A Few Unique Practices in High-Performance Engineering Colleges

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Abstract- A large number of private entrepreneurs have started self-financing engineering colleges in order to meet the youngsters' desire of settling early in life by acquiring engineering degree. A good number of colleges have had bitter experiences recently in attracting the students for their engineering programmes and then they realized the importance of maintaining quality in their programmes. Various governing bodies and agencies like ISO, NBA have developed their own models and suggested a few domains (dimensions) to the engineering colleges for developing quality. Colleges can build quality by concentrating on these domains, provided they are aware of the practices to be followed for each item falling under those dimensions. This paper tries to identify the unique practices followed in a few high performing self-financing engineering colleges in India. Quality indicators have been identified through literature review on High-Performance Organizations. 15 top ranked self-financing engineering colleges have been listed out for identifying the unique practices, by referring to the magazine Outlook. Unique practices followed with respect to the quality indicators identified have been composed through structured interviews and discussions with various core groups & stake holders of these colleges. The unique practices identified and short listed through this study may be highly useful for the authorities of self-financing engineering colleges to bring quality in its working.

Index Terms: Best practices, unique practices, performance, college.

1. INTRODUCTION

By 2011, there were more than 2,380 approved engineering colleges in India. The steep increase in the growth of engineering colleges has set a great competition within. Demands from the external environment and stakeholders are increasing rapidly. A good number of self-financing engineering college managements have failed recently in providing quality education at affordable costs due to the simple reason that they are unable to fill their seats completely. Reasons behind this are many. Strongest reason could be that they are not aware of best practices that are demanded by various stakeholders in many domains. Understanding such highly demanded best practices on their own through survey methods may become expensive and also time taking. An easier and economical method would be referring to the list of best practices (these are followed at most of the high performing colleges) as well as unique practices (these are followed at some of the high performing colleges) summarized by various researchers through their latest study.

2. LITERATURE REVIEW

Many different definitions are available in the literature regarding a high performance organization (abbreviated as HPO). Each definition conveys one or more attributes of a HPO. By referring to those common themes, Andre'A.de Waal has proposed a definition on HPO [1]. The proposed definition is as follows:

A High Performance Organization is an organization that achieves financial results that are better than those of its peer group over a longer period of time, by being able to adapt well to changes and react to these quickly, by managing for the long term, by setting up an integrated and aligned management structure, by continuously improving its core capabilities, and by truly treating the employees as its main asset.

A report was commissioned by Achieve, Inc., with an intention to move Ohio's K-12 system to world-class levels. The report contains several best practice implications for Ohio [2]. According to the report, the world's highest-performing educational systems exhibit three common attributes - High Challenge, High Support and Aligned Incentives. These three attributes reinforce each other to ensure system alignment and focus on delivering high levels of student achievement. The system ensures personal accountability through the attributes namely: high challenges and aligned incentives. The system provides high support to its users through the delivery of the resources, opportunities, information,

autonomies, development, and targeted help necessary to meet those expectations.

Following points can be concluded as the features of a High Performance Education System:

1) They set high academic content standards.
2) They design curriculum and course work more efficiently.
3) They maintain high transparency in student assessments.
4) They maintain high clarity in their expectations and evaluations for students and faculty members.
5) They ensure high quality applicants entering into the system as faculty members.
6) They facilitate high placements so that the applicants can choose the school/college optimally.
7) They provide core support and essential autonomies for students and faculty members.
8) They ensure personal development through ongoing training.
9) They provide performance measures well in advance to all students, faculty members and heads of departments.
10) They address underperformance by providing evaluation-based supports.
11) They align positive incentives and negative consequences to induce all key persons (teachers, division heads, deans, principal/director in order to meet high expectations.
12) They even offer differential pay and recognition as a consequence of evaluation.

Major headings should be typeset in boldface with the words uppercase.

