

# Evaluate and Improve High School Students for Some Skills using Quality Function Deployment

Rania Ahmad Elrifai  
Benghazi University, Engineering Faculty,  
Industrial and Manufacturing System Engineering Department  
Benghazi, Libya

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**Abstract:** The current study, which deals with the quality of education, is an identification of the necessary needs from the point of view of faculty members regarding the skills required for secondary students. These are the necessary requirements that must be met in the course of secondary education before the student joins scientific faculties to proceed to a higher academic stage. The Department of Industrial Engineering and Manufacturing Systems at the College of Engineering at the University of Benghazi proposed the teaching of some of the skills already included in the existing curriculum in order to prepare the students for the next stage (undergraduate) through the quality function of publishing technology. The key stakeholders in this audit were identified as the faculty members of all departments (Industrial Engineering and Information Systems, Electrical, Civil, Mechanical, Petroleum and General Department) and secondary teachers. Customer expectations that were immediately identified through the survey of all faculty members were summarized and prioritized. The requirements of the two shareholders differed only in their order of priority. The requirements were then converted to quality characteristics.

**Keywords:** Quality Function Deployment; Total Quality Management (TQM); School Curriculum; High School; Relationship matrix; House of quality

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## 1. INTRODUCTION

Secondary education in Libya changed over a course of three stages, beginning in the fifties with the contract system that lasted until 1991 and consisted of general high school and three years of studying general topics. When it began, it was what is known as specialised secondary education, which was then a solution that helped the student adapt initially in the university these were opinion since. However, there was a shortage of qualified teachers for each specialisation, which led to the teachers' study topics not being related to their fields. In this, the paper focuses on to evaluate and Improve high school students for some skills using Quality Function Deployment which skills in the form of requirements took their importance depending on the customers who are faculty members, who are from the point of view of professional and found that the skills were one of the first to be before they enter college , and that was one of the shortcomings of the high school students the scientific, the author found that a quality function deployment is an effective tool for overcoming this difficulty QFD is the management technique for comprehending the "voice of the customer" and enables a translation of the customer requirements into the appropriate quality characteristics. Its use facilitates the process of concurrent engineering and encourages teamwork while working towards a common goal of ensuring customer satisfaction. QFD also provides the means for inter-functional planning and communications. based on the previous study that has been reviewed by QFD[1]. In this paper, evaluate and improve some skills of high school students in Schools of Higher Education for adapting for studying in

University Education as well as next steps have been reviewed and evaluated by the QFD technique.

## 2. QFD review of the skills of high school students in Schools of Higher Education

Quality Function Deployment (QFD) is one of the Total Quality Management (TQM) techniques which can be applied for process and design improvement. QFD was used as a tool for quality improvement and benchmarking in higher education institutions of Pakistan. The study is based on primary data have been collected from five hundred students which were considered as customers and five hundred teachers, considered as technical describer from six Pakistani national degree awarding universities, QFD assessment showed the comparison of different universities in certain areas of their quality teaching was first applied to education at the beginning of the 1990s [2]. The Quality Function Deployment was applied at two stages:

Stage1, where each course's goals and outcomes were related to the program goals and institutional learning outcomes.

Stage 2, where actual end-of-the-semester data from student assessments and faculty evaluations were collected and fed to the Quality Function Deployment system, the results of the exercise can be used to evaluate the effectiveness of the program's yearly cycle and to devise appropriate interventions for improving the program and course design and delivery strategies[3].

The curriculum of the tire technology department at the Kocaeli university, vocational school of higher education (KU-KVSHE) has been reviewed by using the quality

function deployment (QFD) technique, the university senate has approved the new curriculum proposed in this study and the school management has decided to apply the new curriculum as of the fall term of the 2002–2003 school year [1]. Application of QFD, in a higher education curriculum redesign, has been made at the Rain Star University, in Scottsdale, Arizona. This curriculum was for a master's degree program in acupuncture and oriental medicine[4]. The QFD allowed to assess the learning needs of students in an accounting course and translate them into educational strategies (specific techniques) able to satisfy such needs, the results allowed to define "the right things to do for the first time", a significant support for the improvement of university courses [5]. Quality Function Deployment (QFD) has been applied for process and design improvement. The research developed a framework for quality in an educational institute on the basis of literature review. A relationship matrix was developed between the set of identified groups of 'Dimensions of Quality' and sets of 'Enablers' in an educational institute[6]. One of the earliest uses of QFD in studies in education was done, the requirements of customers-students, academic staff and industry were analysed separately [7]. Evaluation of E-learning service is to insist that in spite of the importance of having standards to maintain the quality, and to commit to the aim of quality by achieving customer satisfaction, it reveals the importance of Quality Function Deployment (QFD), to ensure that the voice of customer derives all actions concerned with quality. It can help keep high standards of benchmarking[8]. A matrix Quality Function Deployment (QFD) has been used. It allowed transforming-requirements of clients/students of nursing to easily measurable parameters of service process – process of tutoring, providing their desired values. Due to benefits of introducing QFD, the method can be used on different stages of the quality management process, so you should be exploited in the process or improving the quality of practical training of future nurses [9]. The authors did not consider the students as stakeholders by reasoning that students use the curriculum but often lack information regarding the university needed in their comprehensive and are unable to assess the curriculum from a customer's point of view. However, the high school should have the competency to evaluate the skills to be taken by the students. The risk here occurs if the lecturer-faculty lacks industrial experience, in which case their priorities and ranking would differ from real-life.

