

# Market Needs Based Model for Creating and Managing Change in Saudi Technical Colleges

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**Abstract:** The measurement of success and its continuity in institutions of higher education is based on the ability of these institutions to keep pace and cope with the needs of the local and global labor markets. This can be achieved only by ensuring that their educational and training programs provide the required knowledge and skills. It requires a quick and an effective response from educational institutions. To carry out this role effectively these institutions must have an effective and strategic style of administration that is capable of making the necessary internal changes and carefully managing them in order to achieve their objectives. The most important change is one that will affect their core business, such as modifying their educational programs. In this paper we present a modern experience and advanced practice of change and development in an educational system based on the market needs. This experience is from the College of Telecom and Electronics (CTE), Saudi Arabia. The college has launched a development program to shift its learning language to English in response to the requirements of the local labor market. This model of change involves distinct qualitative change and systematic means occurring at the center of the educational process at the college in accordance with a strategic goal set by the college taking into account all the associated challenges. The main purpose of this change is to comply with industry after discovering that the professional language spoken in the scope of the disciplines of the college in the labor market is English. This fact was obtained from the results of a scientific study carried out by the college. Accordingly, complete new study plans have been designed, including two additional semesters for beginners to learn English as their second language. Several developmental projects have been launched to develop the college teaching staff and the curriculum. The admission policies have also been modified to take into consideration applicants' level of English language skills. The college is now in a completely different phase that will develop it into a new and competitive college.

**Keywords:** Market Needs, Managing Change, Curriculum, Gap, Teaching.

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## 1. INTRODUCTION

The growth and development of most higher education institutions consist of transformation steps that directly influence their current status. If we look at the evolution of some of the world's most prestigious educational institutions with a high rank and reputation, we find that their evolution took place in accordance with deep and radical changes occurring during their lifetime. These changes occurred in time intervals responding to the requirements and needs of the local labor market and the beneficiary community. For example, Massachusetts Institute of Technology (MIT), which is one of the most important educational institutions in both America and the world in science and technology, experienced a historical successive change that is considered the direct cause of its arrival at this advanced engineering and scientific status [1]. One of the main reasons and justifications for the change and continued growth of these educational institutions is dictated by the economic and industrial environment and local development [2]. In fact, the measure that leads to success in educational institutions is based on how to respond to the changing demands of the surrounding community as well as adapting to its requirements [2].

### 1-2 Demands of Change

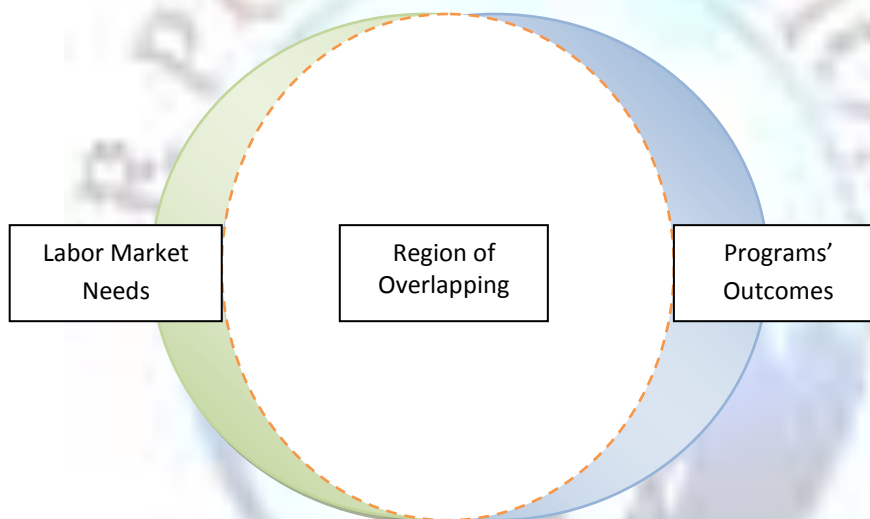
Facing all educational institutions all over the world, a major challenge and a central issue are linked to these institutions' fulfillment of the main requirements for which they were established and are maintained. These requirements are usually predetermined by their stakeholders, who benefit directly from the output of the programs offered [3]. We will here identify two main parties concerned directly with the outputs and performance of these institutions, as well as mentioning the most important demands they have:

**First:** Sectors of the local industries that are directly linked to educational institutions' programs. These sectors act in accordance with the concept and the logic of competition, quality and profitability. They require employment and consider the output when focusing on the selection of individuals with cognitive skills and capacities according to their vision and based on the criteria specified by them.

