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Quality Assurance in Education Based on Six Sigma Tool

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Abstract

In India, over two decades the technical industries unique selling proportion has been that, with its wide infrastructure of technical institute, it is capable of supplying best in class engineers. But recently this claim does not hold water. According to All India Council for Technical Education (AICTE) about 2.6 lakhs mechanical engineers are graduated every year in India. But the real count of industry ready mechanical engineers is approximately less than 7%, hence there is a need to assess the quality of engineering education in India to reduce the flaws in the higher education. The purpose of the paper is to find the various defects associated with the technical education and eliminate those defects using various quality tools. This research is based on six sigma technique ,which is used to assess the quality criteria proposed by National Board of Accreditation India (NBA). The proposed model is then applied in a typical tier II Indian engineering college located in south India. Six Sigma has mainly two methodologies DMAIC and DFSS. The DMAIC (Define, Measure, Analyze, Improve and Control) methodology is implementing for existing system whereas DFSS(Design For Six Sigma) is for assuring quality in new products. In this project the conclusion is driven by DMAIC methodology. Various statistical and non statistical tools are employed in this research. The tools used are CTS-CTQ, SIPOC, Pareto chart, Normal process capability analysis, one way ANOVA, Ishikawa diagram, FMEA, RCBD, and SPC chart. All the statistical process are done using Minitab analytical software. From the results it is identified that the factors which are having (Risk Priority Number) RPN greater than 300 needs improvement, such as versatility in program curriculum, laboratories and workshops and credibility among university. .Six Sigma can be achieved by developing proper strategies for mitigating this defects..

Keywords: Six Sigma, Statistical tools, Non statistical tools and Minitab analytical software

1. Introduction

We are living in a competitive world which is giving more priority to quality in most aspects. Six Sigma have been effectively implemented in engineering, retail and healthcare sectors for reducing the defects. Currently, the researcher are focusing on implementing six sigma in an unlikely location ie the educational sector. Six Sigma will assist in enhancing the structures which build up the education sector. As the parents, faculties, policymakers and global economic factors begin to place more emphasis on developing quality education, educational establishments will depend even more strongly on the Six Sigma approach to provide the best potential guidance for reducing the defects in educational sector. As in the global sense we can define the term 'Quality' as "Quality is the ability of a product or service to consistently meet or exceed customer expectations". The evolution of Six Sigma is from the inspection. In this Six Sigma project the customers are Industries, Society, Parents & Institutions.(Joseph . et al 2005)

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This project focuses on the implementation of Six Sigma in tier II Indian engineering college to reduce the variations in seven quality criteria(quality criteria proposed by National Board of Accreditation India).The seven criteria is the most critical areas in education such as, vision, Mission, PEO's ,Program curriculum and teaching learning process, course objectives (CO's) and program objectives (PO's),student performance, Faculty information and contribution, facilities and technical support and alumni survey. Six Sigma is employed to reduce the variation and gaining knowledge about education industry. The input of the proposed Six Sigma process is Higher secondary (HSE) level and lateral entry students and the output of the process will be industry ready mechanical engineers. The main aim of this research is to reduce the variations in the process. Most of the college managements are not bothered about the current industry requirements. In this work, the team identifies most demanded soft skill and hard skill from industries. These requirements are prioritized on the basis of top client requirements to medium client requirements. The aim of this research is to made capable a student from HSE level background to industry ready mechanical engineers with the help of six sigma tool. The research aims is achieved by implementing various statistical and non statistical tools of six sigma. The statistical tools include Pareto Chart, Normal Process capability analysis, Correlation and Regression analysis, One way ANOVA,FMEA, Randomized Complete Block Design(RCBD). The non statistical tools include CTS-CTQ,SIPOC chart and Ishikawa diagram. Six Sigma has mainly two methodologies DMAIC and DFSS. The DMAIC (Define, Measure, Analyze, Improve and Control) methodology is implementing for existing system whereas DFSS(Design For Six Sigma) is for assuring quality in new products. In this research, the conclusion is driven by statistical approach. This paper is structured as follows, in Define phase the problem identification is highlighted. Data collection-data representation and process capability is analyzed through Measure phase. In Analyze phase the correlation of variables and root cause of the problem is determined, In Improve phase the recommended action is found out , The control phase is used to sustain the changes made in improve phase. Finally a conclusion is provided in last section.(Jenicke. et al. 2008)

