

A Study on Requirements for Engineering Education in South India

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Abstract: In engineering education, business of knowledge transfer has achieving by various levels with education contributors in our society. But if any factors affecting the interacting level between the educator's communities, the teaching level will not be excellent and not be fit to the students understanding level. A study has carried to understand the various factors affecting engineering education in a South Indian state – Tamilnadu. The merits and demerits in engineering education of South India have studied in this paper.

Keywords: Tamilnadu, engineering, education, faculty, requirements

Introduction

In India, number of universities and colleges are increasing year by year. D. Manjunatha [15] has mentioned that in 1947, only 20 universities were available in India with 500 colleges. But now, more than 500 university level institutions are available. University Grand Commission (UGC) has illustrated the status of approved 487 autonomous colleges under the UGC scheme on 'Autonomous College' as on 01.08.2014 [11]. A per 2012 status, 3345 engineering colleges were available in India. In March 2010, the director of cabinet secretariat, government of India [12] indicated that, Indian government has the aim to increase gross enrolment ratio (GER) in higher and technical education to 30 percentage in the end of 2020. In India, Indian Institutes of Technology (IIT), Indian Institutes of Information Technology (IIIT), Indian Institutes of Managements (IIM), National Institutes of Technology (NIT), National Institutes of Technical Teacher's Training Institute (NITTR), Central and state universities, Deemed, private and open universities, Board of technical education, Statutory councils of India, Research councils of India, Autonomous and Affiliated colleges are the important higher education providers as mentioned by All India Council for Technical Education (AICTE) [8]. Rangan Banerjee and Vinayak P.Muley [17] have explained the organization chart and the detailed state of various Indian Institute of Technologies (IIT's). Among the 3345 engineering colleges in all over India, 497 colleges are available in Tamilnadu. In the middle of 14,73,871 engineering vacancies, 2,36,417 engineering seats are available in Tamilnadu. The growth of engineering educational institutions was the positive sign in educational growth. But various difficulties are also available in higher educational sector. D.P.Gupta and Arvind Dewanga [5] has indicated various challenges before engineering education in India. In engineering colleges of Tamilnadu, number of pass percentage has decreasing in past two years. It is necessary to discuss about the existing difficulties and challenges in front of the educators in engineering field. This paper deals with the study of present status of engineering education in Tamilnadu with advantages and disadvantages.

Engineering Education in South India

In India various statutory bodies are constructed to regulate the higher educational system. Nordic Recognition Information Center [14] has mentioned the names of statutory bodies which regulates the standards of education in India. UGC (established in 1952) is responsible for higher education to evaluate the universities and to allocate the grants from central government. For the periodic assessment of universities and colleges, UGC established an autonomous body named National Accreditation and Assessment Council (NAAC). AICTE (established in 1948) is the responsible organization charged for planning and developing the technical education in India. Sajal K.Palit [18] explained the planning and co-ordination of AICTE in the development of technical education. National Board of Accreditation (NBA) has established in 1994 to evaluate the standards of quality education. D.Brahadeeswaran and M.A.Abdul Hakeem [4] has discussed the importance of various criteria and parameters were used in the revised system process of NBA. Affiliated and non affiliated colleges, private universities, deemed universities, autonomous institutions and other engineering institutions are having the infrastructural facilities to educate the students. Professors and teaching faculties are directly interacting with their students to educate them in various engineering disciplines. UGC regulates the minimum requirement of faculties in engineering colleges and universities [20]. The department of higher education in Tamilnadu has revised the scale of pay for faculties of engineering colleges and universities in various levels by 2010[7].

In South India, most of the students were entering into the college environment after school level without any awareness about engineering education. Fig. 1 shows the position of engineering students in their social environment. Sanjeev Kumar and J. P. Bhukar [19] has explained various stress level and coping strategies of college students. Students were entering a college through their parents and they must gather excellent knowledge of engineering to implement it in the society. If the students were not gathering complete knowledge in their college level, they will face more difficulties for placement and also in future life. So in present status, it is more important to enrich their engineering knowledge for their life.

Requirements for Administrators

Without customers no business can run for a long duration. Same like that, without students no institutions can run. If student's enrolment rate decreases from intake capacity, the business of knowledge transfer will affect in various level. Fig. 2(a) and (b) shows the growth of engineering institutions and their intake capacity in India as per AICTE report [1]. In the past two years, the engineering college administrators are suffering from student's admission. In the year 2013, more than 80,000 seats were vacant in Tamilnadu engineering colleges and in 2014 it has increased by 1,00,000 numbers. The major factors for these vacancies due to increase in number of colleges, decrease in students pass percentage and their unemployment. If admission decreases, the college administration will suffer to invest for the development of their educational institutions. Because of this reason they will require minimum staffs with minimum qualifications and experiences to teach the students.