**Second:** Students themselves are the internal and external clients as well, and have their requirements and aspirations regarding the right of access to education and rehabilitation compatible with the needs of the labor market to ensure they have equal opportunities to work. Besides that, they have an additional requirement, which is usually ignored by the majority of traditional educational institutions. It is their desire based on their right to continue their collectible educational either in local educational institutions or in global ones without any cognitive- or linguistic-specific obstacles precluding acceptance or causing failure. These desires are often ignored in traditional educational institutions, thereby failing to respect the wishes of this important segment of students. It is possible that this desire comes immediately after graduation or during the period of work because of personal ambitions for development and growth or the need to acquire additional skills and knowledge.

Therefore, it is the responsibility of educational institutions to design and construct their educational programs according to these two axes and to measure their performance based on the level of satisfaction. Another challenging factor is the competition between these institutions in order to survive and this is not limited to local institutions, but extends to regional and global institutions as the labor market has become a worldwide phenomenon [4]. Additionally, institutions should offer academic and training programs that should be designed according to international standards to ensure local and international compatibility and convergence in order to provide the minimum common skills and knowledge that enable graduates to continue their educational attainment successfully.

Now, for institutions to meet these demands, they must have a methodology and mechanism to ensure a dynamic and lasting change and continuous improvement at the heart of the educational and training process [5]. Figure 1 shows the overlap between the requirements of the labor market and the outcomes of the educational programs.



**Figure (1) Overlap between educational outcomes and labor market requirements**

We can also use this form to clarify the relationship and overlap required between the common educational programs offered by various local and global institutions. This overlap should be wide enough to include most courses, knowledge and skills to reduce the disparities among graduates and ensure they can transfer between these institutions without hindrance to their academic progress.

### **1-2 Gap between the Labor Market and the Educational Institutions**

The difference between the value of the actual output of educational institutions and the needs and requirements of the labor market is the gap value, which is also known as the error value [6], and is modeled mathematically as:

$$G = x - \hat{y}$$

The difference between the constant  $x$ , which represents the requirements of the labor market for a specified period of time, and the value of the variable  $y$ , which represents the cumulative achieved level of knowledge and different skills that students can gain from any academic or training program, is defined mathematically as follows:

$$\hat{y} = K_0 + \int_{t=0}^T \left[ \sum_{n=n_0}^{N_t} \dots \sum_{m=m_0}^{M_t} [\alpha_{n,\dots,m}(t)] \right] dt$$

$$= \int_{t=0}^T \hat{y}(t) dt$$

where  $\alpha$  is the exponential value,  $t$  represents time periods (weekly, monthly or quarterly),  $m \dots n$  represents the values of the elements of different skills, knowledge and behaviors achieved during the period  $t$  and finally  $K_0$  is a constant value that varies from one student to another and represents his previous achievements.

Figure (2) shows the relationship between the two values: one has a constant value with time  $x(t)$  and represents the value and ceiling requirements of the labor market and the other value  $y(t)$  is a variable with an exponential curve that shows the actual outcome derived from the outputs of the educational institution. The difference between them or the gap has a maximum value at the beginning and gradually reduces to its minimum value by the end of the course period. Of course, it cannot become a zero value, but it is required to keep it within in the limit to satisfy all the related parties.

