

Improving the Quality of Higher Education Service by Using the Quality Function Deployment: A Case Study

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ABSTRACT

The aim of this study was to apply quality function deployment to identify the critical quality management system requirements that have a higher impact on service quality at the economic sciences department in Tlemcen city. Data were obtained from a sample of 110 students at the economic sciences department.

Results revealed that service quality in economic sciences department was more than moderate level, and it can be improved by focusing on the critical quality management system requirements. The application of quality function deployment identified 8 critical requirements of managerial system, technical system and social system that have a higher impact on quality service at economic sciences department.

KEYWORDS: *higher education, quality function deployment, quality management system, service quality.*

JEL CLASSIFICATION: *I23,M19*

1. INTRODUCTION

In the context of globalization and knowledge economy, there is a growing interest in improving the quality of higher education services in many countries. Many higher education institutions adopted quality management systems for several reasons: attracting new students, improving quality service, the pressure of labor market, government policy, and improving competitiveness.

Service quality has become an important issue for the Algerian government facing the growing number of students and the pressure of the labor market that needs quality. Therefore, the challenge for the Algerian higher education system is to do more than teach a maximum number of students, to go further by introducing the quality management systems focused on satisfying the needs of the labor market (Yahia Berrouiguet & Bensmain, 2015). One of the objectives of the Algerian higher education is to establish an efficient quality management system in every educational institution (CIAQES, 2016). During the quality management implementation, managers used my tools for improving the quality. Quality function deployment (QFD) is one of those tools. Despite the number of publications and amount of research on QFD, few studies have been carried out in higher education institutions in developing countries, specifically in Algeria.

The aim of this study is to apply quality function deployment to identify the critical quality management system requirements that have a higher impact on service quality in the Economic Sciences Department in Tlemcen city.

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This paper is organized as follows. Initially, the review of literature on quality function deployment in higher education is presented, which is followed by an overview of the research methodology, and finally, the research findings are then presented.

2. LITERATURE REVIEW

Quality Function Deployment (QFD) is a quality management tool introduced in Japan in the 1960s by Yoji Akao, it's translates customer needs or requirements into product or service features. QFD is recognized as one of the most useful quality improvement tools. QFD was used by industrial firms to improve the quality of products, and also in services. In higher education services, QFD can be used to improve the quality. Various studies have been carried out on the application of QFD in higher education. Clayton (1993) discussed the application of QFD at Aston University. Krishnam & Houshmand (1993) used QFD to identify customer requirements in the design of engineering curricula at Cincinnati University. Jaraiedi & Ritz (1994) used QFD to improve the quality of teaching processes at West Virginia University. Lam & Zhao (1998) used QFD with the analytical hierarchy process (AHP) to examine the effectiveness of the teaching process in realizing higher educational objectives at the City University of Hong Kong. Motwani et al. (1996) used the three-house approach using American accreditation requirements for designing the master business administration program at Grand Valley State University.

Hwarng & Teo (2001) used QFD to translate the voices of customers in stages into operations requirements at the National University of Singapore. Sahney et al. (2004) used SERVQUAL and QFD to identify a set of minimum design characteristics that meet the requirements of the students of some Indian educational institutions. Aytac & Deniz (2005) applied QFD to review the curriculum of the technology department at the Kocaeli University. Singh et al. (2008) applied QFD to analyze quality planning at YMCA institute of technology. Gonzalez et al. (2011) used QFD to the curriculum development process of a major international business program. Ictenbasa & Eryilmazb (2011) applied QFD to improve the quality and assess the effectiveness of the teaching methods of industrial engineering course. Singh & Rawani (2019) used QFD to prioritize National Board Accreditation quality parameters in engineering education. OMURGONULSEN et al. (2020) used the QFD and Kano model to categorize and prioritize the needs of customers to increase production and operations management course quality in a public university in Turkey.

These studies show that QFD is a very useful tool in higher education quality improvement. Our research contributes to the literature by showing how to use QFD to identify quality management system requirements that have an important impact on higher education quality dimensions. The improvement of the education quality dimensions can be realized by the implementation of quality management system. This system has a set of requirements and is composed of three subsystems: managerial system, technical system, and social system. It is important for the managers of the higher education institutions to know the critical quality management requirements that have a higher impact on the education quality in their institutions.

There are four elements of QFD, which are:

- Determining the students requirements (what).
- Determining the quality subsystems requirements (how).
- Relationship between the students requirements and the quality subsystems requirements.
- A quantification of the relative importance of the requirements .

