

# The Changing Face Of Engineering Education In Kerala -An Empirical Study At Engineering Colleges In Kerala

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## **Abstract**

The engineering education in Kerala is undergoing dramatic changes. Around fifteen years back only cream students went for engineering studies. At present students are joining the course not for passion to engineering stream but as a matter of prestige and pressure from external environment. The scenario is not different among the faculty community also in terms of quality erosion. The present study aimed to find out the impact of age group, educational qualification, experience, extend of participation of faculty members and impact of career development programs on the quality of teaching. The most popular career development tool utilized by faculty members in the field of engineering is attending Seminars. It may be due to the fact that it is an easy task. The research reveals that the majority of faculty members in the Engineering discipline belong to thirty five years and their basic qualification is B.Tech. Apart from that, attending workshops, faculty development program, participating in national and international conference helps a faculty to increase the quality of teaching. It is viewed that there is reluctance from the part faculty members in participating in career development programmes.

## **The history of education in India**

The history of education in the Indian subcontinent began with teaching of traditional elements such as Indian religions, Indian mathematics, Indian logic at early Hindu and Buddhist centres of learning such as Taxila (in modern-day Pakistan) and Nalanda (in India) before the common era. Islamic education became ingrained with the establishment of the Islamic empires in the Indian subcontinent in the Middle Ages while the coming of the Europeans later brought western education to colonial India. A series of measures continuing throughout the early half of the 20th century ultimately laid the foundation of education in

the Republic of India, education in Pakistan and much of South Asia. The Early education in Indian commenced under the supervision of a guru. Initially, education was open to all and seen as one of the methods to achieve Moksha, or enlightenment. As time progressed, due to superiority complexes, the education was imparted on the basis of caste and the related duties that one had to perform as a member of a specific caste. The Brahmans learned about scriptures and religion while the Kshatriya were educated in the various aspects of warfare. The Vaishya caste learned commerce and other specific vocational courses while education was largely denied to the Shudras, the lowest caste. The earliest venues of education in India were often secluded from the main population. Students were expected to follow strict monastic guidelines prescribed by the guru and stay away from cities in ashrams. However, as population increased under the Gupta empire centres of urban learning became increasingly common and Cities such as Varanasi and the Buddhist centre at Nalanda became increasingly visible.

The Education in India in its traditional form was closely related to religion. Among the Heterodox schools of belief were the Jain and Buddhist schools. Heterodox Buddhist education was more inclusive and aside of the monastic orders the Buddhist education centres were urban institutes of learning such as Taxila and Nalanda where grammar, medicine, philosophy, logic, metaphysics, arts and crafts etc. were also taught. Early secular Buddhist institutions of higher learning like Taxila and Nalanda continued to function well into the common era and were attended by students from China and Central Asia. On the subject of education for the nobility Joseph Prabhu writes: "Outside the religious framework, kings and princes were educated in the arts and sciences related to government: politics (danda-niti), economics (vartta), philosophy (anviksiki), and historical traditions (itihasa). Here the authoritative source was Kautilya's

Arthashastra, often compared to Niccolò Machiavelli's The Prince for its worldly outlook and political scheming. The Rgveda mentions female poets called brahmavadinis, specifically Lopamudra and Ghosha. By 800 BCE women such as Gargi and Maitreyi were mentioned as scholars in the religious Upanishads. Maya, mother of the historic Buddha, was an educated queen while other women in India contributed to writing of the Pali canon. Out of the composers of the Sangam literature 154 were women. However, the education and society of the era continued to be dominated by educated male population. It is possible that later historian twisted the truth that the so-called lower castes in the society were denied the right to education only in order to pitch for better concessions and create a feelgood factor to the leaders of society so they may corner the valuable mass support. If one did not learn how to kill a wild boar without being goaded or gather honey without being strung by it or sow maize and harvest or brew the fine somabanams or make tools and implements, the society would have perhaps gone without food or shelter. It is wrong to say that the teaching existed only in schools run by the upper cast teachers in their so-called Gurukuls. The society was teaching its subjects in the exact and required skills as appropriate to the time. It is widely acclaimed now that the class room education does not teach the actual required skill sets either for life as it is perceived now or add value to the humanity at large.

