QUALITY IMPROVEMENT OF LONG DISTANCE LEARNING IN MASTER OF INFORMATICS ENGINEERING TELKOM UNIVERSITY USING QFD METHOD

[1]**Prima Annisa Karunia**, [2]**Yati Rohayati**, [3]**Rio Aurachman**

[1,2,3]Bachelor of Industrial Engineering, Industrial Engineering Faculty, Telkom University

[1]**imaprims19@gmail.com**, [2]**yati.rohayati.ittelkom@gmail.com**, [3]**rio_aurachman@yahoo.com**

Abstract:

Long Distance Learning (LDL) is one of the government's program to increase the number of university students in Indonesia. Telkom University (Tel-U) is one of the universities that provide LDL Program for postgraduate students. One of the majors in Telkom Graduate School which is the object of this research is Master of Informatics Engineering (MIF). LDL MIF Tel-U has yet to reach the target number of students each year due to the lack of quality of services provided. Therefore, LDL MIF Tel-U needs to improve the quality in order to achieve the targets set.

This research aims to provide recommendations to improve the quality of LDL MIF Tel-U services based on nine true customer needs using Quality Function Deployment (QFD) method. QFD is one of the quality improvement method that focus on Voice of Customer (VoC). QFD calculation that is used in this research is QFD two iterations, which are the House of Quality (HOQ) to determine the technical requirement and Part Deployment Matrix to determine the critical part.

Recommendation formulation drawn up by the data processing and concept selection using decision matrices, analysis of brainstorming with LDL MIF Tel-U, as well as benchmark to the competitor that aims to develop the service quality of LDL MIF Tel-U. The recommendations given are, increasing the number of servers, adding both speed internet access, increased bandwidth, updating software versions of lectures, replacing video conference software, adding the number of communication with lecturers, controlling the development of the curriculum each year, training related to the world of work, and change the file sharing application.

Keywords: LDL, QFD, MIF, Tel-U

1. Introduction

Long distance learning is a system which is very suitable to be applied in Indonesia because Indonesia is a country that is quite extensive and consists of thousands of islands. Indonesia's geographical situation is one factor of education inequality in Indonesia for it is difficult to obtain in remote places in Indonesia. With LDL, people in Indonesia can implement quality education without having to leave family, home, and work wherever they are.[1].

Currently there are only 6 out of 3,207 universities in Indonesia (Ministry of Higher Education and Research, 2016) which has been running LDL program; Universitas Terbuka (UT), Bina Nusantara (Binus), University of Indonesia (UI), Gadjah Mada University (UGM), Surabaya Institute of Technology (ITS), and Bandung Institute of Technology (ITB)[2]. Because there are still a few number of universities in Indonesia which has the LDL program, this is a great opportunity for Tel-U to run similar programs.

Telkom University is one of the the private universities that provide LDL programs for postgraduate students. However, the practice of LDL run by the Telkom University graduate school is still not fully optimized because of constraints such as teaching staff, the material provided, and the limitations of the technology used.[3].

MIF is one f the major in Telkom Graduate School that has an LDL program. Currently, the MIF has 89 students who are still active in the academic year 2015/2016 and consists of 2013-2015 batches. From 89 students, 39 of whom are LDL students, while the target MIF students for each semester if 60 people.
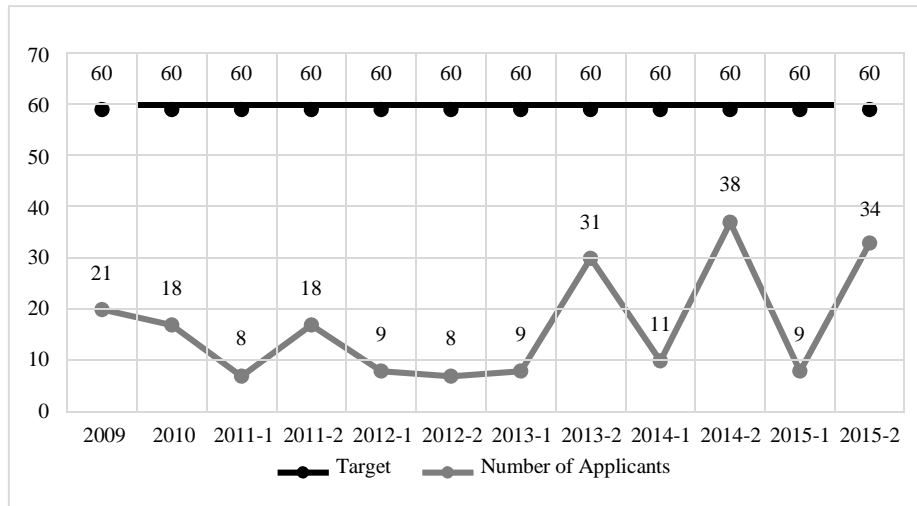
Figure 1. Number of Applicants

