its performance.

(B) Improving industrial education contributes in preparing and providing students in Egypt with the latest techniques and methods of training.

(C) The corporate schools model is a basic tool to improve the performance of industrial education. We can adopt the learning life cycle as a model for learning which can be followed at industrial schools to link theoretical knowledge to practice.

The aims of the suggested proposal

The suggested proposal are represented in the following points:

- Solving the points of weakness and problems of the industrial education in Egypt.
- Making the teachers, students and all industrial education schools model as an approach to improve raising the society members' awareness of their role in cooperation with school members to implement the activities and teaching methods used in the corporate education schools and adept them in improving performance of the industrial education schools.

The procedures of the suggested proposal

(A) Procedures related to human competences:

- 1- Providing all school members with the culture of corporate schools, their vision and mission in improving the students' performance.
- 2- Holding orientation meetings to increase society and school members' awareness and desire to participate together in adoption of this model.
- 3- The local principals should participate at the initial meetings concerning the applying of this model.

(B) Procedures related to materialistic competencies of industrial schools:

1. Offering a suitable budget to the application of the corporate schools

model.

2. The adoption of the foreign designs of these schools.
3. Holding a partnership among these schools and traditional industrial schools.

(C) Procedures related to the organizational and administrative aspects:

1. The corporate administration body should be based on a team to coordinate efforts on multiple sites. The decentralization form should be followed at schools to help the small units make its decisions.
2. At each site, there should be a local coordinator who is responsible for administering the in-house courses, setting up and maintaining the cooperative arrangements with the local university, and tracking students throughout the whole three-year period. In some instances, this individual is also a principal lecturer. During the school portion of the program, the administration is a joint effort between the local coordinator and the school's administration.

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