### **The Engineering education in India**

The East India Company in 1806 set up Haileybury College in England to train administrators. In India, there were four colleges of civil engineering; the first was Thomason College (Now IIT Roorkee), founded in 1847. Their role was to provide civil engineers for the Indian Public Works Department. Both in Britain and in India, the administration and management of science, technical and engineering education was undertaken by officers from the Royal Engineers and the Indian Army equivalent, (commonly referred to as sapper officers). This trend in civil/military relationships continued with the establishment of the Royal Indian Engineering College (also known as Cooper's Hill College) in 1870, specifically to train civil engineers in England for duties with the Indian Public Works Department. The Indian Public Works Department, although technically a civilian organisation, relied on military engineers until 1947 and after Growing awareness for the need of technical education in India gave rise to establishment of institutions such as the Indian Institute of Science, established by philanthropist Jamshetji Tata in 1909. By the 1930s India had 10 institutions offering engineering courses. However, with the advent of the Second World

War] in 1939 the "War Technicians Training Scheme" under Ernest Bevin was initiated, thereby laying the foundation of modern technical education in India. Later, planned development of scientific education under Ardeshir Dalal was initiated in 1944

The importance and antiquity of education in Kerala is underscored by the state's ranking as among the most literate in the country. The local dynastic precursors of modern-day Kerala as well as Catholic and Christian missionaries made significant contributions to the progress on education in Kerala. There were many sabha mathams that imparted Vedic knowledge. Apart from kalaris, which taught martial arts, there were village schools run by Ezhuthachans or Asans. Catholic missionaries brought modern school education system in Kerala. History erosion of quality of engineering education in Kerala (a case of alarm for academicians, students, government and public).

At one point of time Kerala having only government colleges or college or professional bodies which are directly under the control of Kerala government. But the opening of higher education sector in Kerala to self financing pattern eroded the quality as well as credibility.

The Kerala high court observed that in order to stop the erosion of quality in higher education, the All India Council for Technical Education (AICTE) should consider revoking affiliations granted to self-financing engineering colleges in the state that had a pass percentage below 40%. The High Court made this observation after reviewing exam results of self-financing engineering colleges in the state for the past three years, and on the basis of an expert committee's report that revealed lack of qualified faculty and infrastructure in an alarmingly large number of colleges.

### **The qualities of teacher in a modern age**

The qualities of teacher in a modern age can be summarized as a) Passion for teaching. b) Love of students. c) Love of their subject. d) A willingness to change. e) Work ethics f) A willingness to reflect. g) Organizational qualities. h) Constant effort to improve. i) Enough egos to survive the hard days. 11) Enough humility to remember it's not about you. j) A willingness to work collaboratively.

### **Objectives of the study**

To find out the age group, Educational qualification and experience of faculty members in teaching profession in the field of engineering.

To find out the extend of participation of faculty members in various career development programs organized by various institutions from time to time.

To find out the relationship between age group and faculty development program

To find out the impact of career development programs in the quality of teaching

To find out the most popular career development tool utilized by faculty members

### Hypothesis:

- H1: There is significance difference between age group with respect to overall opinion about faculty development program
- H2: There is significant difference between genders with respect to overall opinion about faculty development program
- H3: There is significant difference between educational qualification of faculty members and quality of teaching
- H4: There is a significant difference between experience of faculty members with respect to quality of teaching
- H5: There is a significant impact on career development programs over quality of teaching
- H6: There is significant impact of faculty development program on quality of teaching

### Scope of the Study:

The study will help the teaching community in Kerala to exactly identify the area in which they have to improve further. It is an eye opener for the faculties to show their skills nationally and I internationally rather than restricting their career within the place of work and family. More over various previous studies points out that after entering the job epically the teaching community is not fully utilizing their potential for future development and up gradation.

### Research Methodology:

The study is descriptive and analytical in nature. The various elements of research design are

- a) Database Design-the primary data will be collected from faculty members of various engineering colleges in Kerala. The secondary data will be collected from various government records, web portal of department of technical education and other official records, journals, text books etc
- b) Measurement Design- the data was collected by using schedule. The Nominal, ordinal,

interval and ratio scales were used depending upon the data collected

- c) Sampling Design-the simple random sampling is used for the study. The total sample size is 100 and the samples were collected from faculty members of various engineering colleges in Kerala starting from Thiruvananthapuram to Kasaergod.The research was undertaken in the month of July 2012 and
- d) Statistical design: Appropriate mathematical and statistical tool were used for analysis.