### 3. Voice of the Stakeholders/Customers

Seven local departments of engineering faculty were selected for the survey. The total number of lecturers varied 43 which done in the survey, lecturers Where lecturers involved in the study of both doctors and Master Professor and professors assistant of sections of the whole college. One-on-one interviewing was used for collecting the voice of the stakeholders. A special questionnaire form having 7 questions was prepared. The

lectures from an industrial engineering department, mechanical engineering department, electrical engineering department, the civil engineering department and general engineering department. The skill and qualification expectations of the stakeholders from all departments were collected in their own words. The priority of each customer need was also asked during the interview. The stakeholders ranked these needs from 1 to 9 (higher number means higher importance). These interview forms were then analysed by the QFD team. 301 requirements were be identified. These stakeholder requirements were then categorized, shortened, sorted and prioritized taking into consideration the customer's evaluation. A total of 7 ranked requirements were acquired to become the inputs of the "House of Quality" as given in Table 1. After the determination of the requirements and their relative importance, the QFD team underwent successive meetings. Each acquired requirement was transformed into a quality characteristic, namely into courses. The QFD team has then determined the quality characteristics that are likely to affect one or more stakeholder requirements. The desired requirements were investigated step by step, looking at the current curriculum courses and their content, so as to decide whether the requirement could be met with the skills of the current curriculum or not. Whenever the team concluded the impossibility of meeting the requirements of an existing course, the necessary modification was done. All the requirements were transferred into quality characteristics following an extensive analysis of all the courses. The relationship between requirements and quality characteristics were established and indicated in the relationship matrix. There are different weighting methodologies in the discussion, the most widely preferred categories of 'strong, medium, weak and no relationship' with the values of 9,3,1and 0, respectively, were applied. The 1–9 scale represents a geometric progression discriminating heavily against the weak relationship as opposed to the strong relationship. These weightings are subjective [10]. Since all the quality characteristics were affected positively by each other, the house of quality roof matrix was not considered. The customer evaluation of the competitive products, i.e., the benchmarking of graduates from different schools was not done due to a lack of sufficient data. Next, the necessary analysis for the technical difficulties, the necessity of qualified teachers, and the additional cost of financing the improvement of quality characteristics were done. In our study, the school management and faculty ranked the technical difficulties. The degree of technical difficulty relates to how hard or easy it is to carry out the quality characteristics. Therefore, it is common to use a scale from 1 to 5 with 1 denoting the easiest. In order to determine the ranking of the relative importance of customer requirements, the QFD team decided to use a method that would weigh the customer's view based on the number of employees it had. Therefore, the importance weight each customer had assigned to every quality characteristic was multiplied by a coefficient.

This coefficient was determined on a scale from 1 to 5 with 1 denoting the least populated company. These weighted figures were then summarized and normalized to rank the relative importance of the customer requirements as seen in Figure 1.

**Relationship matrices symbols**  
 Strong Relationship : ● - 9  
 Medium Relationship : ○ - 3  
 Weak Relationship : △ - 1

Quality characteristics (COURSES)	Stakeholders/ Customer Needs	Relative importance	Human development courses for teachers, including a mechanism for how to give these skills	Activating the laboratory coursework in English (listen – Conversation)	The provision of a private computer labs to provide practical training for students	The allocation of a science project for collective action at the school level to raise the teamwork and time management	Electronic network linking schools to search	How to allocate a portion of the research work and the work of the project subject of the study (search through the electronic network)	Educational institutions keen on activating share during the week to improve the skill of <i>auditions and Conversation</i>	Application software practically rather than theoretical
English language skills (writing – reading – listening)	5.284		●					●		
Computer skills for the purpose of solving problems related to the area of study	4.354			●	○	●	●		●	
Skills of contact with faculty members	4.348	●	○	●	△	△	○	○	○	
Skills of teamwork	4.14	●		○	●	●	○	○	△	
Skill of interactive education	4.033	●	△	○	○	●	●	○	●	
Computer skill for the purpose of writing reports	3.926			●	●	●	●		●	
Time management skills	13.912	●	○		●	△			△	
Scores		507.89	236.36	468.17	477.31	536.33	466.28	265.11	451.91	
Relative Importance ( % )		14.896	6.932	13.731	13.999	15.731	13.676	7.776	13.254	
Ranking		2	8	4	3	1	5	7	6	
Degree Of Technical difficulties										
New Lecturer Necessity ? ( Yes/ No)		N	N	N	N	N	N	N	N	
Additional Cost Increase ? (Yes/ No)		Y	Y	Y	N	Y	Y	N	Y	