The main cause of student targets not achieved is due to the student needs are not being met, giving rise to many complaints due to customer dissatisfaction to LDL MIF Tel-U program, thus affecting the number of applicants each year which are not increasing. To overcome this problem, quality improvement of LDL MIF Tel-U should be done immediately.

2. Literature Review
2.1 Quality Function Deployment (QFD)
The application of QFD in education first performed by D. Ermer of Mechanical Engineering Department of University of Wisconsin, Madison in 1991[4]. Subsequently in 1997, Rainstar University in Scottsdale using QFD to determine the needs of customers (students) to improve the quality of teaching[5]. After that, QFD started being used to solve the problem of quality improvement in education.

Quality improvement efforts that were completed using QFD can be done in several iterations. In this research, the problem is done through two iterations, which are first iteration QFD and second iteration QFD. Solving the particular issue can be done using two QFD iterations because the result that gotten from second iteration of QFD has been able to answer the formulated problems and therefore there is no need to continue the iteration.

2.2 QFD First Iteration (House of Quality)
The conversion of voice of customer (VoC) into the technical requirements requires a matrix that can meet the needs of customers called QFD first iteration or what is known more as House of Quality (HoQ) which is a planning matrix[6]. HoQ chart generally is as follows.
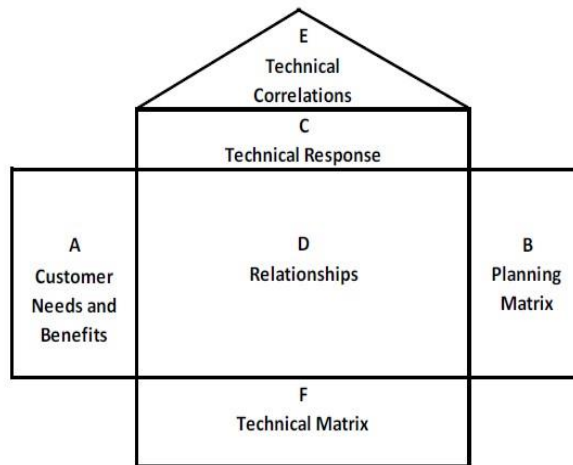

Figure 2. House of Quality

2.3 Concept Development

Development concept is a stage of development that based on the technical requirement of first iteration QFD that after that will be derived to second iteration QFD. Development concept consist of two stages, concept determination and concept selection.

2.4 QFD Second Iteration

Second iteration QFD also known as Deployment Part. Second iteration QFD is described in this picture below.
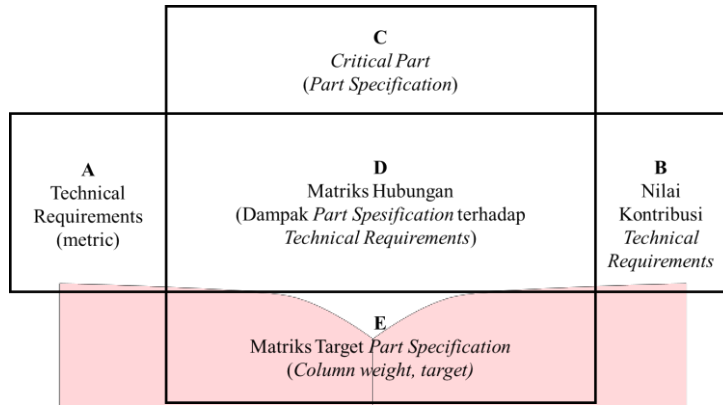