2. Define Phase

Define is the first phase in six sigma project. Here, the problem is defined and the six sigma team is formed. The main aim of the define phase is that clearly define the problem statement through customer analysis. In define phase professionally qualified team is developed, supported, and dedicated to working on project progress. Customers should be located and identified high impact assets (CTQs) are defined, team charter developed , mapped the business processes. The research team identifies the client requirements from top level clients to midlevel clients. In this work, the top client is recognized as the Maharatna companies in India and midlevel companies referred as the Miniratna companies in India. Their desired requirements is used as the customer requirements in this research. The problem statement of the project is that:-"To reduce the variations of seven criterion data in a typical tier II Indian engineering college and implement a suitable action plan for that". Achieving six sigma is the goal of this research. The timeline of the project is to be set by eight months.(Helgesen. and Nesset. 2007)

The research team includes interested personalities in six sigma. A national agency quotes that :-"By 2028 mechanical engineers demand will rise up to 4%". After implementing the charter, the next step is to find the Voice of Customer(VOC). VOC includes the customer expectations, requirements and opinions. The data from customers are collected by their complaints, field reports and benchmarking. The customer satisfaction is the primary goal of our project. The term satisfaction here means that it is the comparison of expectation to experience. Critical To Satisfaction(CTS) to Critical To Quality (CTQ) is developed. The CTS-CTQ chart is developed through a brainstorming session. In intermediate to CTS and CTQ seven drivers are associated. These drivers are further brainstormed into 59 factors.*(*Helgesen. 2006) The detailed diagram of CTS-CTQ is given in the figure 1. The goal statement of the research is to achieve six sigma in mechanical engineering department of a typical tier II Indian engineering college located in south India. For process characteristics and analysis the team employed SIPOC chart. This process analysis is used to improve quality delivery and responsiveness. The SIPOC chart is given in Table 1.

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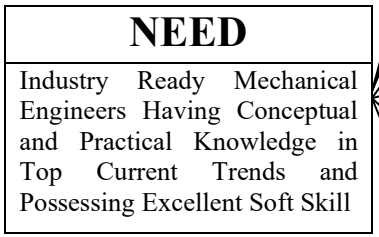
Table 1. SIPOC chart

Supplier	Input	Process	Output	Customer
• HSE level institution • Diploma level institution	• HSE level students • Diploma level students	Students were admitted on the basis of entrance rank ↓ Series of orientation ↓ 4 years of mechanical engineering education by achieving 160 credits ↓ Reduce Variation ↓ Industry Ready Mechanical Engineers	HSE/Diploma level students have been made to graduated as a world class mechanical engineers	• Industries • Society • Institutions • Parents

3. Measure Phase

Measure phase employs more numerical and data analysis than define phase. This phase involves data collection, data representation and process capability analysis. The data is collected by face to face and online survey. The 59 factors (CTQ) is classified into four sessions and according to this classified session the data is proceeded. The various survey includes industry, faculty, student and alumni survey. All the survey are carried out by using a 5 point scale. The collected data is represented by using pareto chart.(Grosfeld-Nir et al. 2007) The most critical 25% defects are taken for analysis in the first phase . The pareto chart is given in figure 2. In pareto chart ,the analysis of 59 factors are listed. The cumulative frequency up to 72% are taken for deep analysis. Up to 72% there are 12 factors. The most defective factors involve working in core field, success rate without backlogs, programme curriculum, industry interaction, success rate in stipulated period of time, new courses introduced, improvement in quality of student admitted, PO'S and PSO'S , lab, Correlation of CO's and PO'S, satisfaction in applied level knowledge and publication of technical magazines. By reducing the variations in these 12 factors the rate of defect will be reduced by 80%.(Harvey, 2001) Thus a keen observation and deep analysis is required to these 12 factors in coming phases. After data representation and finding the most critical defects it is necessary to analyse whether the process is capable or not. The process capability analysis is proceeded by Minitab analytical software. As a prerequisite for the process capability analysis the project team goes through the basic concepts in statistics and probability theory. As these two fundamental concepts are necessary to proceed further six sigma project. Before going into process capability analysis the team analyze whether the process is normal or non normal. The normality is analyzed through a normal probability plot. Before going into process capability analysis it is required to calculate sigma value and mean value. The team analyze the project on a short term basis. Thus a 1.5 sigma shift is accounted as a compensation factor. If 1.5 sigma shift is ignored it will be long term basis. In statistically, the six sigma is achieved only by long term basis. That is by ignoring 1.5 sigma, the overall limit will be 4.5 sigma and the actual value of sigma will be low compared to short term basis. The sigma value and mean value is shown in table 2.