- Determining the critical quality management requirements.

3. METHODOLOGY

The study was conducted at the Economic Sciences Department in Tlemcen city. This department implemented a formal quality management system. The population of the study was the master first year students of the economic sciences department; this choice is because the master first year students have the sufficient experience in the department and they are able to answer the questions and appreciate the quality.

The research instrument is a questionnaire, a total of 140 questionnaires were distributed to all master's first year students. 110 questionnaires were returned, the response rate was 78.57%. The questionnaire is composed of two parts. The first part focused on the quality dimensions. The most popular models for measuring service quality in higher education are: SERVPERF (Cronin & Taylor, 1992) and HEdPERF (Firdaus, 2006). This study uses five dimensions and some items from SERVPERF and HEdPERF, because the second model consists of 41 items, which is much longer, and 13 items of this model were adopted from SERVPERF.

The first part of the questionnaire was consisted of 22 items in five dimensions: tangibility, academic aspects, assurance, reliability, and responsiveness. However, the 22 items included in the study have been pilot tested and reduced from 22 to 15 (Table 1). Students were asked to rate their perceptions of the items listed on a five-point likert scale from strongly disagree (1) to strongly agree (5).

Table 1. Number of items of the quality dimensions

Quality dimension	Number of items
Tangibility	3
Academic aspects	3
Assurance	3
Reliability	3
Responsiveness	3

Source: the authors

The second part of the questionnaire consisted of 15 items in three subsystems of quality management system: managerial system requirements (MS), technical system requirements (TS), and the social system requirements (SS) (Table 2). Those items reflect the quality management systems requirements implemented in the economic sciences department. Students were asked to rate their perceptions of the items listed on a five-point likert scale from strongly disagree (1) to strongly agree (5).

Table 2. Number of items of the systems requirements

Systems	Number of items
Managerial system requirements	5
Technical system requirements	5
Social system requirements	5

Source: the authors

Source: the authors

The internal consistency of quality dimensions and systems requirements was examined using the Cronbach's alpha.

Table 3. Internal consistency test of the quality dimensions

Quality dimension	α
Tangibility	0.51
Academic aspects	0.70
Assurance	0.58
Reliability	0.69
Responsiveness	0.79

Source: the authors

Table 3 shows that the Cronbach's alpha values of the quality dimensions ranged from 0.51 to 0.79, which suggests that this is a reasonable degree of internal consistency.

Table 4. Internal consistency test of the systems requirements

Systems	α
Managerial system requirements	0.79
Technical system requirements	0.52
Social system requirements	0.66

Source: the authors

Table 4 shows that the Cronbach's alpha values of systems requirements ranged from 0.52 to 0.79, which suggests that this is a reasonable degree of internal consistency.

In this study, we used the following symbols:

Table 5. Relationship matrix symbols

	symbol	weight
Strong relation	⊙	9
Medium relation	●	3
Weak relation	Δ	1
No relation	0	0

Source: the authors

Table 6. Interrelationship matrix symbols

	symbol
Strong positive relation	+
Positive relation	●
Negative relation	X
Strong negative relation	#
No relation	•

Source: the authors

4. RESULTS AND DISCUSSIONS

The table 7 shows the mean and the standard deviation of the quality dimensions:

Table 7. Mean and standard deviation of the quality dimensions

Quality dimension	Mean	Standard deviation
Academic aspects	3.46	0.84
Reliability	2.99	0.86
Assurance	2.64	0.86

Quality dimension	Mean	Standard deviation
Tangibility	2.49	0.76
Responsiveness	2.31	0.88

Source: the authors

The mean values ranged from 2.31 to 3.46. It appeared that not all of the quality dimensions have the same degree. The respondents cited “academic aspects” as an important quality dimension, this could be attributed to the experience and competition between the teachers and the recruitment of young teachers in the last few years and their motivation to improve their performance. Respondents cited “Responsiveness” as the lowest quality dimension, which could be attributed to the absenteeism of the administrative staff, staff turnover, and lack of communication between administrative staff and students.

We can calculate the relative importance of quality dimensions:

Table 8. Relative importance of quality dimensions

Quality dimension	Aggregate weight 1	Aggregate weight 2	Aggregate weight 3	Aggregate weight 4	Aggregate weight 5	Aggregate sum	%
Tangibility	100	186	81	380	75	822	17.9
Academic aspects	26	110	105	672	230	1143	24.9
Assurance	66	224	141	340	100	871	19
Reliability	36	170	222	468	90	986	21.5
Responsiveness	76	286	141	240	20	763	16.6
						4585	100

Source: the authors

The master’s first year students ranked service quality dimensions in following manner:

- Academic aspects.
- Reliability.
- Assurance.
- Tangibility.
- Responsiveness.

