

# Acase study of quality function deployment in E - Examination Quality Function Deployment

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## ***Abstract:***

Quality function deployment is one of the most techniques to initially manufacturing organization, sometimes a customer doesn't understand the desire which is reflected on the faces of the system, the aim of this paper is a case study of the requirement of the international university of Africa to deploy E – Examination at the university.

The methodology of this paper is an interview of some of decision makers and officers IT at the university to overall the requirements and to deploy QFD to helped and to understand these requirements, the result is the cost is very important for re-engineering characteristic because is the high degree of analyze with QFD (22%) and Infrastructure is second important (20%,) so with the QFD the researcher could understand the desire of the university clearly and recommend using them in the future.

***Keywords*** (quality function deployment,E- Examination,IUA, E learning)

## **I. INTRODUCTION:**

Today With the development of the customers' awareness we have to keep pace with these trends to meet all desire and to deploy a high efficiency of a product, the most problem to implement which cannot understood the desire of the customers clearly and they will effect to the final product and this can be crated a psychological barrier for the customer, The primary objective of any organization or company is the quality of product warranty and customer satisfaction.

One of the most important quality control policies is the process of translating the customer's requirements for the development of good products to meet the needs of the customer fully and until the design of a better product to meet the expectations of customers, customer are complex because they don't understand what do you want and they can change in requirements.

To fill the gap between the customer and their desire is to understand this requirement clearly, quality function deployment (QFD) is one of the most techniques to improve the requirement of customers, QFD is to extract the customer needs and to translating to measurable product quality, the main advantage of the QFD framework is to structure and consistent needed of the enterprise, QFD is to capture the voice of the customer to maximize the customer satisfaction[1].

The name was taken from feature , attribute (quality) ,mechanization (function), diffusion or development and evolution (deployment), the goal of QFD is to understand customers better than understanding themselves, what is the customers need less than mistake ,another goal is to translate the customer needed into development goals and technical capabilities , with QFD can be provided structure and prioritize resource.

In international university of Africa Students are currently being tested in traditional way using paper and pencil. The process of compiling the requirements is done manually until the exams are completed well, so with the policy of the university in 2018 is the year of e-learning and with the use of QFD technology helps greatly in understanding what the requirements of the university to convert form conventional exam to electronic exam.

In this paper they will attempt to choose a case study in the field of e learning (specifically in E-Examination) to abstract the all requirement in this filed in IUA and improve them by using QFD.

#### **A. Abbreviations and Acronyms:**

Quality Function Deployment (QFD), Electronic examination (E-Examination, International University of *Africa(IUA)*, *Electronic Learning(e-learning)*)

## **II. P PRELIMINARIES**

### **A. *E learning and E examination***

E-learning is one of the most critical methods to increase student capacity and increase the student's ability to understand information compared to the old method.

E-learning is the use of all means of modern technology for the purpose of serving the student whether through electronic lectures or electronic exams.

Electronic Examination (e-examination) is intended to serve as summative (final) assessment - e-exam - in order to define the evaluation, grade for a course.

Electronic examination can be defined as 'a system that involves the conduct of examinations through the web or the

intranet Functionally, an e-exam can be provided using a dedicated system or it can be included as a module part of LMS[2].

### ***B. Quality Function Deployment***

QFD technique has developed in japan at the late 60s, the Japanese created a methodology to support the development process for a complex product by linking the planning.

Elements of the design and construction process to specific customer requirement, the basis of technology is the division of the product into parameters that will be presented by potential customers as more useful than the quality process.

One of the most important features of technology is that it depends on the customers and not on the technology itself, sometimes allowing the addition of new technology to add some elements to the new products is not always useful, such as adding small keys in mobile phone, QFD It is a unique tool for planning and introducing new products instead of old products, and requirements are extracted from the customer to ensure the extraction of the final product.

The most important elements of the success of a technique is the need to ensure the effectiveness of collective action that facilitates the task of anticipating and applying.

The customer requirements are better, making it easier to focus on the target itself.