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DRIVERS	CTQ
Vission, Mission and PEO's	Imparting Knowledge , Intellectual Stimulus , Synergistic Skill, Idea Conveying Skill, Social and ethical values
Programme Curriculum and Teaching Learning Process	Versatility of designing the programme curriculum, Gap fill activities to meet technological advancement, Quality of examinations-assignments, Academic Research, Curriculum Competiveness in Global Level
Course Outcome and PO's	Effectiveness of students feedback system, Correlation of CO's and PO's, PO's and PSO's attainment levels and actions for improvement
Student Performance	Quality of Student projects, Students Performance, Success rate without backlogs, Success rate in stipulated period of time, Participation in inter institution events by students ,Placement, Higher Studies and Entrepreneurship, Improvement in quality of students admitted to the programme
Faculty Information and Contribution	Process to improve quality of teaching and learning, Industry Consultancy, Project Guidance and support for skill development, Faculty Qualification, Faculty Retention, Faculty Competencies in correlation to programme specific area, Faculty development sessions, Quality of work life of teaching staff, Faculty Cadre Proportion, Student Faculty ratio
Facilities and Technical Support	Enrollment ratio, Development of infrastructure, Research and Development, Adequate and well equipped lab, Lab maintenance and overall ambience, Safety Measures, Project laboratory, Entrepreneurship Development, Publication of technical magazines, Initiatives related to industry interaction, Professional Societies, Sponsored Research, New courses introduction
Alumni Appraisal	Alumni associations, Professional activities, Level of campus experience, Commitment towards your boss, Placed students satisfactory level, Support of college after graduation, Satisfaction to university, Working in core field, Contribution of campus life in social aspects, Satisfaction in applied level knowledge, Students commitment in gaining current trends, Business minded approach,

Figure 1. CTS-CTQ

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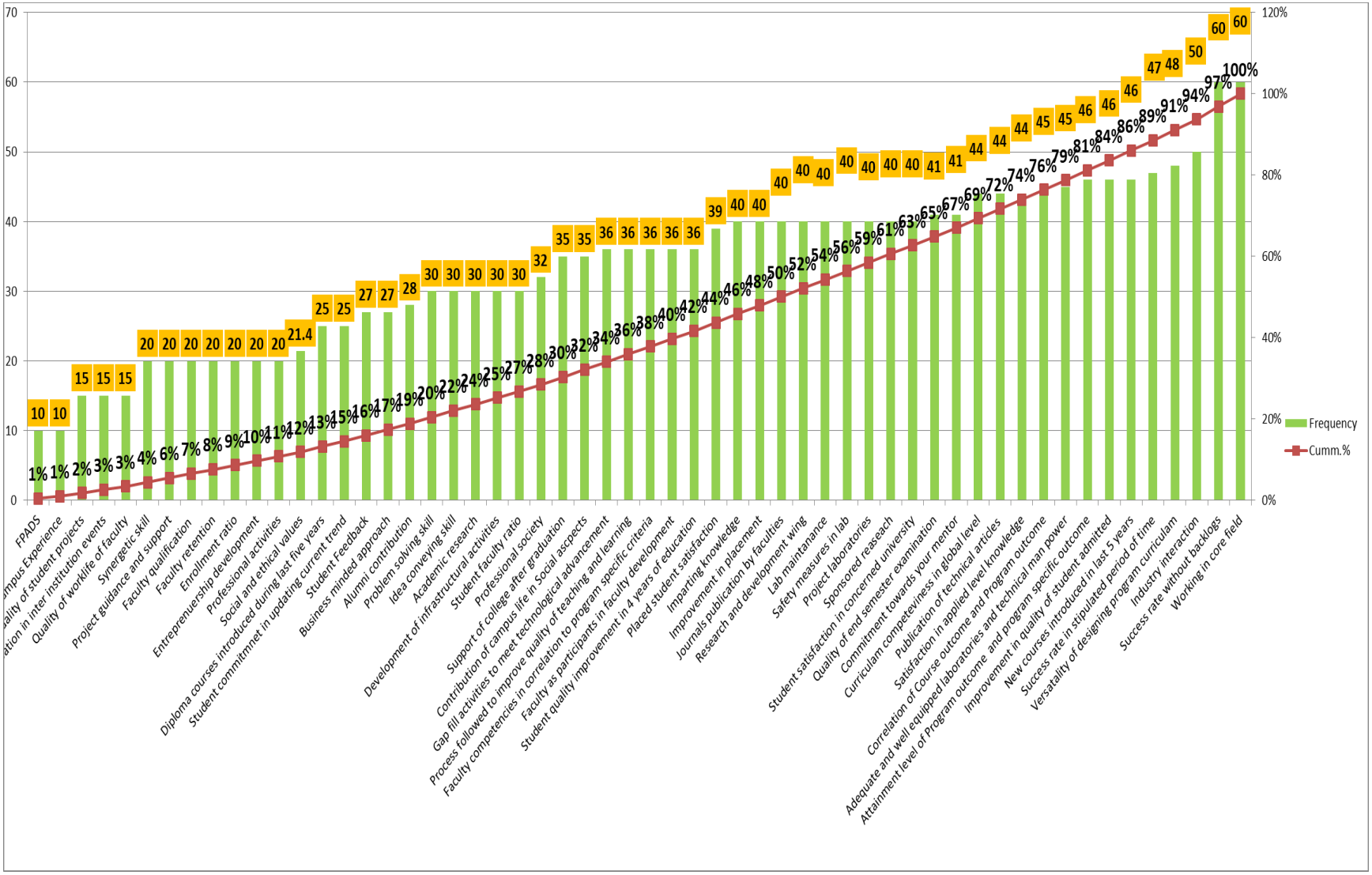