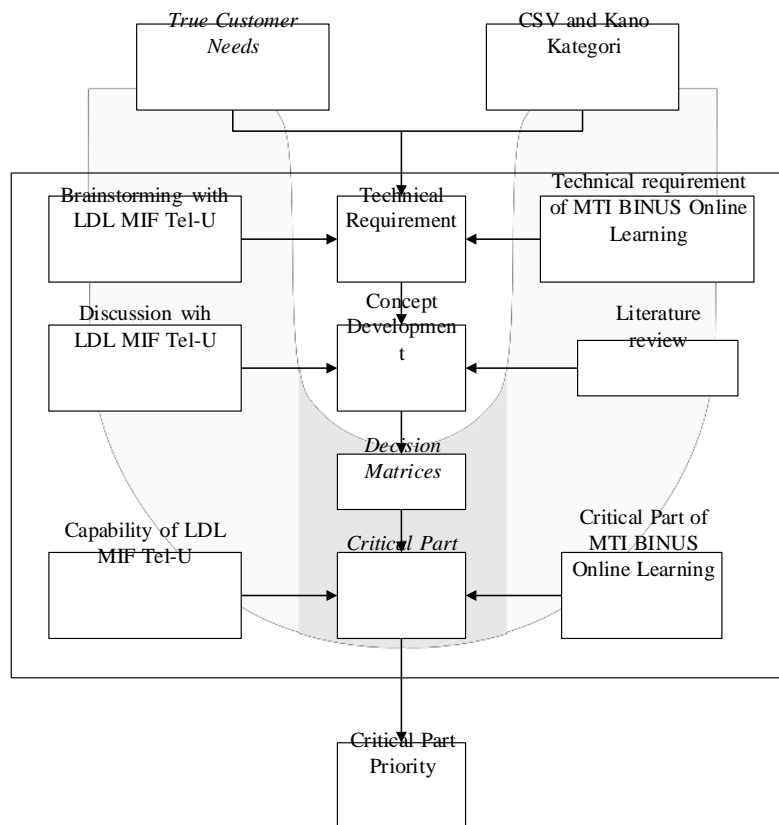Figure 3. Part Deployment Matrix

3. Research Methodology

Figure 3 Conceptual Model

4. Analysis

The input of this research which is true customer needs, customer satisfaction value, and Kano category are obtained from the previous research about the integration of E-SERVQUAL for Higher Education and Kano Model[7]. Next, technical requirement is deermined for each true customer needs.

Table 1. Technical Requirements

| Attribute Code	*True Customer Needs*	Technical requirements
EFF1	Stable internet network connection	Internet Network System
SAV1	The ease of accessing Open Library	Internet Network System
		Open Library System Maintenance Procedure
SAV2	The ease of accessing lecture materials	Internet Network System
		Software specification that is used.
SAV3	Updated lecture software	*Lecture software specification*
RES1	The Announcement about lectures is informed quickly	Information delivery media
		Information delivery standard
RES2	Rapid administration service to the needs of students	Qualifications of Admin that is required by Faculty
CON1	Lecturers are easily contacted	Communication Procedure
TEN1	The Lecture materials are relevant to the world of work	LDL Curriculum
		Communication with the field of work
DEL1	File sharing facility of lecture material	Application specification of *file sharing*
		Standardization of Learning System
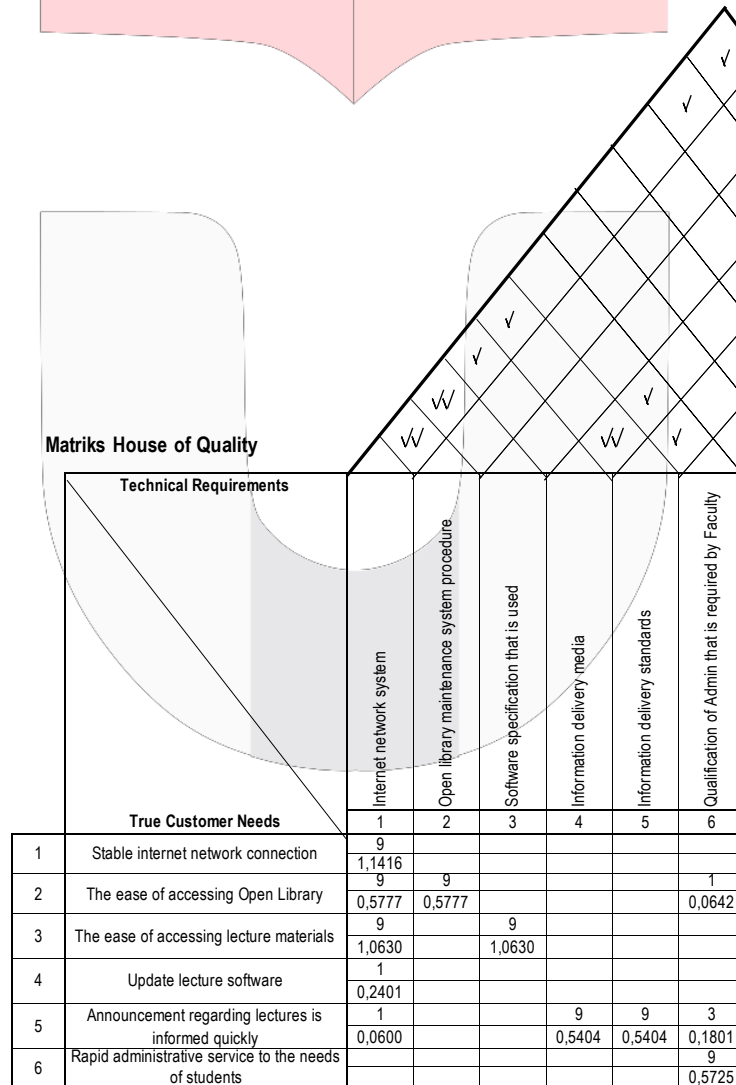
Figure 4. House of Quality Matrix