### Analysis Procedure

The data was analysed using statistical package for social science (SPSS V 12.0).Descriptive statistics such as mean and standard deviation were generated to provide an overview of the data .Frequency distribution was used to describe the general characteristics such as age, experience educational qualification of faculty members, various parameters pertaining to the quality of teaching, and career development programmes attended by faculty members. The multiple regression analysis was used to examine the relationship between dependent variable(continuous improvement and updation ) with respect to independent variables (attending FDP,workshops,colloquium,national conference, international conference, paper presentation, publishing books, acquiring certification programmes).T test was used to find out the association between gender, age group with respect to overall opinion about FDP. Anova is used to establish the relationship between experiences of faculty with respect to the overall opinion about faculty development programmes and also to establish relationship between educational qualification with respect to quality of teaching.Chisquare Test was used to find out the relationship between age group, educational qualification of foreigners and frequency of visit to foreign countries. Friedman Test was used to find out significant the mean rank of quality development programmes and also to obtain the mean rank of attending, FDP.workshop, national and international conference on the impact of teaching.

### Limitations of the study:

The major constraints of the study were the availability of the time, some of the teachers did not co-operate with the survey, sample size for the study is low, there are chances that the respondent's bias may also reduce the effectiveness of the data collected, the result of the study cannot be generalized, because the data analysis and interpretations are based on the response of the respondents, which reflect their state of mind at the time of response

## Results and Discussion;

### DESCRIPTIVE ANALYSIS ON SAMPLE

Percentage analysis is one of the statistical measures used to describe the characteristics of the sample or population in totality. Percentage analysis involves computing measures of variables selected of the study and its finding will give easy interpretation for the reader.

**Table 1 Frequency Distribution of Age group of faculties in years**

Age Group	Frequency	Percent
18-30	79	71.8
Above 30	31	28.2
Total	110	100.0

From the above table, 71.8 % of the faculties in the Engineering sector belongs to the age group 18-30 whereas 28.2 belongs to the age group of above 30 .It may be due to the fact that a number of new engineering colleges were started in Kerala recently and due to this reason the talented and experienced pool may not be easily available.

**Table 2 Frequency Distribution of education of faculties**

Education	Frequency	Percent
B.Tech	53	48.2
M.Tech	40	36.4
Others	17	15.5
Total	110	100.0

From the above table, 48.2 % of the faculties in the Engineering sector is having B.Tech as the essential qualification 36.4% has M.Tech 15.5 % of faculties are either doing M.Tech or PHD or have acquired PHD

**Table 3 Frequency Distribution of experience of faculties**

Experience in Years	Frequency	Percent
1-2	53	48.2
3-5	29	26.4
Above 5	28	25.5
Total	110	100.0

From the above table, 48.2 % of the faculties in the Engineering sector is having 1- 2 years experience whereas 26.4%as the essential qualification 36.4% has M.Tech 15.5 % of faculties are either doing M.Tech or PHD or have acquired PHD

**Table 4 : Frequency Distribution of various programs attended /published/gone through after joining teaching profession**

Programs attended/published/gone through after joining teaching profession	Yes		No		Total count
	Count	Percentage	Count	percentage	
Attend ed FDP after joining teaching Profession	15	13.64	95	86.36	110
Attend ed Worksh op after joining Teaching professi on	25	22.73	85	77.27	110

Attend ed colloqui um after joining teachin g professi on	5	4.55	105	95.45	110
Attend ed Nationa l Confer ences	32	29.09	78	70.91	110
Attend ed Interna tional Confer ences	2	1.82	108	98.18	110
Gone for paper present ation	26	23.64	84	76.36	110
Done any consult ancy service s	2	1.82	108	98.18	110
Publish ed books	2	1.82	108	98.18	110
Acquire d certific ation progra ms	29	26.36	81	73.64	110

From the above table, 13.64 % of the faculties in the Engineering sector have attended Faculty development program after joining the teaching profession , 22.73% of the faculties attended workshops , 4.55% attended colloquium, 29.09% attended national conferences ,1.82% attended international conferences, 23.64% gone for paper presentations ,2% have done consultancy work,2% have published books,29% acquired certification programs