Figure 2. Pareto Chart

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Table 2. Sigma and Mean value

Criteria	NO. OF CTQ	Yield	Defective	DPMO	Standard deviation	Mean value
Vission, Mission, PEO's	5	0.716	0.284	56800	3.08	71.72
Programme curriculum and teaching learning process	5	0.602	0.398	79600	2.93	60.2
CO's and PO's	3	0.606	0.39	130000	2.63	60.6
Student Performance	10	0.65	0.34	34000	3.33	65.9
Faculty Information and contribution	13	0.64	0.35	26900	3.43	64
Facilities and technical support	14	0.6414	0.358	25571	3.45	64.14
Alumni Appraisal	10	0.646	0.354	35400	3.33	64.6

The overall sigma value for the mechanical department is calculated as 3.16 and mean value as 64.5. The team uses these values to develop process capability analysis. The process capability analysis is shown in figure 3.

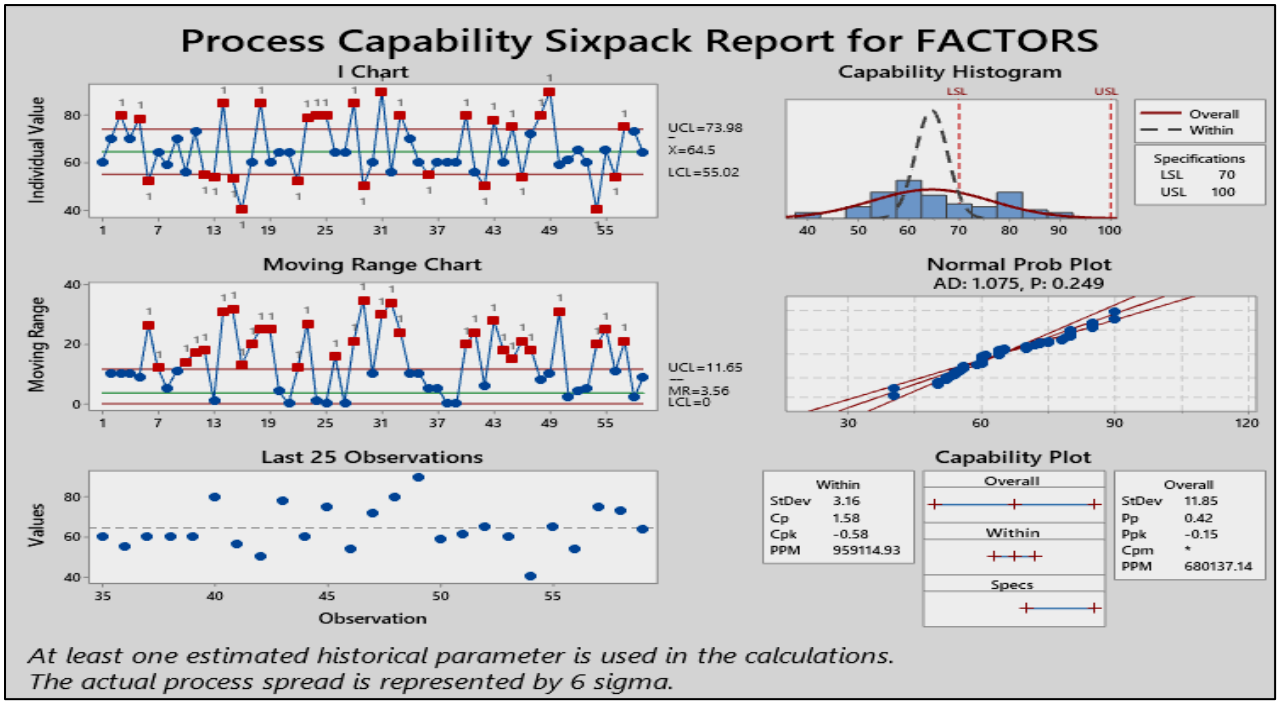


Figure 3. Process capability Sixpack report

From the normal probability plot it is shown that the data is normally distributed. Hence the team employs normal process capability analysis. As per the industrial survey majority of the mechanical recruiters demanded that their employees needed a minimum of 65% in all levels of soft skill and hard skill. Therefore the Upper specification limit(USL) is given by 100 and Lower specification limit (LSL) is given by 65. The normal probability distribution