Quality function deployment process consist a six phases firstly planning the desire of customer ,concept development, system level design, testing and refinement and production rump up[3].

QFD is present challenges for a top management to arrive what does customer need, the QFD method is implement as sequential matrix to translate the customer requirement into measurable product technical characteristic[4], QFD Is a graphical representation of the results of the planning process, the matrices are very different and things such as process priorities and competitive objectives are shown, the matrices are created by the interdepartmental team, the house of quality are contained customer needs importance , technical Characteristic, importance normalized, comparative priorities see (Fig1).

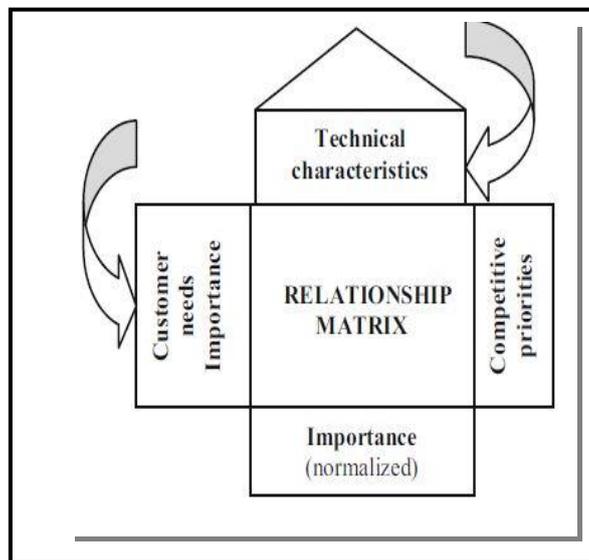


Fig. 1. The house of quality

The core of the house quality is the relationship between each technical characteristic and their customer needed, the relationship is divided as: strong, very strong, weak, very weak or nothing and this depend on valuation of technical team, the house of quality is describe the relationship and give

A positively related or negatively related between requirement and the main issue of this violation is to give a trade - off for the technical team to what is an important requirement.

### III. METHODOLOGY

the methodology of this paper is a case study of implementation E Examinations at international university of Africa, and they restrict all the requirement of the management to implement E- Examinations, the data was collected using an interview with some of Decision-makers and some officer of IT department, this data was using in QFD to improve the best result and to meet the goal of the university.

After determining the needs of each faculty individually and determining the needs of all departments, whether it is special examinations or technology are all linked to the university's main goal is the e-learning project, and then we use QFD techniques have been used to what is important and what is the relationship between requirement.

