2. ACADEMIC PLANNING PROCESS TO INTEGRATE THE VOICE OF THE CUSTOMERS USING QUALITY FUNCTION DEPLOYMENT

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Abstract

Quality Function Deployment (QFD) is one of the Total Quality Management (TQM) techniques which can be applied for process and design improvement. This paper explores the possible application of quality function deployment (QFD) to the design and improvement of an undergraduate Engineering program. To accomplish this, the institute must first identify its customers, understand their expectations, and then serve them in meaningful ways. It must ensure that the voice of the customer is incorporated into the design and the delivery of a product or service. The institute translates this voice into academic specifications that everybody in the school can understand and uses it to align its processes to meet the needs of its customers first time and every time.The use of QFD helps the institute to focus on priorities, provide better documentation and facilitate communication among everybody in the institute.

INTRODUCTION

Total Quality Management has been used successfully in a variety of organization viz., health care organizations, government agencies, educational institutes, banks, library, transportation facility etc. The continuous pressure from the various stakeholders makes the survival of these agencies extremely difficult specifically educational institutions. Growth of the educational institutes depends on the environment, working style and ultimately the satisfaction of the customers.

No educational institution can exist without serving. Thus a institute or a university justifies its existence by serving customers in meaningful ways. In order to be competitive, it must listen to them and work hard to meet their requirements. Although it may sound simple in theory, achieving a customer focus is actually more difficult to accomplish in practice. This paper will explore the possible application of quality function deployment (QFD) to the design and improvement of an undergraduate Engineering program. To apply QFD successfully, the institution must understand and appreciate its philosophical underpinnings. This paper will review the history of QFD, examine its use in the past in other organizations, and illustrate a possible application in academia.

QUALITY FUNCTION DEPLOYMENT

If an organization wants to know about the quality of its product or service it should go out and ask its customer (Cort, 1995). Since the

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customer is affected by the quality of the product or service on a daily basis, he or she is in the best position to judge the performance of the production and service system. If the organization does not adequately please its customer, it will likely cease to be economically viable (Foster, 2007). Thus it must be familiar with customer needs, wants, opinions, perceptions and desires. This is also known as the voice of the customer.

Initiated by Mizuno and Akao, the QFD technique, has been used by organizations worldwide to plan and design products and services to meet customer requirements. It ensures that the voice of the customer is deployed throughout the project right from the beginning to the end with the basic objective of identifying and understanding customer needs, and help them derive customer satisfaction (Akao, 1990a, b; Shin et al., 2002; Masui et al., 2003). It is an integrative process that focuses on establishing relationships between the customer requirements with products and service design characteristics, followed by the relationship among the design characteristics themselves, finally helping arrive at a set of design characteristics to best satisfy the customer requirements (Hauser and Clausing, 1988; Pitman et al., 1995, Sahney, 2003).Organizations use the voice of the customer to drive changes to the way they do business. They align their processes to meet the needs of their customers the first time and every time (summers, 2006). QFD's success depends on organizational teamwork and constant focus on customer demands. These two factors can substantially reduce the time and cost needed to design and deliver a quality product or service. Thus it is imperative that the work of every unit in the organization is linked to meeting customer needs. The use of QFD helps to shorten the design and delivery process "by helping to focus priorities, providing better documentation, and facilitating communication among team members" (Cort, 1995).

USING QFD TO DESIGN AN IMPROVED UNDERGRADUATE ENGINEERING PROGRAM

QFD uses a set of matrices, often called the House of Quality, to translate customer requirements into a functional design. Building the House of Quality involves the following steps:

1. Identify customer requirements.
2. Identify technical requirements.
3. Relate customer requirements to technical requirements.
4. Identify the relationships between technical requirements in the roof of the house.
5. Perform a competitive assessment of customer requirements.
6. Prioritize customer requirements.
7. Prioritize technical requirements.
8. Determine which technical requirements to deploy.

To illustrate the QFD process, this paper will present a simple example of how it can be used to design an undergraduate program of Engineering.

Step 1: Identify customer requirements

This is probably the most important step of the QFD process.

