

SOME ISSUES TO IMPROVE QUALITY OF TECHNICAL EDUCATION BASED ON PERCEPTIONS OF FACULTY

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Abstract

Technical education plays a significant role for the economic progress and development of any country. For rapid and sustained development of the nation, the strong and well qualified technical manpower is a pre-requisite. It is realized that the number of Government technical institutions are insufficient to meet the requirements of technical manpower. Due to paucity of funds, Government pursued the policy of privatization, which resulted into mushrooming of large number of self-financed institutions. Now, the technical education has expanded quantitatively but quality of education imparted has fell down. To identify the possible areas for improvement of quality, the empirical study seeking the perceptions of faculty has been conducted. The methodology followed has been explained and the issues which need improvement for enhancing the quality of education have been identified and discussed.

Keywords : *Quality, Technical education, Faculty, Facilities.*

1. Introduction:

Technical education plays a crucial role for the economic progress and development of any country. Hence, there is more emphasis for achieving and sustaining the quality in technical education. Though the question of what academic "Quality" means has often been raised, but has never been satisfactorily or comprehensively answered. The commonly employed criteria for measuring the quality are as follows¹.

- Depth and nature of course work: rigid or flexible course requirements; theoretical or practical
- Number of Ph. D. holders on faculty
- Student/faculty Ratio: Since this ratio often combines UG and PG students, a better criterion is the average class size
- Acceptance rate or 'Selectivity' represents the scores of entering freshmen on standardized tests. A school's growing reputation in a particular field can contribute to greater selectivity.
- Average Grade Point Average / SAT scores of Freshman Class
- Number of enrolled students who graduate
- Students' later achievement
- Library facilities
- Laboratory / computer facilities

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- Reputation
- Productivity (number of Ph. D. produced, papers published etc.)
- Curricula

The above criteria help to evaluate the quality of an educational institution in an objective manner. There are some issues like culture on an institution, student-faculty interaction, leadership qualities of student and faculty, involvement of faculty in decision making, collaborative environment etc. that cannot be qualified but are equally important to assess the quality of an academic institution. Though it is difficult to assess the quality of an academic institution in a comprehensive manner (taking all quantitative and qualitative factors into consideration), academicians tried to incorporate measurable issues to assess the relative quality level of institutions. Due to proliferation of self-financed engineering colleges imparting technical education, it has become necessary to assess the quality of education in these institutions for the benefit of stakeholders in the technical education system².

2. Factors Affecting Quality:

The factors on which quality in technical education depends can broadly be classified into three categories.

- Faculty
- Course work
- Facilities

Under each factor, several items have been identified. Under the Faculty, the following items are included.

- Teaching experience of faculty
- Motivating student to write national competitive examinations.
- Motivating students to write inter-national competitive examinations.

- Encouraging students to participate in Symposia / Workshop / Conferences.
- Impartial evaluation of answer scripts

Under the course work the following items are included:

- Supplementing theory with practice
- Quantity of the prescribed syllabi
- Quality of the prescribed syllabi
- Suitability of the prescribed syllabi for competitive examinations
- Institutional assistance for summer training
- Placement opportunities provided by the institute
- Opportunities to develop communication skills, personality development etc.
- Suitability of prescribed syllabi for placement

Under the Facilities, the following items are included:

- Adequacy of textbooks in the library
- Subscription of national/international journals by the library
- Provision of services like Photostat, organization of books and periodicals
- Convenience of timings of the library
- Adequacy of laboratory equipment
- Computing facilities provides by the institute
- Adequacy of transport facilities
- Adequacy of medical facilities
- Adequacy of hostel facilities
- Availability of canteen facilities

- Facilities for extra curricular activities
- Quick response of management to solve students' problems
- Involvement of students in decision-making
- Provision of opportunities for meeting alumni

Based on these items, an instrument has been developed to administer on the faculty of various engineering colleges.