The improvement of quality service dimensions in the economic sciences department can be realized by focusing on the critical requirements of its quality management system. This system has a set of requirements and it’s composed of three subsystems: managerial system, technical system and social system. Each subsystem requirements have an impact on quality dimensions. Based on the master’s first year students responses, we tested the correlation between quality dimensions and quality subsystems requirements (Table 9).

Table 9. Correlation between quality dimensions and quality subsystems

Quality dimension	Managerial system	Technical system	Social system
Tangibility	0.47*	0.34*	0.40*
Academic aspects	0.46*	0.39*	0.52*
Assurance	0.44*	0.35*	0.49*
Reliability	0.44*	0.28*	0.54*
Responsiveness	0.46*	0.32*	0.42*

* Significant at 1% level

Table 9 shows that all of quality dimensions have positive correlation with the managerial system, technical system, and social system, and the correlation coefficient values range from 0.28 to 0.54.

After calculating the correlation between quality dimensions and quality subsystems, the next task was to draw the quality houses for the quality subsystems and the final house.

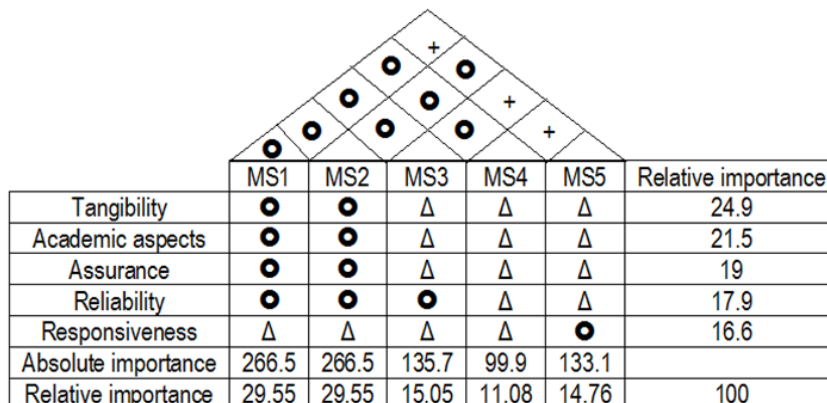


Figure 1. Quality house for the managerial system

Source: the authors

Figure 1 shows the development of department staff competencies (MS1), managers encourage education quality improvement (MS2), and the diffusion of cooperation and team work (MS3) have the highest relative importance and impact on higher education quality in the economic sciences department.

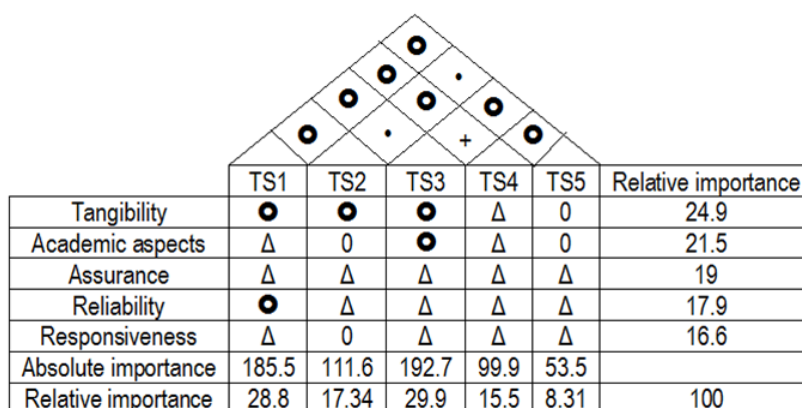


Figure 2. Quality house for the technical system

Source: the authors

Figure 2 shows that using the scientific approach in teaching (TS3) and using the modern methods in teaching (TS1) have the highest relative importance and impact on higher education quality at the economic sciences department.