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curve is out of specification limit. A small portion of the curve is in the specification limit. So, it is necessary to made the probability curve within the specification limit. Also The process capability index (Cpk) and process performance index (Ppk) is less than 1 . It implies that the process is not capable to satisfy and meeting the customer requirements [Here the customers are mechanical recruiters] (Hörsch and Rudinger, 2009)

4. Analyze Phase

The objective of analyze phase is to find and validate the root cause of defects and ensure that improvement is focused on causes rather than symptoms. For analyzing the root causes of defects the project team employed hypothesis testing on Correlation, Regression analysis and One way ANOVA. The defects of having high cumulative frequency from Pareto chart is selected and based on that the above mentioned statistical tool is followed. In the hypothesis testing there are two types of errors:- Type I (α) and Type II (β) error. In Type I error it is mentioned that the process is supposed to be out of statistical control but in reality process is in the statistical control. The value of α= 0.05 and β=0.10.(Gruber T et al. 2007) Thus the process is keen to focus on to reduce the Type I error 1-α is known as the confidence level and 1-β is known as power of test. For analysing the data we have to check whether there is a relationship between the CTQ's and Industry Ready Mechanical Engineers (IRME). For that the team adopts correlation analysis and based on that the relationship between CTQ's and IRME determined. The correlation analysis of each CTQ's and IRME is given in table 3.

Table 3. Correlation

CTQ	IRME
Vission, Mission and PEO's	0.799
Student Performance	0.910
Faculty Information and Contribution	0.840
Facilities and Technical Support	0.999
Alumni Appraisal	0.924
Programme outcome and Course outcome	0.999
Programme curriculum and teaching learning process	0.979

From this correlation analysis we can understand that there is a good relationship between CTQ and IRME. The correlation analysis only gives whether there is a relationship and it doesn't give the strength of the relationship . The strength of the relationship is given by the regression analysis. The regression analysis is shown below. The R-square and adjusted R-squared is compared and it is found that a high reliability is existed.(Fredericksen .et al. 2000) The regression analysis predicts the value of dependent variable based on known value of independent variable assuming average relationship between two or more variable. In this research , the team identifies the dependent variable as IRME and independent variable as 7 criteria. The regression analysis is carried out in minitab analytical software. The regression equation represents the equation of a straight line $Yi = \beta o + \beta 1Xi + \sum i$. Here β1 represents the slope of the linear regression model. And if the slope is greater, then higher is the autocorrelation between IRME and criteria. By regression analysis the team identifies the intensity of autocorrelation between depended variable and independent variable and there by facilitates the primary session to find the root causes of the defects.(Thurau et al. 2001) The regression analysis is shown in table 4.

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Table 4. Regression Analysis

Criteria	Regression equation	t- VALUE		P- VALUE	
		Constant	Criteria	Constant	Criteria
Vission, Mission, PEO's(VMP)	**IRME= 29.4+0.619 VMP**	**1.52**	**2.31**	**0.225**	**0.104**
Programme Curriculum And Teaching Learning Process(PC&TLP)	**IRME= -1.27 + 1.02 PC&TLP**	**-0.31**	**0.776**	**0.776**	**0.001**
Programme Outcome and Course Outcome(PO&CO)	**IRME= -14.08+0.8090 PO&CO**	**-6.07**	**21.36**	**0.104**	**0.030**
Student Performance (SP)	**IRME= 6.8 + O.740 SP**	**0.52**	**3.81**	**0.638**	**0.032**
Faculty Contribution(FC)	**IRME= 12.7 + 0.7 FC**	**0.68**	**2.68**	**0.546**	**0.075**
Facilities and Technical Support (F& TS)	**IRME= 2.23 + 0.975 F&TS**	**1.21**	**34.65**	**0.315**	**0.00**
Alumni Appraisal(AA)	**IRME= 10.5 + 0.753 AA**	**0.79**	**4.18**	**0.486**	**0.025**

The regression analysis of 7 criteria is shown above. From the regression equation it is found that the programme curriculum and teaching learning process has higher value of β0 (slope) .Thus it have a high autocorrelation with IRME. Thus a keen focus is required in program curriculum as it have a high positive relationship to IRME. PO's and CO's, Facilities and technical support, Student performance are the other criteria which needs to pay greater attention.(Enarsson, 1998)

The analysis of T-value is determined on the basis of hypothesis testing.