3. METHODOLOGY

India Today, OUTLOOK, Times of India and Careers 360 are a few magazines that annually publish the list of best colleges along with its rank nationally. The top 30 ranked engineering colleges have been selected for our study from the list of best engineering colleges published by the OUTLOOK magazine in June 2009 issue. Request letters have been mailed to the authorities seeking permission for conducting survey. Twelve engineering college managements have given permission for conducting the questionnaire based survey as well as for interviewing a few respondents from their undergraduate engineering programmes regarding the practices followed by the respective college after scrutinizing the questions present in our questionnaires and the content that would be asked in the interview. This process is repeated with the engineering colleges that have appeared in June 2010 as well as June 2011 issues of OUTLOOK magazine.

Two engineering colleges from June 2010 list and one engineering college from June 2011 list have given permission additionally for visiting, surveying and interviewing a few respondents from their undergraduate programmes. Thus, the total number of top-ranked engineering colleges that have given the permission for our study became fifteen. These fifteen colleges are treated as high performing colleges.

A few willing respondents were interviewed on various practices followed by their college regarding the 51 variables of the questionnaire. The practices that were expressed commonly by all the three groups (people representing management, faculty members and students) have been consolidated. As per the agreement, consolidated list of practices from each institute has been submitted to the head of that institute/representative for verification. This procedure is repeated with all the 15 different ranked colleges. The practices observed in all the 15 colleges against each variable have been listed in MS Excel Sheet. If a particular practice is observed in nearly 50 percent of the ranked colleges against each variable, it is declared as a best practice. If a particular practice is found in very few colleges but has contributed significantly, it is termed as a unique practice in engineering education.

4. LIST OF UNIQUE PRACTICES OBSERVED IN RANKED ENGINEERING COLLEGES

Note: The term "colleges" printed in italics represents the ranked engineering colleges.
The Unique Practices observed in the above mentioned top ranked engineering colleges are listed under six most appropriate headings:

4.1Factors connected with Organizational Governance:

(A)   Decentralization:
The faculty members in 6.6 percent of the colleges are empowered in deciding the courses, syllabus, teaching methodology, question paper as well as the evaluation scheme. This practice could bring high responsibility in the faculty members. Due to the institute autonomy, various departments started offering a large number of open electives. For example, Programming in C++, Programming in Java and Essentials of IT are a few open electives offered by Computer Science Department during 4th semester. Database Management Systems, Principles of Software Engineering and Essentials of Industrial Computing are a few open electives offered during 6th semester. Students from various branches of engineering (other than Computer Science) are allowed to take these open electives. Now-a-days, a large number of students are opting for these courses as their ultimate goal is to work for IT companies. Intercultural Communication,   German   Language,   French

Language, Advanced Communication Skills in English, Financial Management, Human Resource Management, Marketing Management and Operations and Systems Management are a few open electives offered by the Humanities and Management Department during 4th and 6th semesters. In the survey, at least 40 percent of the students have agreed strongly that they are studying the branch of their parent's choice. The open elective concept is allowing the students to study courses of their choice and excel. For example, if a Computer Science student takes any six open electives offered by Humanities and Management department, the student will be awarded a degree titled "B.Tech in Computer Science with Business Management minor". This concept is greatly received by the students now-a-days but implemented only in one college, among the colleges considered for the study.

(B) Faculty Involvement:

In 20 percent of the colleges, faculty members are working in teams formed not just from the same department but also from other departments especially in the process of development of curriculum but also in the development of detailed syllabus. Such a practice helps the faculty members from colleges not only in faster completion of tasks but also in the development of cordial relations among the departments

(C) Monetary Incentives for faculty members:

When faculty members acquire higher qualifications like PhD, they get eligibility for promotion which in turn will improve their salary. In 40 percent of the colleges, the faculty members are offered monetary incentives when they acquire higher qualifications like PhD. For example, an Associate Professor is given a fixed amount of Rs.10000 per month as PhD incentive in addition to the regular salary in one of the colleges.