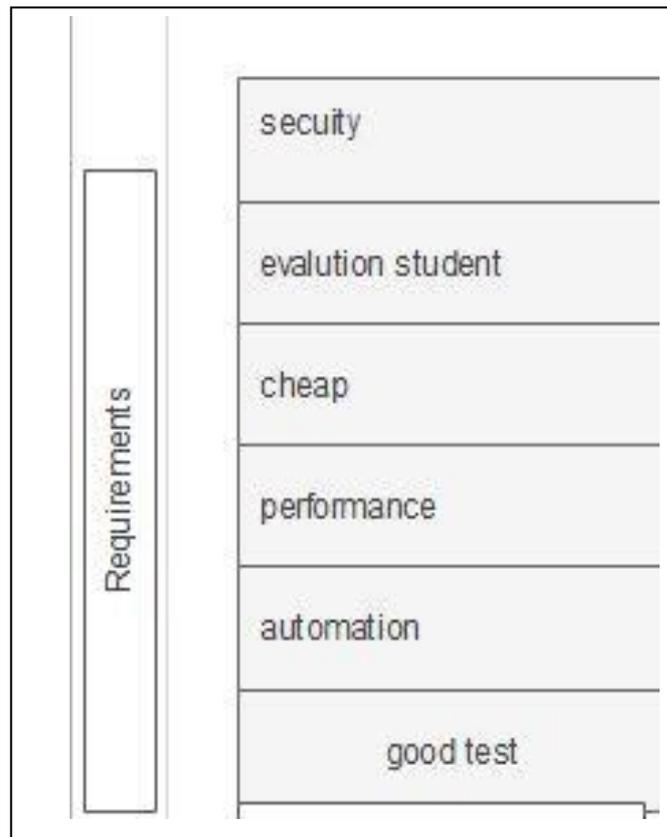


Fig. 2. Seven requirement of QFD

In the fig2 above there are seven requirements security(the system is safe and detriment the access and privilege of user if the user is student ,manger , a teacher or admin), evaluation student(means the system is measure student of course objective), cheap (when you deploy a software the cost must be few), performance (software must be interaction between all user and Works continuously), automation (all the exams and result are full computerized) ,good test(the software before implement they must be deep testing to make sure the system works well and without mistakes and there are seven technical characteristic re-engineering (cost, size, weight, color, tests per unit, exp life, Infrastructure)see (Fig3) .

Customer Importance	%	cost	size	weghit	color	test per unit	exp life	Infrastructure
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Fig. 3. Characteristic reengineering

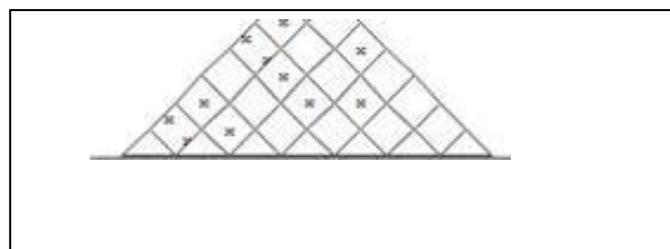


Fig.4. technical characteristic reengineering.

Core of QFD is relationship between each requirement and each technical characteristic re-engineering and divide the relation as: in the second column is importance requirement Divided as (1,2,3,4,5) 5 means is very important and 1

is very low and between 2 - 4 is med, After that the relation between the requirement and technical characteristic re-engineering is divided as ,(0,1,3,9) 0 is no relation, 1 is weak relation, 3 is med relation and 9 is strong relation, At the top of the house there can see the relation between each technical characteristic re-engineering with them divided as : (++,+,-,-) ++ means is very strong relation, + strong relation, -- is very weak relation,+ is weak relation see (Fig4).

Requirements	Customer Importance	%	cost	size	weghit	color	test per unit	exp life	Infrastructure
	security	9	25	9	0	0	0	3	3
evaluation student	3	15	1	0	0	1	1	3	3
cheap	5	25	0	9	3	0	3	0	3
performance	3	15	3	3	3	1	3	1	1
automation	2	10	1	3	3	0	0	0	0
good test	2	10	9	1	9	0	9	1	0
weight importance	20		365	310	240	30	300	145	360
Relative Value	%		22	18	13	2	17	8	20

Fig.5. quality function deployment for E Examination

#### IV. DISCUSSION AND RESULT

After deploy QFD for the seven requirement of the needed to implemented e examination at the university there are more result to be discussed: firstly the percentage of the re-engineering of cost is (22%), size

(18%), weight (13%), color (2%), test per unit (17%), exp life (8%) and infrastructure (20%), this result means impotents of the characteristic re-engineering is the cost because is high degree of percentage (22%) and this issue can be seen , Other importance is Infrastructure of the university the degree of percentage is (20%) and this second important result ,so with the QFD We can say the technical engineering must be focus on reduce cost and Infrastructure To achieve all the requirements of the university .

In QFD you can add another two column first column is to determine all the difficult issues and evaluations the risk assessment, the second column to compare between the importance requirement and with the real system currently working to view the diagram of frequency of requirements depend on the importance requirement.

## V. CONCLUSION

In this paper we discussed the customer requirement and how to understand this desire using a simple technique (QFD), in our paper there was chosen a case study in a field of e learning (e - examination) and Inventory all requirements of the international university of Africa to implement the QFD, QFD Helped the researchers to understand the requirements well and the researchers recommend using them in the future.

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