**Table 5: Frequency Distribution of various parameters pertaining to the quality of teaching**

Statem ent	Not agree		Agree		Strongly agree	
	Cou nt	Perc ent	Cou nt	Perc ent	Cou nt	Perc ent
Do you feel that faculty develop ment program improve s the quality of teaching	36	32.73	59	53.64	15	13.64
Do you feel that attendin g worksho ps can update the latest trends in Enginee ring	32	29.09	53	48.18	25	22.73
Do you feel that attendin g Nationa l and internati onal confere nce can help to develop to switch over from a general area to a specializ ed area	42	38.18	66	60	2	1.82

From the above table, 67 % of the faculties agree that Faculty Development Program improves the quality of teaching , 70% of the faculties believe that attending workshops can update the latest trends in Engineering and 62% believe that attending National and



international conference can help to develop to switch over from a general area to a specialized areas

**Table 7 Mean and Standard deviation of the parameters pertaining to quality of teaching**

Statements	Mean	SD
Faculty development program improves quality of teaching	3.81	0.66
Attending workshops can update the latest trends in Engineering	3.94	0.72
Attending National and international conference can help to develop to switch over from a general area to a specialized area	3.64	0.52

From the above table, the mean of Faculty development program improves quality of teaching is 3.81 on a 5 point scale with standard deviation 0.66, the mean of Attending workshops can update the latest trends in Engineering is 3.94 on a 5 point scale with a standard deviation of 0.72, the mean of Attending National and international conference can help to develop to switch over from a general area to a specialized area is 3.64 on a 5point scale with a standard deviation 0.52

### INFERENCE ANALYSIS ON SAMPLE

Differences between two groups in the mean scores of variables are studied using Student t test are discussed in this section. Also Chi-square test, Correlation Analysis and Regression Analysis are used to verify the hypothesis stated in the first chapter

#### HYPOTHESIS 1

Null Hypothesis: There is no significance difference between age group with respect to overall opinion about faculty development program

**Table 1: t test for significant difference between age group with respect to overall opinion about faculty development program**

Age group in Years	Mean	SD	t value	P value
18-30	11.00	0.71	7.119	.000**
Above 30	12.35	1.25	5.668	.000**

Note \*\* Denotes significant at 1 % level

Since P value is less than 0.01, the null hypothesis is rejected at 1 percent level of significance. Hence concluded that there is significant difference between age group with respect to overall opinion of Faculty Development Program. Mean level of opinion about faculty development program of faculties of age group above 30 are better than those in the age group of 18-30.

#### HYPOTHESIS 2

Null Hypothesis: There is no significance difference between gender with respect to overall opinion about faculty development program

**Table 2: t test for significant difference between gender with respect to overall opinion about faculty development program**

Gender	Mean	Std. Deviation	T value	P value
Male	11.92	1.192	5.32	0.000**
Female	10.93	0.73	5.10	0.000**

Note \*\* Denotes significant at 1% level

Since P value is less than 0.01, the null hypothesis is rejected at 1 percent level of significance. Hence concluded that there is significant difference between gender with respect to overall opinion of Faculty Development Program. Mean level of opinion about faculty development program of male faculties are better than female faculties which implies that male faculty will give good feedback about faculty development programs. It may be due to the fact that male faculty members are good in receiving and delivering practical sessions.

Above 5	12.3571 c	1.22366		
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### HYPOTHESIS 3

Null Hypothesis: There is no significant difference between educational qualification of faculty members and quality of teaching

**Table 3 ANOVA for significant difference between Educational Qualification with respect to quality of teaching**

Degree of faculty	Mean	Std. Deviation	F value	P Value
B.Tech	10.9623 a	.78354	11.088	0.000**
M.Tech	11.6000 b	1.05733		
Others	12.1765 c	1.38000		

Note \*\* Denotes significance at 1% level

Note: Different alphabet between degree of faculty denotes significant at 1% level using Duncan Multiple Range test

Since P value is less than 0.01, the null hypothesis is rejected at 1 percent level of significance. Hence concluded that there is significant difference between educational qualifications with respect to quality of teaching. Based on Duncan Multiple Range test, the quality of teaching of B.Tech, M.Tech and others differ. It is based on the perception that when more qualified the output quality also will be very high.

### HYPOTHESIS 4

Null Hypothesis: There is no significant difference between experiences of faculty members with respect to quality of teaching.