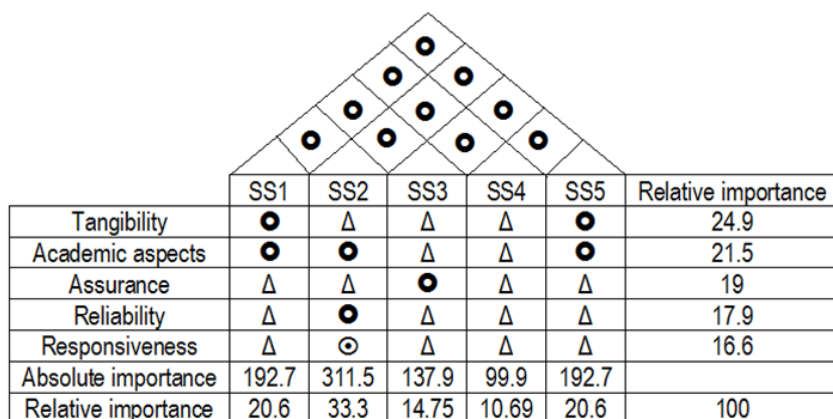


Figure 3. Quality house for the social system

Source: the authors

Figure 3 shows that the ability of staff to respond to students’ requests (SS2), the development of mutual respect between the students and the department staff (SS1), and the development of a safe environment (SS5) have the highest relative importance and impact on higher education quality in the Economic Sciences Department.

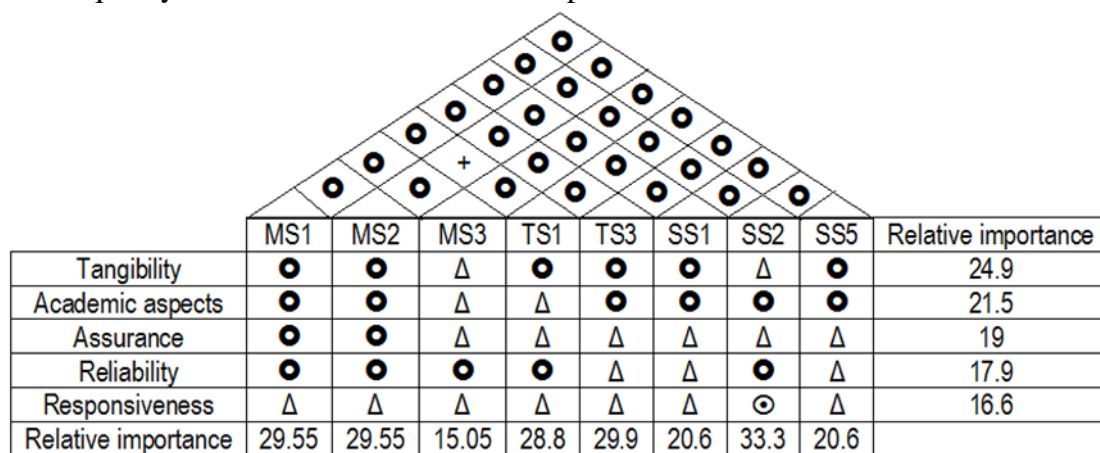


Figure 4. Final quality house

Source: the authors

Figure 4 shows that the quality service in the economic sciences department can be improved by focusing on the practices that have a higher relative importance because they have a direct and great impact on quality dimensions. These practices are:

- Ability of staff to respond to students’ requests (SS2).
- Using the scientific approach in teaching (TS3).
- The development of department staff competencies (MS1).
- Managers encourage education quality improvement (MS2).
- Using modern methods in teaching (TS1).
- The development of mutual respect between students and department staff (SS1).
- The development of safe environment (SS5).
- The diffusion of cooperation and team work (MS3).

5. CONCLUSIONS

The aim of this study was to apply QFD to find the critical quality management system practices or requirements that have a higher impact on service quality in the Economic Sciences Department. The Economic Sciences Department students ranked service quality dimensions in the following manner:

- Academic aspects.
- Reliability.
- Assurance.
- Tangibility.
- Responsiveness.

The results showed that not all of the quality dimensions have the same degree and was more than moderate level from master student's perceptions. This means that there is a space for improvement. The study revealed that some practices have a higher impact on quality service at the Economic Sciences Department. These quality management system practices or requirements are:

- Managerial systems requirements: the development of department staff competencies, managers encourage education quality improvement and the diffusion of cooperation and team work.
- Technical systems requirements: using the modern methods in teaching and using the scientific approach in teaching.
- Social system requirements: the development of mutual respect between students and department staff, the ability of staff to give response to students' requests, and the development of a safe environment.

The managers of the Economic Sciences Department should use the results of this study to improve their service offering by focusing on the critical quality systems requirements revealed by the application of QFD.

Finally, this study showed that QFD is a very useful tool that can be used by other higher education institutions to improve their quality.

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