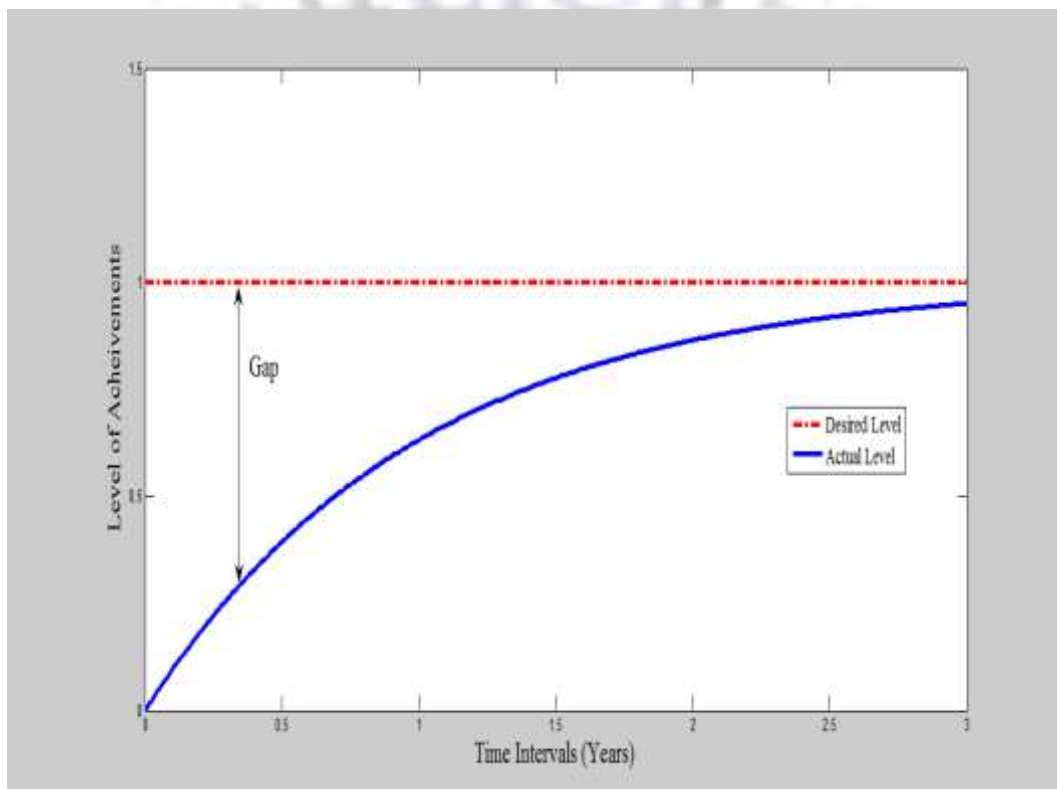


Figure (2): Gap level between industry needs and outcomes from educational colleges

### 1-3 Management and Control Mechanism

For balanced managerial control of the college outcomes and the requirements of the labor market, educational institutions must work efficiently and periodically with constant contact to obtain the correct feedback. The tasks of the administrative control system are based on gaining correct and reliable feedback and making appropriate decisions to correct or prevent errors. Figure (3) shows an effective control system that can be used to maintain the level of educational outcomes in accordance with the requirements of the labor market [6]. The model shows the importance of the educational institution having reliable feedback from the labor market about its requirements, which can be obtained directly or through specialized sources.