(D) Performance Appraisal for faculty members: The primary purpose of any appraisal is to know the level of achievement and to identify the practices that have resulted in the success of a person or department or division or an organization. It also helps in taking decisions regarding the persons to be promoted. Collecting the feedback from students about their faculty members is one of the items in performance appraisal process.

(i) Feedback is collected from the students about the faculty performance twice in a year in 13.3 percent of the colleges. This practice develops responsibility in faculty members in a greater way.

(ii) In addition to the salary, monetary incentives are offered to the best performing faculty members by 40 percent of the colleges. For example, an Associate Professor is given Rs.11000 per month as total performance incentive in addition to the regular salary in one of the colleges. The newly joined faculty members are motivated by assigning 'A+' grade instead of 'A' grade (no monetary incentive for this

grade) during the performance appraisal in the above said college.

(E) Skills up gradation for staff: A few college managements own a group of institutions offering a wide variety of programs. Those managements allow their staff members to register for the courses offered by the sister concern institutes with concessions in tuition fee. Overall, 13.3 percentage colleges fall in this category.

(F) Employer's Feedback: The positive feedback marked by the recruiters is useful to the college in different ways. For example, the feedback from reputed organisations may increase the number of placement offers in future. Many industries show interest to offer internship initially before the job offers so that they can monitor the student's performance and behaviour during the internship. The concept of internship is practised in 46.7 percent of the colleges, which enables the employers to have an opportunity to observe and assess the student performance prior to employing them. Students are allowed to work in any industry for 4 to 6 months in the form of a project or internship in those colleges. Semester long internship is not thought of in some of the colleges as their students have 3 courses to study in 8th semester along with project work. In 2 colleges out of 15, a special provision is made to the students with high CGPA to complete those 3 courses in their earlier semesters so that the students can pursue project work in any industry in the form of internship.

(G) Admission Criteria:

Single window (merit quota) system is followed in 6.6 percent of the colleges for admitting the students. The merit quota is filled based on the rank obtained in the entrance exam. This college is able to attract students with high merit through their single window admission system. Another college is offering a facility of waiving the total fee in order to attract the students with high merit. Students become eligible for this facility only when score a rank below 1000 in the entrance exam and if their parent's income put together is less than four lakhs per year. Fee waiving facility is continued only when the student maintains a CGPA of 8.5 continuously.

(H) Alumni Involvement: Alumni can contribute a lot if the college management design and execute a few programs and involve them in the activities of the college through alumni cell.

(i) Alumni, especially, who are in bigger positions or own industries have played the most important role by providing (a) Sponsored projects (b) Internships and also job offers. This point is claimed by 33.3 percent of the colleges.

(ii) Alumni, especially, who feel that value addition done by the college to their life is high and has helped in becoming financially sound donate funds for the developmental activities of the college. This is possible only when college management discusses and convinces the alumni with the

developmental plans of the college. Some of the alumni who have industrial business units might provide training to the present students of the college. About 26.7 percent of the colleges have shown that they are getting such benefits from their alumni.

4.2 Factors connected with Members of the Faculty:

(A) Efficiency of Faculty: It is the responsibility of the college management to improve the efficiency of the faculty members. A few factors that contribute majorly in improving the efficiency of the faculty members of a college are described below:

(i) Curriculum needs to be revised whenever new technologies enter the market or industries change their requirements in recruiting criteria. In 20 percent of the colleges, new subjects (courses) are introduced in to their curriculum very frequently.

(ii) The faculty members develop mastery over a course if they are allowed to teach the same course for multiple sections in a given semester or teach the same course for two or three years consecutively. In 26.7 percent of the colleges, faculty members get very high chance to teach the same course to multiple sections in a given semester as those colleges operate multiple sections due to their high intake of students.

(iii) A faculty member can become efficient if there is a provision to get trained in the college under an experienced faculty member. Such a practice is observed regularly in 13.3 percent of the colleges.