3. Methodology:

As mentioned in previous section, the quality of education imparted to the students depends on quality of faculty, course work and facilities offered by the institute. To seek opinion of faculty, an instrument has been developed. The opinions are obtained from 21 engineering colleges offering B. Tech. In four branches of engineering viz., Civil, Mechanical, Electrical & Electronics and Electronics & Communications Engineering. In the sample of colleges, a mix of both old and newly established colleges is included.

3.1 Subjects :

The subjects for the present study were 321 faculty members from 21 engineering colleges in Andhra Pradesh. 20 faculty members from the four branches were selected as sample from each college. In case of colleges having only two branches, 10 faculty members were taken from each branch.

3.2 Instruments used:

To access the perceptions of faculty, a questionnaire is developed about three aspects, quality of faculty, course work and facilities available in engineering colleges. There are five statements that assess the quality of faculty, ten statements to assess the quality of course work and fourteen statements to assess the facilities provided in the institutes. The response

is marked on a 7-point scale varying from 1 to 7 in the ascending order, very poor to extremely good conditions.

3.3 Procedure for Data Collection:

Each of the 21 colleges is visited, questionnaire is supplied to 20 faculty members of each college and responses are sought from them. The scores regarding each of the three factors obtained from the response of each faculty member are totaled and tabulated. Institution wise tabulations are given in Table 1 and question wise in Table 2.

3.4 Statistical Methods Employed:

In order to find out whether there is any significant difference among the three factors of quality, t-test is conducted. To find whether there is a correlation between the various items like experience of faculty Vs communication skills of students, Experience of faculty Vs motivation of students towards competitive exams etc. in all institutions, the data was subjected to **Pearson** coefficient of correlation. The procedure for determining the correlation between the two variables is illustrated below.

3.4.1 Correlation:

Correlation is an important measure to examine the relationship of one variable to another than to measure performance of either alone. The procedure for one sample is as illustrated below.

Step-1: To find the correlation between the experience of faculty (Question one) versus faculty motivating the students to write the national competitive exams (Question two).

Step-2: Let x is the score of first statement (experience of faculty) and y is the score of second statement (Motivation) and calculate.

$$\sum X^2 = 165985, \sum Y^2 = 136525$$

$$\sum XY = 149399, X = 87.64 \quad Y = 77.04$$

$$N = 21$$

Institute Code	Faculty	Course Work	Facilities	Total
AP101	515	876	1264	2655
AP102	362	710	1099	2081
AP103	549	1137	1526	3206
AP104	532	1067	1472	3071
AP105	369	721	915	2005
AP106	548	1017	1564	3129
AP201	535	988	1474	2997
AP202	589	1139	1575	3305
AP301	249	460	697	1406
AP302	365	590	818	1773
AP303	507	955	1266	2728
AP304	429	729	1136	2294
AP401	347	650	971	1968
AP402	449	842	1234	2525
AP403	120	222	277	619
AP404	424	638	838	1900
AP405	412	785	1080	2277
AP406	308	5985	894	1787
AP407	283	515	768	1566
AP408	270	572	808	1650
AP409	352	624	878	1854
Total	8514	15816	22554	
Mean	405.4	753.1	1074	
Mean per question	81.08	75.31	76.71	
Std. Deviation	24.186	23.835	24.158	

Table 1: Institute-wise perceptions of faculty members for Faculty, Coursework and Facilities

