Assess the GAP between the performance of Indian college and foreign colleges using Coefficient of Variation method

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ABSTRACT *An assessment has been done on the basis of questionnaire survey in the twenty-degree engineering colleges from India and foreign countries Ten colleges colleges each are taken from the two countries to measure the current or baseline performance level. A total of 4000 persons have been surveyed from the 20 colleges. The baseline or current performance level of the colleges has been assessed based on the coefficient of variation (CV%) through quantification of the survey questionnaire consisting of eight enablers. Each enabler contains several questions or drivers. A seven-point scale has been designed for each driver ranging from "Unsatisfactory" to "Outstanding".*

INTRODUCTION

In the recent past, many private engineering colleges have come up along with a few more Government colleges in West Bengal. Furthermore, a trends are there in West Bengal to go USA ,UK or other countries to study engineering.

While the Government colleges in West Bengal charge between Rs. 4800 to 48000 per annum per student depending upon the engineering stream, the private colleges charge between Rs. 70,000 to 1, 40,000 per annum per student but the foreign colleges have charge beyond the range of the average people.

The comparative figures in this regard are provided in Table.1

Table 1: Charges of Engineering Colleges.

Year	Charges of Government Engineering Colleges	Charges of Private Engineering Colleges
West Bengal, India	Rs.4800-48000/-	Rs.70, 000-1,40,000/-
Foreign countries	Rs.20, 00000/- to Rs.18, 00000/- ($40,000-$36,000)	

Moreover, there exists a feeling in the society at large that most of these private institutions are not up to the mark in terms of delivering the quality education that makes the students market-worthy. In this backdrop, it has been decided to undertake this study to assess the 'as is' situation of the engineering colleges in West Bengal as well as foreign engineering colleges measured through coefficient of variation (CV %) based on the feedback obtained from survey questionnaire. Side by side, identification of vital few weak areas has been made through application of Pareto Analysis of defects per million opportunities (DPMO) and the internal benchmark level is considered as the coefficient of variation (CV %) of the top most college in the new ranking. It goes without saying that it is possible to achieve the target coefficient of variation (CV %) level once appropriate remedial measures are taken corresponding to the identified weak areas even under the existing set up. Certainly, breakthrough kind of improvement is possible to achieve provided much better resources and infrastructure are brought in.

SURVEY METHOD

A questionnaire has been designed to survey the perceptions of different stakeholders (faculties, students, administrators and other supporting staff) taking cue from the paper (Parasuraman, A. 1988) that discussed five dimensions for assessing service quality [SERVQUAL] consisting of tangibles, reliability, responsiveness, assurance, and empathy.

It can be seen in Table 2 as to how many drivers or questions drive the enablers. For each driver, driving an enabler, a seven-point scale has been developed ranging from 'outstanding' to 'unsatisfactory' in line with the Likert Scale (Helman, M., 2006;Wilson, J.R et al., 2002).

Table 2: Seven-point Questionnaire Format.

Enabler	Driver	Seven point scale Performance Indicator (AA to D)						
		AA90-100	A+80-89	A60-79	B+45-59	B35-44	C25-34	D0-24
Placement	2 drivers/ questions	Outstanding	Excellent	Very Good	Good	Satisfactory	Marginal	Unsatisfactory
Infrastructure	8 drivers/ questions							
Students	16 drivers/ questions							
Faculties	8 drivers/ questions							
Supporting staff	3 drivers/ questions							
Curricula/ courses	5 drivers/ questions							
Administration	25 drivers/ questions							
Innovation / Research activities	8 drivers/ questions							

OPERATIONAL DEFINITION

Enablers: - These are the entities that determine how the things are done in an engineering college to have direct bearing on the key performance results.

Drivers: - These are the specific questions framed in a questionnaire corresponding to different 'enablers'. The replies for these drivers are taken in a 7-point scale ranging from 'outstanding' (AA) to 'unsatisfactory' (D).

$$DPMO = \frac{1,000,000 \times number\ of\ defects}{number\ of\ units \times number\ of\ opportunities\ per\ unit}$$

DPMO: - Defects per million opportunities or DPMO is a measure of process performance. It is defined as

Defects: - It is the number of 'D's ('Unsatisfactory' tick mark) for an enabler that is responded by different people – faculties, administrators, other supporting staff and students.