Here null factor, H0 : No autocorrelation

H1 : Positive autocorrelation

Our main focus is to reduce the Type I error as we mentioned above. Thus in the T- test all the 7 criteria have Tstat> Tα/2 in the two tail test. Thus all the 7 criteria reject H0 .Thus it implies that there is a positive autocorrelation exists among criteria and IRME.

The P value of all the criteria is less than α. That is value of α =1.Thus it also implies a strong autocorrelation between the criteria and IRME.

To identify the whether the mean is same or not among the factors and client requirements, the team employs One way ANOVA (Analysis Of Variance) test. One way ANOVA test is shown in table 5.

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Table 5. One way ANOVA

Method	ANOVA
Method Null hypothesis: All means are equal Alternative hypothesis: Not all means are equal Significance level: α = 0.05 *Equal variances were assumed for the analysis.*	**Analysis of Variance** Source: FACTORS, Error, Total DF: 17, 15, 32 Adj SS: 5525, 1332, 6858 Adj MS: 325.00, 88.83 F-Value: 3.66 P-Value: 0.008

Here the value of P (0.008) is less than 0.05, thus the null factor H0 is rejected and alternate hypothesis is claimed to be true. That is the mean among the factors and client requirements are different . For analyzing the relationships between contributing factors the project team proceeded Ishikawa diagram. It examines why something happened or might happen by organizing the potential causes into smaller categories.(Elliot and Healy 2001) The cause and effect diagram is shown in figure 4.

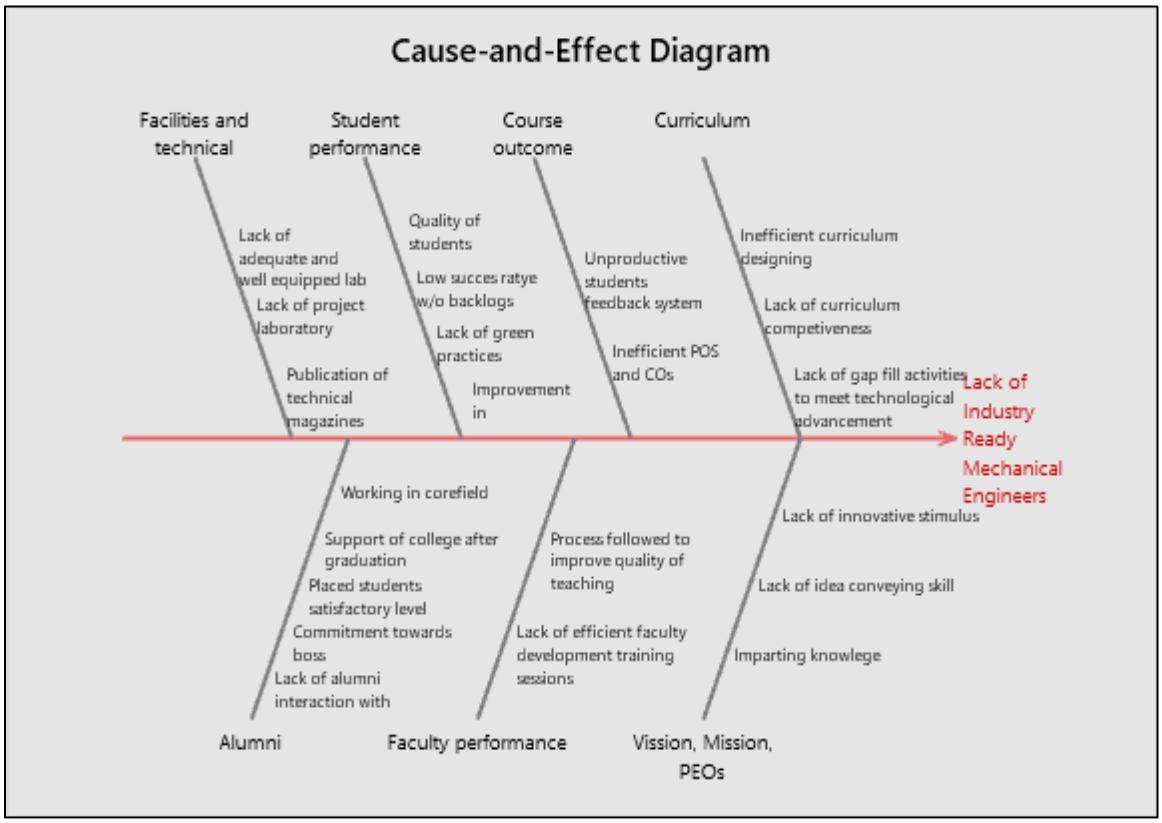


Figure 4. Cause and Effect diagram

The cause and effect diagram is proceeded by using results from Pareto chart, Correlation and regression analysis and ANOVA. The CTQ's having high autocorrelation is depicted in cause and effect diagram.