(B) Commitment of Faculty: It is the duty of college management to motivate their faculty members so that they commit themselves actively in variety of activities of the college.

(i) Involvement of faculty members in research projects and consultancy projects is considered as an additional commitment. Management of colleges are ensuring such an additional commitment by awarding points that in turn help faculty members in their promotion. Such a practice is observed in 33.3 percent of the colleges. In those colleges, up to 60 percent of the revenue created from the consultancy works is offered to the faculty members whoever has created.

(ii) Institutional development is the responsibility of not only administrators of a college but also the responsibility of each and every faculty member. In the 13.3 percentage colleges, the management is assigning points for faculty member's involvement and at the same time rewarding by monetary incentives.

(C) Publications: In 2 colleges out of 15, the total processing fee charged by the journals of high repute in publishing the article are borne by the college. Faculty members are paid contingency allowance in one of the colleges. For example, an associate professor is paid Rs 18000 per year. This amount can be used for attending training program/purchasing text books/paying membership for a technical association/paying the processing fee for a journal.

4.3 Factors connected with Students:

Examination System: The examination system practised by a college should able to test the acquired knowledge of the students in depth, learning capacity of students and at the same time it must allow the students to obtain optimum development in their chosen field. This particular objective is achieved effectively in 1 out of 15 colleges considered for the study by conducting the first half of the exam in closed book mode and the second half of the exam in open book mode (for testing the student's ability to apply the knowledge)

4.4 .Factors connected with Facilities:
Transport Facility: (i) One of the colleges is located away from city and made a provision for bus transport a few hours after the college working hours as well. It has been observed that the students have shown more interest to stay with the college library and the faculty members have shown more interest to stay and carry on with the research activities after the college working hours. (ii) Academic buildings get spread horizontally in some of the campuses. Faculty members had to travel a lot to reach their class room. In one of the colleges, bus facility is provided to move the faculty members between the blocks. Bus starts 10 minutes before the lecture hour moving to lecture hall building and returns 10 minutes after the lecture hour back to department block. This facility minimizes the fatigue in people.

(A) Number of messes: In one of the colleges, food court is providing its services most economically by locating its building in central point and by serving large number of students. Food wastage is kept to minimum by preparing the menu through several surveys with its users.

(B) Medical Facilities: As per the AICTE, it is mandatory to have medical facility inside the college campus.

(i) Medicare facility is provided to its employees covering the employee family as well as their parents in one of the colleges considered for the study. This is one of the facilities in the college that has supported the stability of tenure of personnel to a great extent.

(ii) Only one college (6.6 percent) has a facility for its employees to reimburse the bills incurred in attending the bigger health problems as it does not have its own hospital service.

(C) Hostel Facility: Students and parents expect to have hostel buildings located closer to the college premises. By doing this, college management will be to avoid the transport facility.

(i) Type of hostel facility available: Only one college has a range of options staring from normal to luxurious rooms. This college is able to attract the students from lower middle class to ultra rich class due to its variety of hostel rooms. Residing students are able to get exposure to multicultural through this type hostel facility. This particular knowledge would

be useful to the students in future when they work with multinational companies.

(D)   Availability of learning material:

A few colleges (26.7 percent) have the policy of uploading the learning material in the form of slides on their website. This particular facility keeps its learners at ease and also minimizes the photocopying.

4.5 Factors connected with Teaching and Learning:

Number of Instructional days/hours available in a semester: Faculty members are able to teach the complete syllabus of each and every course offered by the college as they get more number of working days due to their long semesters and less number of public holidays. More number of working days is created in another 20 percentage of the colleges by compensating the public holidays with working on Saturday afternoons occasionally.

Academic Research for higher qualifications: Many faculty members take up research that helps in acquiring qualifications like PhD. Higher qualification such as PhD leads to promotion of the faculty members in most of the organisations. College management motivates such employees by offering additional pay as an incentive in 33.3 percent of the colleges.