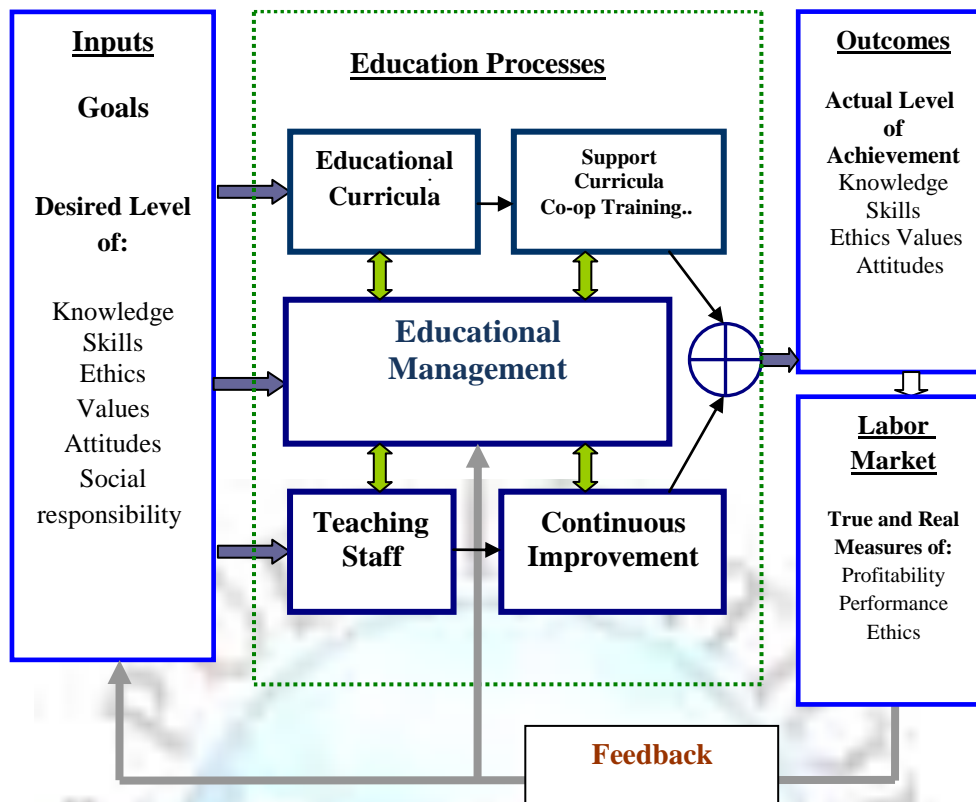


Figure (3): Block diagram of the control system model for educational outcomes

## 2 – COLLEGE OF TELECOM AND ELECTRONICS – STEPS OF CHANGE

The College of Telecom and Electronics is a technical college in Saudi Arabia, which has passed through multiple transitions, the latest in 1997, and was renamed the College of Telecom and Electronics and transferred from the Ministry of Telecommunications to the General Organization for Technical and Vocational Training (TVTC) as a direct consequence of the privatization process that took place in the telecommunications sector in the Kingdom. You may refer to the Appendix for more information about the college and its current status, including its departments, enrollment and staff, or visit the college's website [7].

At the beginning of the academic year 2010/2011 the college recognized the need at this stage to carry out an assessment of its programs and their outcomes as well as the relationship with the labor market to obtain an accurate measure of its needs and requirements in order to identify the gap. Accordingly, the college decided to form a working team within the college to conduct the study. The main purpose of this study in its external part was to measure the level of satisfaction in the related sectors and gain their feedback regarding how to meet their needs. For the internal part, the task was to conduct internal assessments, including programs, staff, curricula, etc. The final outcome would be the identification and presentation of the gap between the college and the related labor market. These results, which will be discussed later, crystallized an urgent reform step by transforming the language of study from Arabic to English after it emerged that the professional language used in the scope of the college disciplines in the related labor market is English. The results also showed that the English level for CTE graduates is always a weak point in their ability to acquire the available jobs and that they need to spend more time on their On Job Training OJT.

As mentioned in the summary, this paper aims to present the CTE experience as a real model of change in its educational system in accordance with the needs and requirements of the labor market. This is a deep and radical change at the heart of the educational process to transform the study to the English language and of course to face all the related consequences, such as changing study plans, modifying curricula, establishing an English program for beginners, developing staff, etc. In the remaining part of this paper, we will try to clarify this experiment and start to find the college's answers to the questions of why to change, what the change will be, how it will occur, what has been achieved up to this point and finally how the outputs can be measured and evaluated.



It is clear that the college's work methodology for the implementation of this transformation plan was divided chronologically into the following successive stages:

- Phase I: Conducting the Study and Identifying the Gap
- Phase II: Decision Making
- Phase III: Planning and Building Teams
- Phase IV: Implementation
- Phase V: Evaluation and Follow-up

Figure (4) is a graph that shows the stages of implementation and the duration of time calculated in thirds of semesters as the college works in a tertiary system.