Q.No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
AP101	122	98	81	96	118	114	103	105	111	82	90	52	54	73
AP102	85	82	62	66	67	69	93	94	96	64	59	37	65	53
AP103	117	110	100	110	112	113	119	125	121	102	106	104	111	107
AP104	100	106	102	112	112	114	104	101	106	106	104	106	110	101
AP105	84	65	64	88	68	81	69	63	61	65	56	84	86	92
AP106	129	95	93	106	125	103	109	111	101	88	98	104	92	112
AP201	120	106	96	114	99	102	99	109	103	104	89	92	97	99
AP202	122	114	115	119	119	110	120	113	116	115	111	117	110	115
AP301	52	53	43	51	50	53	56	53	50	30	37	32	51	53
AP302	78	69	67	65	86	76	70	75	69	48	56	37	41	57
AP303	102	90	106	103	106	106	88	99	97	84	99	101	85	103
AP304	87	80	73	90	99	85	77	76	77	60	73	54	78	70
AP401	62	75	65	69	76	68	65	75	70	68	65	41	61	70
AP402	98	80	82	95	94	88	95	94	93	57	79	61	82	93
AP403	26	19	21	26	28	29	30	30	23	13	17	13	20	25
AP404	50	62	66	69	77	65	74	68	67	60	57	60	58	65
AP405	81	86	85	90	70	78	85	79	76	78	84	73	76	73
AP406	70	56	57	52	73	74	73	69	64	48	51	34	52	54
AP407	64	57	46	54	62	60	51	61	54	37	51	37	51	57
AP408	58	53	47	48	64	61	64	57	65	55	57	48	50	57
AP409	70	67	68	71	76	64	68	64	62	59	60	60	59	70
Total	1777	1623	1539	1694	1781	1713	1712	1721	1682	1423	1499	1347	1489	1599

Table 2: Question-wise perceptions of faculty members

Q.No.	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
AP101	92	102	87	80	92	116	94	43	69	121	57	109	104	93	97
AP102	80	78	73	75	78	84	60	69	82	86	69	80	59	57	59
AP103	123	111	115	90	109	110	113	110	113	110	106	110	111	110	109
AP104	107	106	103	107	100	114	109	105	111	101	99	103	104	107	104
AP105	64	80	86	90	63	84	99	75	44	17	30	59	66	66	56
AP106	99	130	111	103	121	104	126	131	94	109	104	129	102	99	101
AP201	93	105	101	105	109	110	94	101	102	116	105	104	108	110	104
AP202	112	109	109	112	113	114	115	119	122	114	114	107	115	105	109
AP301	45	55	49	49	60	58	50	52	37	52	48	47	51	49	40
AP302	61	73	44	33	59	77	79	84	35	60	68	60	47	64	37
AP303	93	101	82	88	99	112	102	57	76	96	80	102	83	89	98
AP304	98	89	87	80	93	94	82	98	57	87	78	71	84	82	72
AP401	67	79	70	63	81	71	68	68	68	64	65	68	70	68	68
AP402	90	86	85	81	90	101	71	91	74	97	83	87	102	102	84
AP403	22	20	16	14	24	23	23	21	15	28	17	19	21	18	18
AP404	64	65	52	52	74	67	42	47	55	64	58	64	61	69	68
AP405	83	78	84	82	90	76	68	74	71	72	79	74	76	80	70
AP406	66	67	63	70	65	75	63	71	44	67	62	58	69	70	50
AP407	56	65	56	51	56	65	46	65	47	61	56	43	55	58	45
AP408	58	64	62	60	66	66	48	48	49	57	47	50	59	60	52
AP409	58	61	62	56	61	68	47	80	48	73	63	48	75	75	61
Total	1631	1724	1597	1541	1703	1789	1599	1609	1413	1652	1488	1592	1622	1631	1502

Table 2: Question-wise perceptions of faculty members (contd.)

Step-3: Calculate the Pearson coefficient of correlation using the formula

$$r = \frac{\sum xy - N \bar{x} \bar{y}}{\sqrt{(\sum x^2 - N \bar{x}^2) (\sum y^2 - N \bar{y}^2)}}$$

Step-4: Coefficient of correlation is an index ranging over a scale, which extends from - 1.00 through 0.00 to 1.00. A positive correlation indicates both the variables vary in the same direction, a negative correlation indicates that the variables vary in opposite direction and a zero correlation indicates that there is no consistent relationship between them. In this case, the coefficient of correlation obtained is +0.9165.

Step-5: To judge whether this correlation coefficient (r) is statistically significant, probable error of correlation coefficient (P.E.(R)) is calculated.

$$P. E. (r) = 0.6745 \frac{(1 - r^2)}{\sqrt{n}}$$

where n is sample size

If $r < 6 P.E. (r)$ correlation is NOT significant

$R > 6 P.E. (r)$ correlation is significant³

For the above example, $P.E. (r) = 0.02355$ and $r > 6 P.E.(r)$. Hence correlation is significant. It is concluded that experienced faculty motivate the students to write national competitive examinations.

