

Failure Mode and Effect analysis in Engineering Educational Sector

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ABSTRACT

To maximize the profit of organization and achieving selling target, the industries are in position to satisfy the customer needs and expectation. To stay in global business, it is necessary to indentify customer expectations and fulfill their needs, achieving customer satisfaction is an essential task for any kind of organization such as manufacturing, service and trading. Failure Mode and Effect Analysis (FMEA) is an effective tool for continuous improvement in any processes and services. In FMEA method, the Risk Priority Number (RPN) calculated for finding the high risk failure mode. The RPN calculated by multiplication of Severity (S), Occurrence (O) and Detection (D). The main aim of the proposed method was to identified the failure mode in engineering educational service sector, The questionnaire survey framed based on the SERVQUAL model (Parasuraman, 1985) in its original formulation consists of 20 statements measuring 5 critical to quality dimensions of service quality namely tangibility, reliability, responsiveness, assurance, and empathy. The questionnaire based survey was conducted for finding failure mode in engineering educational service sector, 5 linker scale method used for conducting questionnaire survey and it was evaluated and validated by SPSS software. In this proposed work 1250 responds collected from students to know more about their response in severity (S) of the educational service components. The 200 responds collected from teaching professor and assistant professor for identifying the Occurrence (O) and for detection (D) 30 responds collected through control of examiner and senior professors those who are working in engineering educational sector. From that proposed work the reliability component scored maximum RPN value (504) and got first rank in risk priority number which meant the reliability (quality of education and job assurance) was most expected from the student's point of view.

KEY WORDS: FMEA, Engineering Educational sector, student's expectation.

1. INTRODUCTION

Achieving customer satisfaction is an important task in service and manufacturing sector, here we had chosen private engineering college for our study. Now a day the engineering college admission getting down due to not placement provided by the college, improper facilities in colleges, the wrong teaching methodology and many colleges newly opened in same region etc. our aim of this study, to find the failure mode in engineering college by FMEA tool. Failure Mode and Effect Analysis (FMEA) in an effective tool for continuous improvement in any processes and services. In FMEA method, the Risk Priority Number (RPN) calculated for finding the high risk failure mode. The RPN calculated by multiplication of Severity (S), Occurrence (O) and Detection (D). Severity is the assessment of the seriousness of the failure effect, Occurrence is the chance that one of the specific causes will occur, and detection is assessments of the likelihood that the current controls that detect the cause of the failure mode. In this proposed method, the failure mode predicted for engineering educational service sector to improve the operations, functions, services etc. in this proposed work 1250 responds collected from students to know more about their response in severity (S) of the service components. The 200 responds collected from teaching professor and assistant professor for identifying the Occurrence (O) and for detection (D) 30 responds collected through control of examiner and senior professors those who are working engineering educational sector.

Service Component – A Review: Parasuraman (1985), developed the service quality dimensions model, namely called SERVQUAL model. There were five service quality dimensions described in this model such as tangibles, reliability, responsiveness, assurance and empathy. The meaning of these dimensions explained below.

Service Quality Dimensions: Tangibles: The physical facilities and equipment, and the appearance of personnel, Reliability: The ability to provide what was promised, in a dependable and accurate manner, Responsiveness: The willingness to help customers and provide prompt service, Assurance: The knowledge and courtesy of employees, and their ability to convey trust and confidence, Empathy: The degree of caring and individual attention provided to customers. Using SERVQUAL model, the quetionary based survey conducted for collecting responds from patients, nurses and customer relation officers.

Problem Identified: The statistics shows, every year the engineering colleges admission getting down, many engineering colleges unable to run the courses due to very few admissions. The students and parent's expectation keep on increasing towards the quality of engineering educational sectors. The colleges unable to meet the student's expectation and requirement.

Objective of this Proposed Work: To find the failure mode in engineering educational sector by FMEA tool and proper questionnaire based survey.

2. METHODOLOGY

FMEA: Failure Mode and Effect Analysis (FMEA) is an effective tool for continuous improvement in any processes and services. In FMEA method, the Risk Priority Number (RPN) calculated for finding the high risk failure mode. The RPN calculated by multiplication of Severity (S), Occurrence (O) and Detection (D).

Calculation of RPN: The questionnaire survey was conducted for finding failure mode in engineering educational service sector, 5 linker scale method used for conducting questionnaire survey and it was evaluated and validated by SPSS software. In this proposed work 1250 responds collected from students to know more about their response in severity (S) of the educational service components. The 200 responds collected from teaching professor and assistant professor for identifying the Occurrence (O) and for detection (D) 30 responds collected through control of examiner and senior professors those who are working in engineering educational sector. From the below table 1 shown the risk priority number for various service components, the reliability component scored maximum RPN value (504) and got first rank in risk priority number which meant the reliability (quality of education and job assurance) was most expected from the student's point of view.

Table.1. Calculation of Risk Priority Number (RPN)

Process Function	Potential Failure Mode	Potential Effect (s) of Failure	Severity (S)
Analysis of service quality in Engineering college Educational sector	Tangibles	Unable to meet the students expectation, so dissatisfied in service which leads to lower admission	8
	Reliability		9
	Responsiveness		8
	Assurance		8
	Empathy		6

Potential Cause(s)/ Mechanism(s) of Failure	Occurrence (O)	Current Process Controls	Detection (D)	RPN= S*O*D
The improper planning in layout of campus	7	The proper facilities to be provided	7	392
The colleges not tie-up with industrial	8	The proper placement to be arranged	7	504
The improper teaching methodology	6	The right teaching methodology to be adopted	6	288
The insufficient training provided	7	The coaching and proper training to be arranged	6	336
Not properly identify the students expectation	7	The student and staff relation to be maintained smoothly	7	294

The tangible got second rank, the students expected well infrastructure includes lab, play ground, internet, canteen, hostel & transport etc. the assurance got third rank, the students expected qualify staff member and innovation teaching methodology in educational sector. Empathy got fourth rank; the students expected individual caring from staff members and also responsiveness in services. Responsiveness got fifth rank in risk priority number.

3. RESULT

Table.2. Rank of service quality dimensions

Potential Failure Mode	RPN= S*O*D	Rank
Tangibles	392	2
Reliability	504	1
Responsiveness	288	5
Assurance	336	3
Empathy	294	4

From that above table.2, shown the highest risk priority number for reliability (504), the educational sector the proper placement to be arranged.

4. CONCLUSION

From the questionnaire based survey and applied FMEA in engineering college educational sector, we conclude, the students expectation towards engineering educational service quality was high. They expected high reliability in educational services which meant the quality of education and job assurance was most expected from the student's point of view. These research methods, one of the ways to improve the organization in continuous manner and this survey helped us to know more about the student's expectation towards service quality in engineering colleges.

Research Limitation: This research was done at private engineering college located at Karur, Tamilnadu, India. The sample size taken for this research was limited. This results and failure mode may not be fit for all engineering colleges.

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