Figure 1: HOUSE OF QUALITY for the curriculum

**4. Decision and Analysis :**

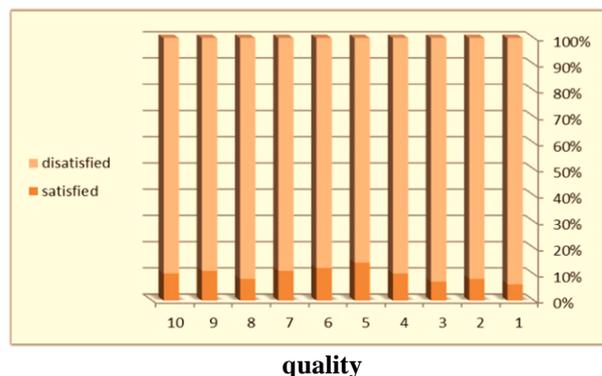
In order above the house quality deployment, QFD can be used to improve high school education level through enabling some skills that have been found in the curriculum, but they have needed simple mechanisms for application by insurance about improvement level of high school student before going head to faculty. In this study some skills must be activated for raising the level

of student especially in writing, conversation, listen in English language and programming, writing by computer ..etc., all these according to an expectation of customers ( stakeholders) from undergraduates of all local departments were determined by survey with the questioner. From constructed " House Quality Deployment" in figure (1), it has shown from the point of view of customers (Stakeholders/Customer Needs) that the most relative importance is the internet

linking of the schools to search, improve these the skills which related to the curriculum, such reviewing the student the topics with developing the skills therein for each subject then human development courses for teachers, including a mechanism for how to give these skills, through this characteristic can enable the teachers how to activate these skills can be activated through the tutorials, then the allocation of a science project for collective action at the school level to raise the teamwork and time management , the provision of a private computer labs to provide practical training for students which is integrated with the first quality characteristic which can't be applied without it , How to allocate a portion of the research work and the work of the project subject of the study (search through the electronic network) so that quality character depended on the first quality character that emphasizes the importance of this characteristic . Application software practically rather than theoretical that because the programs must be shown and run practically that enabling correctly understanding process, other words in almost educational institutions do not have computer labs and basically curriculum mostly programming languages necessary to be applied on the computer in the event enable this will overcome the weaknesses and strengthen the idea of thinking and perception (carried out practical image and earn the right idea and the ability of the development). Educational institutions keen on activating share during the week to improve the skill of auditory and Conversation, also Activating the room coursework in English (listen – Conversation) because both will contribute in improvement of level of student , then The allocation of a science project for collective action at the school level to raise the teamwork and time management as same importance nearly as How to allocate a portion of the research work and the work of the project subject of the study (search through the topics for supporting an ability of student for aware and more understanding through the internet linking). Application of the software practically rather than theoretically as tackling above of ways. After that, internet linking schools to search such as this very important characteristic by it can be enabled some skills are integrated as research in internet, time management and contact with faculty members. These seven Customer Needs are the most important from opinion of customer than other Customer Needs that the least importance, based on previous study about a simple way to measure customer satisfaction, so that must be considered satisfaction of customer such as made another survey about rating satisfied of customer about the recent customer requirements such can be found both the high

importance and the least satisfaction [11]. The results were the following that relative rating dissatisfied is higher than relative rating satisfied, so that was necessary focused on this region for improvement the recent situation for level of high school education, also form all these conclusions can be summaries some the recommendations in below. This Figure (2) is approximately data and not actual data, they have been put here just to give manifestation to the written comment.

**Figure 2: shows the presented data from house of**



## 5. RECOMMENDATIONS

Due to the needing for the inevitable to raise the level of academic must attention means that enable to improve the level of education , which has become the other nations advanced dramatically despite the fact that these methods do not cost a lot of money, time and effort g spite of the results that will return us over time, which will advance our Islamic nation, especially the Arab world General, and therefore we recommend in our study that the characteristics we have learned to be starting out in the early stages, even before the beginning of the school stage( kindergarten),

for example, enable the child to display a simple subject and talk about it in front of his colleagues earned many skills, including the courageous confrontation, connect with others and instil confidence that makes a strong base for the personal leadership of the children, and do not forget that the child is affected by the environment around them, so take care of this opportunity to improve our future generations, through our study, there are some of the things want to be displayed and recommend as the following:

2. Use laptops instead of bags that weigh weights strain our children as well as the ease to download the curriculum according to each level
3. The use of laptop computers to facilitate the process of Internet connectivity and to keep pace with scientific development.
4. Focus on the internet linking and connection with as consideration a part of topics of courses inside the

curriculum for raising the education quality level of each level.

5. Concern on these skills from the beginning of the school at first stage as consider the basic level is the base for future a generation.
6. Mainstreaming the introduction of these skills in the early stages of the study as consider there are available applications but need funder and support from the government.
7. Support the confidence of children through the presentation in front of his colleagues and his parents are present.

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