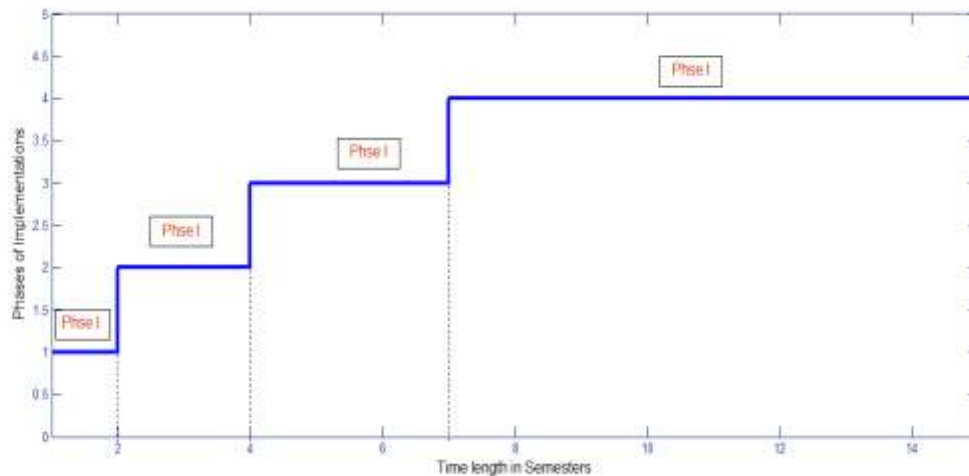


Figure (4) Milestones of the work plan and their time frames

The college is currently undergoing chronologically the beginning of the fourth phase in its first semester of the year 10-1433 H - 9-2013 A. According to the new study plan, all newly admitted students are in the English language program and their level of English language was considered as one element of the selection criteria.

Because the process of change has not been completed in all its phases, we will focus on what has been and will be accomplished in the first phase, being a key step during which the process of change undertaken by the college was developed. The paper will also review the second and third phases and the beginning of the fourth stage, which the college is undergoing at the moment. Thus, it can be said that this study is only partial and does not include the fourth stage, which is the longest and most important and difficult one. The assessment and follow-up processes overlap temporally with the fourth stage and should provide the outcomes, including indicators, comparisons and all the progress reports.