**Table 4 ANOVA for significant difference between experience of faculty members with respect to overall opinion about Faculty Development Program**

Experience	Mean	Std. Deviation	F value	P Value
1-2	11.2830 b	.63177	27.990	0.000**
3-5	10.6207 a	.90292		

Note: Different alphabet between experiences of faculty denotes significant at 28% level using Duncan Multiple Range test

Since P value is less than 0.01, the null hypothesis is rejected at 1 percent level of significance. Hence concluded that there is significant difference between experiences of faculty with respect to quality of teaching. Based on Duncan Multiple Range test, faculty with above 5 years of experience are significantly higher with respect to quality of teaching

### HYPOTHESIS 5

Null Hypothesis: There is no significant difference between career development programs and its impact on quality of teaching.

**Table 5 Friedman test for significant difference between career development programs towards impact on teaching**

Impact on teaching	Mean Rank	Chi square value	P Value
Do you feel that faculty development program improves quality of teaching	2.00	6.227	0.044*
Do you feel that attending workshops can update the latest trends in Engineering	2.14		
Do you feel that attending national and international conference can help to develop to switch over from a general area to a specialized area	1.86		

Note \* denotes significant at 5% level

Since P value is between 0.044 null hypothesis is rejected at 5 percent level of significance. Hence it is concluded that there is significant difference in mean ranks towards impact on teaching. Based on the relative importance, attending workshops, faculty development program, participating in national and international conference helps a faculty to increase the quality of teaching.

#### HYPOTHESIS 6

Null Hypothesis: There is no significant difference between mean ranks towards quality of teaching and various components of Faculty Development Program, Table 6 Friedman test for significant difference between mean ranks towards quality of teaching and various components of Faculty Development Program,

Quality Development Programs	Mean Rank	Chi square value	P Value
Have you attended any faculty development program after joining the teaching profession	4.99	152.36	0.000**
Have you attended any workshops	5.40		
Have you attended any colloquium	4.58		
Have you attended any national conferences	5.68		
Have you attended any International conferences	4.45		
Have you ever gone for any	5.44		

paper presentations			
Are you doing any consultancy services	4.45		
Have you published any books	4.45		
Have you obtained any certification program	5.56		

Since P value is less than 0.01, the null hypothesis is rejected at 1 percent level of significance. Hence it is concluded that there is significant difference between mean ranks towards quality of teaching and attending faculty developmental programmes. Based on the relative importance it can be summed up that attending national conferences, certification program, workshops, faculty development program, colloquium, publication of books, consultancy services and International conferences can help to improve the teaching level.

#### Regression analysis of continuous improvement and up-dation of faculty members on attending career development programs.

Regression is the determination of statistical relationship between two or more variables. In simple regression two variables are used. One variable (independent) is the cause of the behaviour of another one (dependent). When there are more than two independent variables the analysis concerning relationship is known as multiple correlations and the equation describing such relationship is called as the multiple regression equation.

Regression analysis is concerned with the derivation of an appropriate mathematical expression is derived for finding values of a dependent variable on the basis of independent variable. It is thus designed to examine the relationship of a variable Y to a set of other variables  $X_1, X_2, X_3, \dots, X_n$ . the most commonly used linear equation in  $Y = b_1 X_1 + b_2 X_2 + \dots + b_n X_n + b_0$

Here Y is the dependent variable, which is to be found.  $X_1, X_2, \dots$  and  $X_n$  are the known variables with which predictions are to be made and  $b_1, b_2, \dots, b_n$  are coefficient of the variables.

In this study, the dependent variable is Adjustment score, Independent variables are Depression and Anxiety and analysis are discussed as follows:



Dependent variable : Continuous Improvement and Updating(Y)

Independent variables :

1. Attending Faculty Development Programs( $X_1$ )
2. Attending Workshops ( $X_2$ )
3. Attending Colloquium ( $X_3$ )
4. Attending National Conferences( $X_4$ )
5. Attending Paper Presentation( $X_5$ )
6. Publishing of Books( $X_6$ )
7. Attending certification Program( $X_7$ )

Multiple R value : 0.845

R Square value : 0.715

F value : 36.527

P value : .000\*\*

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## Conclusion

The all stakeholders of engineering education must introspect and try to prevent the quality erosion in all respects. For having a brighter tomorrow for engineering discipline, we shall count on quality and not the numbers.

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