At this stage institute seeks to capture the essence of the customer's needs and expectations. In Figure 1, part of the QFD house of quality shows the customer (hypothetical) requirements for an undergraduate Engineering program. These requirements are determined by collecting data through questionnaires, phone surveys, focus groups, and other means. It is important at this stage for the Institute to identify its customers: internal and external, academic and administrative, direct and indirect (Maguad, 2007). Examples of internal

customers from the academic side are students, faculty, and programs or departments. Examples of internal customers from the administrative side are students, faculty, non-teaching staff, administrators, and units/ departments/divisions. Direct external customers include employers, other colleges/ universities, and suppliers. Indirect external customers include the government, the community, donors, alumni, and accrediting agencies. While all of these customer groups are important, students are usually considered the most important internal customers of higher education. Among all external customers of higher education, both direct and indirect, employers (service and manufacturing industries and other non-profit organizations) are by far the largest volume customers of higher education. It is left to the institute to decide which customer groups to include in the survey and how best to reach them. According to Figure 1, customers want to have qualified faculty, solid academic program, state of the art technology, and a comfortable atmosphere.

Step 2: Identify technical requirements

These are the elements in the academic design process that are associated with customer needs. The design elements featured in Figure 1 are the number of faculty with PhDs in the Engineering program, professional accreditation, number of computers in the laboratory, adequate classroom/facilities, and the number of publications/presentations made by the faculty.

Step 3: Relate customer requirements to technical requirements

The relationships between customer requirements and technical requirements are shown using the following symbols:

● = 9 (Strongly associated)

○ = 3 (Somewhat associated)

Δ = 1 (Weakly associated)

Notice that the number of faculty with PhDs and the number of publications/presentations are strongly associated with qualified faculty.

Step 4: Identify the relationships between technical requirements in the roof of the house.

The symbols in the roof of the house depict the relationships among the different design elements (technical requirements). The intercorrelations among the technical requirements are represented by the following symbols:

● = +9 (Strong positive)

○ = +3 (Positive)

x = -3 (Negative)

* = -9 (Strong negative)

Notice that the number of faculty with PhD's is strongly positively correlated with professional accreditation and the number of publications and presentations in the engineering institute.