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5. Improve Phase

Improve is the fourth phase in the Six sigma DMAIC cycle. The focus of this stage is to determine a solution which is based on the uncovered problem in the first three phases. The team employs FMEA analysis to determine potential causes, current process control, RPN, Action recommended and the concerned section. The detailed FMEA chart is given in Appendix A. The Risk Priority Number (RPN) is a numerical assessment of the risk priority level of a failure mode in an FMEA analysis. It helps the team to prioritize risks and make the decision on the corrective actions. The value of RPN changes from1-1000.RPN is calculated as follows, RPN=SEV*OCC*DET . The severity level (SEV) is calculated by potential failure effect, Occurrence level(OCC) is calculated by Potential Causes and DET is calculated by current process control.(Deming 1993) The Randomized Complete Block Design (RCBD) is employed in the research to determine the influence of noise factors affecting students from 1st year to 4th year. The noise factor is divided into 3, noise factor due to students (NF1), noise factor due to college management (NF2), noise factor due to environment, university and government bodies(NF3).Data for RCBD is given in table 6.

Table 6. Data for RCBD

Values obtained from Minitab Analytical Software

Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
BLOCK	3	228.3	76.08	0.38	0.770
NOISE FACTORS	2	2312.7	1156.33	5.81	0.039
Error	6	1194.0	199.00		
Total	11	3734.9			

Block V/S Noise Factor

BLOCK	NF1	NF2	NF3
1	30	50	60
2	35	20	62
3	55	15	59
4	45	10	50

Here the Block represents the students from 1st year to 4th year. The data for RCBD is obtained from survey conducted at the Define phase.(Donaldson and Runciman 1995) The P- value of the block is 0.770 > α (0.05). It implies that null hypothesis is claimed to be true. More or less all the students are affecting noise factors in the same intensity irrespective of their year. The P- value of noise factor is 0.039 < α .Thus intensity of all noise factors affecting the students aren't same. By regression equation the intensity of NF affecting students are as follows, NF3> NF2 >>NF1

6. Control Phase

The main objective of control phase is to ensure and maintain the gains obtained from improvement phase. The team employs Statistical Process Control (SPC) chart to determine whether the variations in 7 criteria is in statistical process control and it finds that after the recommended actions the data's will fall in specification limits by satisfying the industry requirements.(Borough 2003)

7. Conclusion

The quality assurance in mechanical engineering education is an inevitable factor. By conducting various survey it is identified that the demand of mechanical engineers are rising,. But the problem is that employers can't find mechanical engineers who is apt for their industry. The main reason behind is the outdated curriculum that college/ university follows. In addition to that lack of facilities and technical support, Faculty development sessions are some key factors for the lack of Industry Ready Mechanical Engineers(IRME). In the case of students they need motivation from faculty, parents and a good support of alumni. The recommended actions are given by FMEA analysis. The sigma level of mechanical department of a typical tier II Indian engineering college is 3.16. The Six

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sigma can be achieved in mechanical engineering department by adopting DMAIC methodology in a systematic manner. The model of this project can be used in Tier II as well as Tier III engineering colleges. The implication of this project in other institution can be processed as follows:- After defining the voice of customer and analyzing the process capability the project can be initiated , the root cause of the problem can be determined through correlation and regression analysis, the recommended action can be employed through FMEA chart and by using SPC chart it can be determined that the altered process is in the control limits.