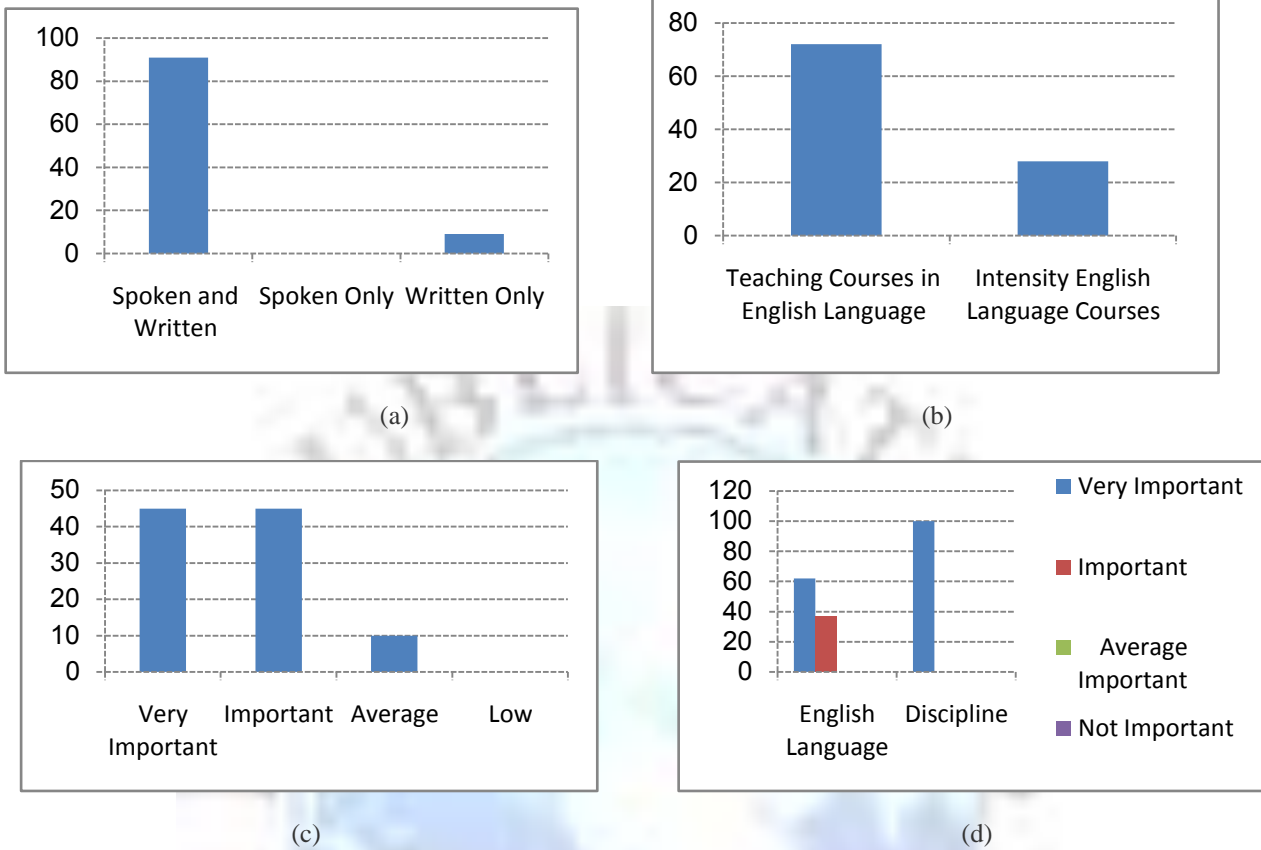
## 2.1 External Analysis

The first task for the team was to set up a field study targeting the concerned employment sectors in order to measure their level of satisfaction and to identify their priorities. A multipurpose questionnaire was designed and prepared by the team.

The analytical results of these questionnaires indicated an important fact: the language used in the labor market within the scope of the college disciplines is English and this is the language of communication, including technical reports. It is also used in the technical and vocational training programs provided. The results also showed a significant weakness in the overall output level linguistically and technically, which reflected negatively on the performance and employment opportunities.

The following charts show the results of the most important elements of this study. The top- chart in Figure 5 shows that 90% of the target companies and sectors responded that English is the language spoken and written in their work environment. The chart shown in Figure (5-c) depicts their suggestions on how to improve the level of English among students during their stay at the college: 70% of them suggested that the teaching and training of the courses must be in

English and the rest proposed the establishment of extra English programs. Regarding the importance of using the English language in daily communication in the workplace, this was of high importance to the majority of companies and sectors and is illustrated in the graph in Figure (5 – c). In their answer to the question concerning the most factor for their recruitment, they gave a high priority to the English language and behavioral discipline, as shown in Figure (5 – d).

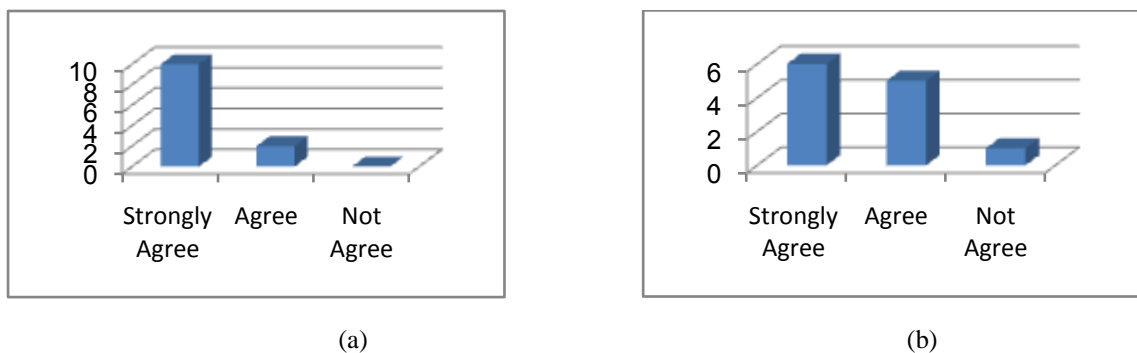


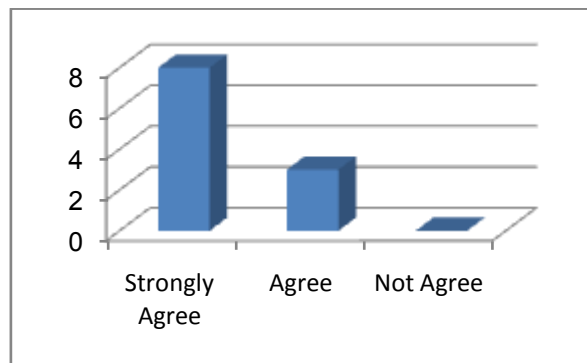
**Figure (5): Results obtained from the external analysis**

The above results caused the team to continue the internal assessment study in order to identify the gap and determine solutions.

**2.2 Internal Analysis**

Immediately after the completion of the analysis of the results and external guidance it was necessary to carry out a study and assessment of the situation through an internal survey of the views of all parties to the internal environment, including the staff members of the college’s departments. One of the most important objectives of this analysis was to identify the gap between the college and the labor market and then define the requirements and elements of change needed, including college readiness, both in educational programs and members of the education, and training to carry out a radical change in the college. This study has been the cornerstone and the key step for the proper start of the project.