Unit: - It is the number respondents who have responded in this study for any enabler through survey questionnaire. It can also correspond to the number of filled in questionnaire.

Opportunity: - It is the product of number of respondents and number drivers for an enabler.

MEASURING COEFFICIENT OF VARIATION

The Coefficient of Variation (CV %), a lower the better measure, is defined as $CV\% = \left(\frac{\sigma}{\mu}\right) \times 100$ where, σ is the population standard deviation and μ is the population mean of the distribution. When the standard deviation (s) and the average ($\overline{X}$) are estimated from the sample observations, the coefficient of variation is estimated as,

$$CV\% = \left(\frac{s}{\overline{X}}\right) \times 100$$

ANALYSIS AND RESULTS

It has been found that the coefficient of variation of different colleges ranges from 35.29 to 100.

Based on the coefficient of variation attained by different colleges, a ranking of the colleges has been made and is furnished in Table 3

Table 3: Discipline-wise Ranking of Different Colleges.

New ranking	Institution	CV% level	Weak Areas
1	Massachusetts Institute of Technology (MIT) United States	0	Not applicable
2	University of California, Berkeley United States	6.1	Financial Administration,
3	Stanford University United States	14.7	Financial Administration,
4	California Institute of Technology (Caltech) United States	18.4	Financial Administration,
5	University of Cambridge United Kingdom	23.8	Financial Administration
6	Kharagpur IIT,West Bengal,India	24.47	Student
7	Faculty of Engineering & Technology, Jadavpur University, West Bengal, India.	25.28	Students, Curricula, Administration (Academic)
8	National Institute of Technology, Durgapur,West Bengal,India.	26.17	Administration (academic)
9	Institute of Engineering & Management, Salt Late, Kolkata, West Bengal,India	27.78	Placement, Infrastructure
10	Burdwan Institute of Technology, Burdwan University,West Bengal,India.	27.89	Placement, Administration (financial), Innovation
11	Carnegie Mellon University United States	28.4	Financial inistration, Placement.
12	Imperial College London United Kingdom	29.1	Financial inistration, Placement.
13	Georgia Institute of Technology United States	31.1	Financial Administration, Placement
14	Govt. College of Engineering & Ceramic Technology, Kolkata, West Bengal, India	32.16	Placement, Students, Administration (academic), Innovation
15	University of Tokyo Japan	32.6	Infrastructure, Curricula, Academic Administration.
16	Institute of Jute Technology., Kolkata, West Bengal,India	33.23	Placement, Innovation
17	Jalpaiguri Govt. Engineering. College, Jalpaiguri, West Bengal,India.	33.35	Infrastructure, Students, Faculties, Curricula, Academic Administration, Innovation.
18	Haldia Institute of Technology, Haldia,West Bengal,India	33.72	Placement, Students, Curricula, Innovation.
19	University of Toronto Canada	34	Placement, Infrastructure, Students, Curricula, Academic administration, Financial administration
20	Bengal Engineering & Science University, Shibpur. How rah, West Bengal, India	35.29	Placement, Infrastructure, Students, Curricula, Academic administration, Financial administration

In order to identify the root causes for the weak areas or enablers irrespective of any department or discipline in a college, Pareto analysis (Juran et al., 1988) has been carried out for the corresponding drivers. Based on the Pareto analysis, the "vital few" drivers as well as enablers, which are common for all the disciplines in a college have been found and the corresponding enablers are noted down (see Table 3).

Conclusion

The overall ratings in terms of coefficient of variation of engineering colleges in West Bengal and foreign countries range from 35.29 to 100. It can be seen from Table 3 that the Government Engineering colleges by and large outperform its counterpart's i.e. Private Engineering colleges in West Bengal state of India. Not only that, Kharagpur IIT and Jadavpur University of West Bengal are competent enough to the world class engineering colleges as their ranks are standing within first 10 colleges.

Recommendations

It is needed to establish more engineering colleges in West Bengal like Kharagpur IIT and Jadavpur University as they belong in world-class level and the study cost in these two colleges is very small in comparison to foreign universities.

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