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Biographies

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Appendix A. FMEA Chart

PROCESS STEP	POTENTIAL FAILURE MODE	POTENTIAL FAILURE EFFECT	SEV	POTENTIAL CAUSES	OCC	CURRENT PROCESS CONTROL	DET	RPN	ACTION RECOMMENDED	CONCERN SECTION
Facilities and Technical Support	Adequate and well equipped laboratories	Lack skills in practical knowledge	6	Lack of funding Lack of awareness in practical session	7	Some conv M/C like Lathe,Shaper are installed	8	336	Conventional machines should be replaced by CNC Lab ,Automation lab ,D/S research lab ,Fire project lab ,Industrial engineering lab Thermo fluid and energy systems lab	College mgmt. Govt.
	Project laboratories	Not enthusised to use lab for their project	6	Funding Lack of awareness	6	In some colleges one or two labs are assigned as project laboratories	6	216	Funding should implemented, PL should include all major sessions including manuf., & automobile	Govt College mgmt..
	Publication of tech articles	Students aren't awared current industry trends	5	Lack of awareness	6	Some technical article is quoted in college and university magazine	4	120	Students and faculties research articles should publish in the label of college	Universit y Coillage mgmt..
Alumni appraisal	Lack of alumni interaction with students	Students aren't motivated	4	There is no Alumni meet with the students	5	No such initiative is present	6	120	Student should interact in alumni .Maintain good relationships with seniors	College Universit y
	Commitment towards Boss	Affect the reltn b/w employer and employee	5	Not willing to share their project discussion with mentor	4	An hour is implemented in the first and second year for soft skill	5	100	Share your project progress with mentor. A good relationship with faculties will help to maintain a good relationship with their Boss	Students Faculties
	Placed student satisfactory level	It might affect their career growth	6	Some students have mind to work in the core field	6	No such motivation is shared to students	6	216	Grow a mindset to work in any field &flourish in their field	Faculty Parents
	Support of college after graduation	Fresh engg graduates they are facing a new world	7	Faculties and colleges are not awared about these issue	6	A relationship with faculties is to be maintained	5	210	Maintain a good relationship with faculties Students by placement unit in college	College Faculty
	Satisfaction to university	It might affect the credibility among univ.	8	Result timing, feedback,,Inadequate staff	8	Some initiative taken to improve the sheduled session	7	448	Publish result in scheduled time Respond to student feedback	Universit y
	Working in core field	Students aren't placed in core field	9	Inadequacy in applied level knowledge	8	Some-IT co. preferring for mechanical engineering for their R&D division	6	432	Student should cope up with applied level knowledge.CGPU cell have have to invite product based company into campus regardless of their size	CGPU Faculties
Vision, Mission, PEO	Lack of innovative stimulus	May affect their future projects	4	There is no innovative laboratories innovative practices	4	Some student events are conducted bit is mainly focused in automobile.	6	120	Innovation laboratories is to be implemented Innovation practices should introduce as a core course in academic regulation	Universt y Students

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Programoutcomes and course outcomes	Effectiveness of students' feedback system.	Students losing credibility in feedback system	4	No assigned / staff/motivator to meet students' feedback	7	A feedback system box is installed in campus.	4	112	Appoint a counselor /motivator.	Faculties in concerned field. College management
	Effectiveness of PO'S & CO'S	Might effect the most demanded soft skill and hard skill.	5	Unawared about current industry trends	5	Updating curriculum periodically	5	125	The stated PO's will have a good correlation to courses taught.	Faculties, university / college management.
Program curriculum and teaching learning process	Lack of versatility in designing program curriculum	The gap will exist among industry trend and student knowledge	8	Curriculum designing committee is not aware about current trends. The designing team is not bothered about students' future	8	In the name of curriculum revising, some core concepts in mechanical engineering is removed instead of curriculum enrichment.	9	512	Add the subjects in curriculum – Python with machine learning, HVAC with practical sessions, Enrich product development , Reduce the conv. topics in IC engg. Conv.manuf. and add the core concepts in electric & hybrid vehicles & non-conv m/c process, Add a 50 hr session in various maintenance dept and include 20 hr session in practical diagnostic skill session, Add a 54 hour session regarding engg.energy	University or college management. Introduce MOOC chapters.
Faculty Information and contributions	Lack Faculty development training sessions	Conceptualized knowledge in current trends cannot be shared .	5	Authorities showing negligence in improving FDTP	7	FDTP is only for fulfilling some criteria	7	245	Use teaching tools such as s/w and app.,Lec from industry experts.	College mangmt Facultie s
STUDENT PERFORMANCE	Quality of student admitted to programme	*There occurs a gap btw advanced and slow learner	6	Students are directly entering in engg.. course	6	A low duration orientation class is provided	7	252	*slow learners and students done their schooling in regional language *bridge course should introduce	College, faculty
	*Low success rate w/o backlogs	Can't appear in all interview	6	Lack of learning source,Negligence attitude towards board exam	4	PTA meeting arranged	5	120	A Scale of 0-10 relative to peers in the class..Marks 50% below attend special class	Faculty
	Lack of green practices	It might effect the ethical values of students	3	No such awareness is present	4	Stoppage of straw is implemented	3	36	Public transportation ,paperless office,plastic free campus,install renewable energy sources	Student Faculty Mgmt
	Quality of sem,internal assignment questions	Not cope up with competitive environment	5	If the questions re set in competitive basis,slow learner cant adapt the system	6	University model qn. Is implemented	5	150	Include questions with conceptual knowledge	Faculty Universty Mgmt
	Improvement in entrepreneurship development	A bulliness minded approach cant be implemented in students	5	Students are having a mindset to settle down in low risky areas	5	An EDC is present in the campus	3	75	Provide the students with awareness, camp ,motivation,provide adequate fund for that	Govt Mgmt.

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