(c)

**Figure (6): Results of the internal analysis (Department of Computer Technology – Technical Support)**

The results of the analysis showed the internal causes of the gap, identified elements and concluded the assessment of the ability of the college to change course and make the desired reform at the core of the educational process. At this stage the college became aware of the fact that there was a process change to be carried out, which focused on changing the language of study to English in the educational process, with the survival of the use of Arabic in notes but with English remaining the language for technical and engineering communication and for writing reports, homework, student projects, presentations, teaching aids. Figure (6) shows the results of a survey of the views of a section altogether (Department Computer Technology – Technical Support) regarding the proposal to add an intensive program of English at the beginning of the study plan or at the end and the absolute majority opted for additional chapters at the beginning of the study and within the study plan itself. Collective consent was also ascertained for the transformation of teaching and training to English and its use in writing reports and duties, courses and teaching aids.

The departments submitted their proposals to add an English language program to the academic plans and presented the first copy of the draft plans, which included a semester of 20 hours fully dedicated to learning English for freshmen students as described in Appendix (c). Subsequently a full report was prepared on the project to change the plans for college scholarship, supporting the causes and results of the internal and external study and recommendations, and then presented to the College Board for discussion and to offer recommendations.

### 2-3 Decision Making

At this point there is a bottleneck for the college to proceed with its project of change since it has limited power that prevents it from taking action. The decision is on the hands of the top management of the TVTC, the governmental organization that runs the technical education in a centralized manner, including curricula, finance, regulations, recruitment, equipment, etc. The task here is for the college to pursue the decision makers to give this project the green light and provide the necessary support by excluding the college from the other colleges that have different study plans. The college has to communicate effectively with the decision maker by raising awareness of the presentation. The college sent its study report showing the reasons for the change and how it can be implemented. Fortunately, the Governor of the TVTC adopted the college's initiative with full support. An immediate action was taken by forming a committee at the TVTC to discuss this project's needs and requirements.

### 2-4 Planning, Team Building and Identifying Requirements

The committee formed was headed by the Deputy Governor and the head of the related departments' curriculum, IT, the Dean of CTE and the College of Communication and Information, which had attempted a similar change. The main outcomes of the successful meetings were the formation of a joint team from two colleges that was responsible for examining all the steps of the change and identifying all the requirements based on the proposed study plan and reporting to the organization committee. Meetings continued for about a full academic year. The joint team reviewed the proposed study plans submitted by the college and modified them by adding two additional semesters instead of one for the English language. By the end of this stage, the team had prepared a common vision and a plan of action.

### 2-5 Executing and Following Up the Plan

The actual implementation phase is the real challenge for the project to achieve its objectives. This stage is the longest in terms of time and the most difficult in terms of management, including follow-up. As we mentioned earlier, the college is already going through the beginning of the actual implementation of the program, specifically the first third

of the academic year 1412/1413 AH 2012/2013. The college has prepared an operational plan to move the college to a different educational system on the basis of linguistics and different lesson plans.

The tasks of the Plan of Action were classified into several themes within the college work system as follows:

- English Language Program Management unit to oversee the entire program and evaluate its outcomes.
- Departments and their role with regard to the transition to the new study plans.
- College administration and its role in supporting, monitoring and evaluating the performance of both the English program unit and the departments to achieve the desired results.

### **2.5.1 What Has Been Accomplished?**

Currently the college is in the first semester of its new study plan. All newly admitted students have been enrolled in the intensive English language program. The English program was outsourced by a local academy center specializing in teaching English to second-language non-native speakers. A weekly progress report for each student is produced by the English unit and allows the college to have a good understanding of students' progress and achievements. The expected duration of this stage in its first cycle is nine semesters, from the current academic year 1433/1434 AH 2012/2013 to the end of the third semester of the academic year 2015/2016. The number of new students enrolled in this program is 120 and these are distributed across 6 sessions divided into 2 levels according to their English language skills. The number of weekly contact hours devoted to learning the English language is 20 and there is an additional Introduction to Computers course for 4 hours.

### **2.5.2 Follow-Up and Action of Correction**

The evaluation and follow-up process is very important and decisive for the overall project and gives the transformation the success it needs by providing correct indications of its progress and performance. In this step it was divided into two tracks, one of which can be described as continuous assessment of the educational process, including the English language. The other is an overall assessment of the college outcomes by the end of the first cycle with the presence of graduates who have completed the study plan. The new indicators can be measured by comparisons with previous outputs with participation of the labor market and the internal and external beneficiary community. It is absolutely necessary for the correction process to be effective in both cases to ensure that it is not derailed.