4. Hypotheses:

It is worthwhile studying, whether there exists statistically significant difference among faculty, coursework and facilities offered by the institutes. To do that, the following null hypotheses are formulated.

H_{O1} : There is no significant difference exists between quality of faculty and course work offered by the institutes.

H_{O2} : There is no significant difference exists between quality of faculty and facilities offered by the institutes.

H_{O3} : There is no significant difference exists between course work and facilities offered by the institutes.

5. Results and Discussions:

The t-test results are shown in Table 3.

Hypotheses	H ₁	H ₂	H ₃
t _{cal}	0.7786	0.1890	0.5858
t _{table}	2.71	2.71	2.71
Df	40	40	40
Result	@	@	@

@ Not significant at 0.01 level

Table 3: t-test results of faculty members' perceptions on Technical Education

- 5.1 From Table-3, it is concluded that there is no significant difference among faculty, coursework and facilities of offered by the institute. In other words, faculty perceive that in their institutes all the three factors are treated with equal importance.
- 5.2 The first six highest scores given by the faculty members in descending order are questions 20 (which deals with sufficiency of equipment in laboratories), 5 (which deals with impartiality of evaluation of answer scripts), 1 (which deals with experience of faculty for teaching), 16 (which deals with availability of books in library), 8 (which deals with quality of syllabus) and 6 (which deals with adequacy of practical classes for theory taught).

It shows that faculty members perceive that equipment in laboratories are sufficient, answer scripts are evaluated impartially and experience of faculty is

sufficient for teaching.

- 5.3 The six lowest scores given by the faculty in ascending order are questions 12 (which deals with placement opportunities provided by the institute), 23 (which deals with medical facilities provided by the institute), 10 (which deals with the training students to become entrepreneurs), 25 (which deals with availability of canteen facilities), 13 (which deals with provision of guest lectures) and 11 (which deals with provision for summer training).

From the above scores it is clear that placement is not given adequate importance in all the institutes. Placement can be improved by establishing institute-industry-interaction cells and by taking-up consultancy assignments by faculty members. Faculty members are not satisfied with medical facilities available in the institute, they opine that present curriculum does not encourage students to become entrepreneurs, summer training is not provided in many institutes. Summer training should be made part of the curriculum and it should be made compulsory so that students are exposed to real industrial problems.

- 5.4 It has been found that there is strong correlation (0.88) between summer training and placement opportunities provided by the institute. Both were given low scores by the faculty members. By making summer training compulsory, placement opportunities can also be improved.
- 5.5 The correlation coefficient for experience of faculty and motivation to write national competitive exams is obtained as 0.87, which is statistically significant. It indicates that in an institute having experienced faculty, students are motivated to write national competitive

examinations.

- 5.5 The correlation coefficient between experience of faculty and impartiality in evaluating answer scripts is found to be 0.91 and it is statistically significant. It shows that faculty members believe that the more the experience, the more impartial will be the evaluation of answer scripts.
- 5.6 The correlation coefficient between curriculum training to become an entrepreneur and prescribed syllabi is found to be 0.92, which is statistically significant. Hence prescribed syllabi should be properly framed to bolster confidence among student community to become entrepreneurs.

Conclusions:

For the past three years, the number of self-financed engineering colleges has increased at an alarming rate there by causing acute shortage of faculty. Most of these colleges are established with motto of business, thereby causing doubts about the quality of education they impart to their wards. Liberalisation and GATS have opened vistas for foreign colleges and universities to establish their institutes in Indian soil. That leads to fierce competition and only those, which can attract more students, will survive. It has been found from this study that the most important factor, which does not exist to the satisfactory level in most of the institutes, is placement. Unless it is improved by most of the institutes, the survival of them will be at stake.

Reference:

1. R. Natrajan, Some Issues in the Ranking of Academic Quality, *The Indian Journal*

(Reference Cont. on page No. 52)