From the HoQ matrix, it is obtained the measurement matrix that shows the ranking of technical requirement, adjusted importance, adjusted importance percentage, and also the ranking for column weight. In measurement

matrix, there is a target that wanted to be achieved by PJJ MIF Tel-U. The target is determined by the ability of PJJ MIF Tel-U and also from benchmark to the competitor, MTI BINUS Online Learning. From the target that has not been fulfilled will be the technical requirement priorities and become the input for QFD second iteration. The priorities of technical requirement are; internet network system, lecture software specification, communication procedure between lecturer and students, LDL curriculum, communication with the field of work, and file sharing application specification.

The technical requirement priorities will be the concept attribut for concept development process. The existing concept of PJJ MIF Tel-U will be compared to the substitute concept and with the creating concept and then will be scored using decision matrices with the selection critieria are; effectiveness, efficiency, feasibility, and ease to be realized. As the result, the creating concept was choosen based on the brainstorming done with PJJ MIF Tel-U.

After the concept development process, the calculation process is going to QFD second iteration to obtain the critical part based on the technical requirement. The critical part are as follows.

Table 2. Critical Part

Technical Requirements	Critical Part
Internet network system	Total of proxy servers
	Speed of internet access
	Bandwidth
Updating lecture software	Software Version used
	Software type used
Procedure of communication between lecturers and students	The number of communication media of lecturers and students
	The frequency of guidance and assistance in one semester
LDL curriculum	The frequency of curriculum update in one year
Communication with the work world	The Number of training in one semester
File sharing application	The type of application

From Table 2 it is then be calculated with part deployment matrix as well and from the matrix it can be determined the critical part priorities which are; software version used, the frequency of curriculum update in one year, the number of training in one year, and the frequency of guidance and assistance in one semester.

5. Conclusion

The conclusion of this research are; In the first QFD iteration there are six out of eleven technical requirement priorities, In the second iteration QFD there are four critical part priorities of the eleven critical critical parts that have been identified based on the technical requirements target that has not been fulfilled, and Quality improvement of LDL MIF Tel-U services are done by making recommendations to achieve their respective defined targets. Hopefully, these recommendation can be implemented by PJJ MIF Tel-U in order to achieve the target set.

6. Bibliography

[1] Kemendiknas. (2001). *Panduan Model Pembelaran PJJ di Perguruan Tinggi*. Jakarta.

[2] Kemenristekdikti. (2015). *Kementerian Riset dan Teknologi Direktorat Pendidikan Tinggi*. Accessed on January 6 2015 at 18.06, from Republika.co.id: http://www.republika.co.id/berita/pendidikan/dunia-kampus/15/09/15/nuojcs 346-enam- perguruan-tinggi-adakan-pendidikan-jarak-jauh

[3] Telkom University. Telkom Graduate School Hand Book. (2014).

[4] Aytac, A & Deniz, V. (2005). Quality Function Deployment in Education: A Curriculum Review. Departemnt of Chemical Engineering. Turki: Kocaeli University.

[5] Bier, I., R. Cornesky (2001). Using QFD to construct a higher education curriculum.

[6] Cohen, L. (1995). Quality Function Deployment: How to Make QFD Work for You. Massachusetts: Addison Wesley Publishing Company.

[7] Pawesti, Nur Dining. (2016). *Analisis Kebutuhan Pelanggan untuk Pembelajaran Jarak Jauh Magister Teknik Informatika Universitas Telkom Dengan Menggunakan Integrasi* E-SERVQUAL for Higher Education *dan Model Kano*. Bandung: Telkom University