Step 5: Perform a competitive assessment of customer requirements

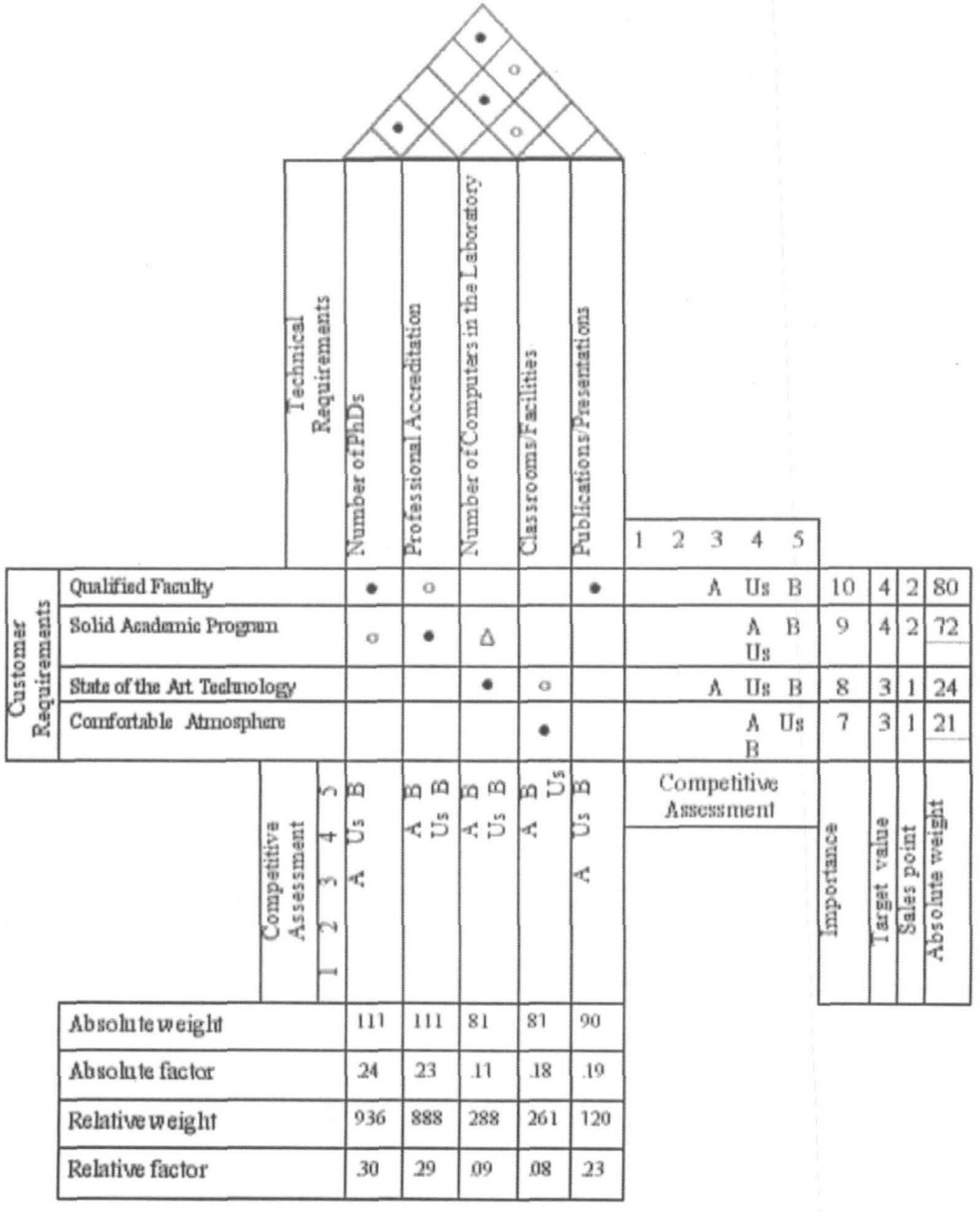
The right side and the lower middle portion of the house of quality contain an assessment of how the institute's undergraduate engineering program compares with those of its two closest competitors with respect to the customer and technical requirements. Comparisons are made on a five-point scale with five being the highest. The letter A stands for competitor A while B stands for competitor B.

Step 6: Prioritize customer requirements

On the rightmost side of the house of quality are the customer requirements priorities which include importance to the customer, target value, sales point, and absolute weight. The ratings on the "importance" column are based on a scale of 1 to 10 with 10 being the most

Figure 1

The House of Quality



important. These ratings are assigned by a focus group of customers. Customer requirements that rank low on competitive assessments and high on importance are potential candidates for quality improvement. Target values are set on a scale of 1 to 5 where 1 is "no change", 3 is "improve the product", and 5 is "make the product or service better than the competition". Decisions on whether or not the product ought to be changed are based on target values. Sales point assessments are made by the QFD team members on a scale of 1 or 2 where 1 means low sales effect and 2 means high sales effect. The absolute weight values are arrived at by multiplying the importance, target value, and sales point columns.

Step 7: Prioritize technical requirements

Technical requirements are prioritized by determining the absolute weight and the relative weight. The absolute weight is determined by computing the sum of the product(s) of the relationship between customer and technical requirements and the customer importance columns. The relative weight is determined by computing the sum of the product(s) of the relationship between customer and technical requirements and customer requirements absolute weights.

Step 8: Determine which technical requirement(s) to deploy

The absolute and relative weights are evaluated to determine what design decisions need to be made based on customer input. Computations of absolute and relative weight factors follow. The house of quality shows that the number of faculty with PhDs has the highest relative importance followed by the number of publications and presentations. These give the institute a focus for improvement in the near future.

CONCLUSION AND RECOMMENDATIONS

One of the dimensions of product quality is perceived quality. This simply means that quality is as the customer perceives it. Despite our best efforts, if we do not adequately meet customer expectations, we will cease to be economically viable. Thus it is worthwhile to allocate resources to attempt to understand the customer. Quality function deployment provides the institute a means to understand customer needs and gives it strategic direction for continuous quality improvement. However, the voice of the customer must be carried out not only during the academic design process but also throughout the implementation process as well. The success of QFD in an engineering institute depends on effective communication and collaboration among the different departments market a product that adequately meets customer requirements.

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