Helping academically weaker students: Various bodies like ISO, NBA suggest the college management to identify the academically weaker students and make provisions to extend the help to them so that the college can have a) immediate benefit of improved result in the short run and b) image building in the long run.

Quiz is conducted on a regular basis with a frequency of once in a week for every course and the weaker students are identified based on the performance in quiz so that the help can be provided much before the tests begin. This type of practice is observed in 6.6 percent of the colleges. Faculty members would repeat their teaching when they find a large number of students not followed the lesson.

4.6 Factors connected with other Processes:

Training the students for placement purpose:

Placement awareness camps are organized in 13.3 percent of the colleges and details regarding the company and tests that the company may conduct are provided. These camps are organized completely by student community and gaining popularity through peer learning.   Entrepreneurial Development: Incubation Centre is available in 53.3 percent of the colleges. The Incubation Centre provides space, financial assistance and other facilities to the people interested in starting a business venture in all those colleges. Incubation Centre located in one of the colleges considered for the study is found very active in its working. M.Tech programme in "Engineering Management" of that college has a course titled "New Venture Management". Students prepare new

business plans and present in front of the business experts. Feedback given by the experts is found as a motivator. Consultancy: Some of the colleges offer consultancy services in addition to their teaching learning services. These additional services would benefit most of their stakeholders. Members of the faculty, students, and college management are a few stakeholders who are benefitted directly from the consultancy services offered by a college. Revenue generation is one of the directly observed benefits. College will be able to offer consultancy services only when a) its research facilities are accessible after the college working hours b) management is willing to extend the additional monetary benefit to the service providers c) these additional services help the people in their promotions.   About 33.3 percent of the colleges have a policy of considering the consultancy service while assessing the performance of their faculty members. Industrial Visits: It is an add-on facility provided by a college that helps the students in visiting the industry and getting an exposure to industrial activities. Industrial Visit, Industrial Training, and Internship are a few titles that are found in the engineering curriculum and all these titles have a similar meaning. Many college managements make arrangements for industrial visits only when it is compulsory as per the curriculum. A few college managements may be ready to make arrangements for industrial visit even when it is not compulsory as per the curriculum. Students from 20 percent of the colleges are able to visit the industry as it is made compulsory in the curriculum under the title "Industrial Visit". Students from 13.3 percent of the colleges are allowed to go to industry and do internship for an entire semester. Students from another 13.3 percentage of the colleges are asked to go to industries and undergo industrial training compulsorily for 3 weeks at any time after 5th semester.   College managements are developing different types of strategies especially in arranging the visit/training/internship to their students. A few faculty members are recruited separately and are stationed in various cities so that they remain in touch with industries, develop relations, arrange internship, and monitor the progress in students' work. This strategy is observed in 6 percent of the colleges considered for the study.   Patents: College management may ask their employees to submit their works for patenting when they feel that their employees have made a remarkable contribution in innovation through research. About 33.3 percentage of the college managements consider the number of patents obtained by the employees while evaluating the performance of their employees. About 33.3 percent of the colleges have a separate cell in the college campus/university campus that helps the inmates in procedures and they conduct seminars on 'Intellectual Property Rights' through that cell.   (F) Sponsored Research Projects: A few faculty members are interested in taking up projects sponsored by

various organizations. A few benefits that a college can derive from the sponsored research projects are: a) these projects help in exploring knowledge b) these projects help in establishing some of the advanced research facilities in the college premises c) these projects help in developing some of the facilities that support main research d) these projects help research scholars in finding new research protocols e) at times these projects help in generating funds for the college. Revenue generated from a project is reinvested in the college generally for creating new facilities. Employees in one of the colleges have claimed that the management consults the persons responsible in generating that revenue while reinvesting.

5. CONCLUSION AND SUGGESTION

The unique practices listed in this paper may be highly useful for the authorities of self-financing engineering colleges to bring quality in its working. College managements are advised to go for these unique practices only when they feel that the results are not improving further even after the implementation of all possible best practices.

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