At the current time of this experience, the transformation project for the new school plan is beginning and the freshmen are participating in a language program at different levels according to their level of abilities in the English language. In other words, the evaluation consists of weekly assessments that that come from the English center. Among the observations that were recorded until the fifth week of this semester are high discipline in the presence and performance of students with a very low dropout rate.

## **3 – POTENTIAL OBSTACLES**

Accompanying any change process are risks and constraints that can be anticipated and a strategy developed to deal with them. It is known that resistance to change, which varies from person to person, is the most important challenge to success. The college has identified the potential obstacles, some of which are administrative and some human.

### **First: Regulatory and administrative obstacles**

1 – As mentioned earlier, the college does not have full authority to make decisions as the decision for approval must come from the owner of the validity legislators, senior officials in the General Organization for Technical and Vocational Training, which directly oversees the management of technical colleges, including the CTE. It has been dealing with this matter using the awareness for persuasion through a scientific study report, which details the reason to change and the expected results of this change.

2 – Technical and logistic constraints including separating the college's plan from those of other colleges. The IT department should prepare a solution.

3 – Providing the new curriculum and courses and new training and how to provide them. The college, through the members of education and training within the different sections, required suitable references and modern textbooks from similar local and global colleges.



### **Second: Human constraints**

1 – Lack of English skills for some staff members, especially in maths and physics. A development program has been prepared in the English language. In the worst case, departments' staff members who have an engineering degree can teach maths and physics.

2 – Possible leakage and dropping out of the program as a result of not exceeding the required level in English. Accordingly, the college has included in its admission criteria English language proficiency through a placement test to determine applicants' level.

3 – Normal human resistance, which can happen in similar changes. The source of this resistance comes from faculty members or the administrative body or even from within the institution itself. One of the most important ways of dealing with it is to follow up more closely and enhance the teamwork approach, as well as providing the necessary training and empowerment.

4 – Lack of provisional English language teachers. Outsourcing would be the best solution to this problem.

### **CONCLUSION**

In this paper we have presented the change mode of the College of Telecom and Electronics (CTE) as a distinct model of change in higher education to correct its courses in alignment with the requirements and needs of the local labor market, as well as compatibility with similar educational programs' outcomes in other educational institutions. The essence of the change is to change the language of study from Arabic to English and deal with the associated consequences regarding study plans and the teaching environment as a whole. It is worth stating here that this experiment is currently at the beginning of its implementation phase and needs to double the effort for assessment and active and ongoing correction actions. This paper has provided a description of the study and the analysis that preceded the implementation of the new study plan by identifying the gap and then defining the requirements, implementation steps and potential obstacles. As an act for the future, the paper recommends that researchers and interested parties from within the college and outside should conduct scientific studies on the execution period, which is the most important and during which the monitoring and evaluation process of the transition must take place through measurements, indicators and comparisons of the different variables and outcomes produced by the new educational environment and those produced by the old system. The paper also recommends greater involvement of researchers from academia or the labor market to study the case and provide feedback to enrich this experience and enable it to achieve the desired goals successfully.

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### **Appendix**

#### **College of Telecom and Electronics (CTE)**

In 1992 the college was founded under the name of the Institute of Telecommunications in Jeddah and later changed its name to the College of Telecommunications under the Ministry of Post, Telegraph and Telephone Saudi. On 7 October 1997 the college was transferred to the General Organization for Technical and Vocational Training (TVTC) and it was named the College of Telecom and Electronics (CTE) and became one of the technical colleges run by the TVTC. According to the college's annual report 2011/2012, the total enrollment is about 1582 students and 104 teaching staff members. The following table shows the college's departments with the distribution of students and staff.

Table (1): The departments and number of students and members of the Education and Training Authority (college report for the year 2011/2012).

Departments	Staff	Students
Electronics Technology	28	537
Communications Technology	23	504
Computer Technology	24	541
General Studies and English Language	29	-
<b>Total</b>	<b>104</b>	<b>1582</b>

The college also has local and global partnerships, notably with **Cisco, Microsoft Academy, Nokia, and Samsung**. More information about the college can be found in its annual report [8].