Now the faculties were joining in engineering colleges immediately after complete their post graduate degree, they are not having any previous teaching experience. The college administration can assign various duties for teaching as well as institution's development works to the inexperienced faculties, but in teaching point of view, fresh teachers cannot teach in better level for engineering students like experienced faculties. They will face various difficulties to access the available teaching facilities in colleges may imply the teaching methods that has observed from their former faculties. So again investment is necessary for college administrators to imply the faculty development programs (FDP) to train the new faculties for teaching. The faculty requirement authorities of engineering colleges must select the candidates for faculty position through interview as per their past achievements (academic results), industrial awareness, qualification and experience. In present situation, for enrolment process administrators need the interaction with students to attract them to study in their colleges. Faculties are sometimes instructed to contribute in enrollment works to attract the students to their colleges. But it will affect their regular teaching work. The unscheduled file and document works will create more difficulties to the faculty's teaching skill. If allotted seats are not filled in the admission time, the college administration will suffer for crediting the salary for teaching and non teaching staff members. So that, in present situation the faculties must have the management skill more than that of teaching skill to withstand their position. Another major factor which affects the student's enrolment process is infrastructure requirements of engineering colleges as per UGC and AICTE norms.

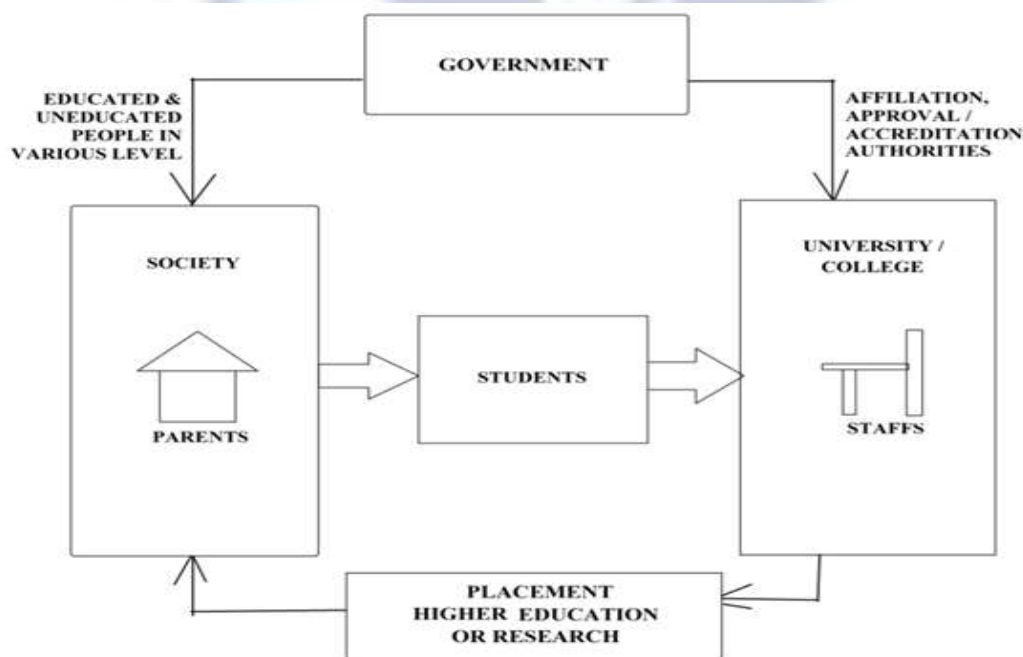


Figure 1: Position of Engineering Students in Social Environment

Requirements for Faculties

A teaching faculty must have affection in their profession to improve their life with others life. In the class room environment, some students may have less interest in studies because of

- Lagging in basic knowledge for understand the engineering concepts
- Less awareness in the importance of engineering education
- Less awareness in the placement opportunities
- Family background

But the faculty should give awareness of benefits and applications of their studies and must encourage the students with different types of study methods and materials like websites and books. Ashish Kumar Parashar and Rinku Parashar [2] have explained the innovations and curriculum development methods for engineering education and research in India. The students can learn the subjects easily through visual aids. The teachers should deliver their presentations with the effect of visual aids like power point presentations and animation videos. The faculty should improve the communication skills of students by speaking, listening and reading exercises with group discussions. For teach effectively, the faculty should prepare well the subject portion before teaching. The students and head of the department's feedback will give more ideas to improve the performance of the faculties to produce good results in examinations. A report of working group on engineering education from national knowledge commission [13] gives a model performance feedback for faculties on teaching. Result analysis of examinations will be done immediately after the completion of each examination to calculate the student's performance level to give better results. The faculty should train the students to develop their innovative skills in current trends by explaining with the experiments and various processes like quiz programs, technical seminars, workshops and conferences.

Faculty Development Programs

Faculty development programs (FDP) are important to refresh the faculties experience and knowledge in teaching. In FDP, various sessions may arrange to create awareness for the following areas.

- How can teach theory & practical methods effectively for students
- How to encourage the students for studies
- To give psychological counseling for faculty members to realize and love their own responsibilities
- To practice the faculties to enrich their knowledge in engineering education
- Providing information about available sources to achieve in education field
- Practice to made personal work schedule for available time interval
- Interaction with industries, institutions and government sector tie-up

The faculty should update their subject knowledge continuously and they can also pursue higher studies related to their field. They have to publish books, research papers in forums and teaching aids. B.M.Gupta [3] has mentioned the names of top 50 Indian universities based on publication and citation data. E.C.Subbarao [6] has mentioned that, in 2009 only 2.5% of technical publications were available from India when compared with world publications. The engineering faculties can even undergo research projects with industries and government agencies.

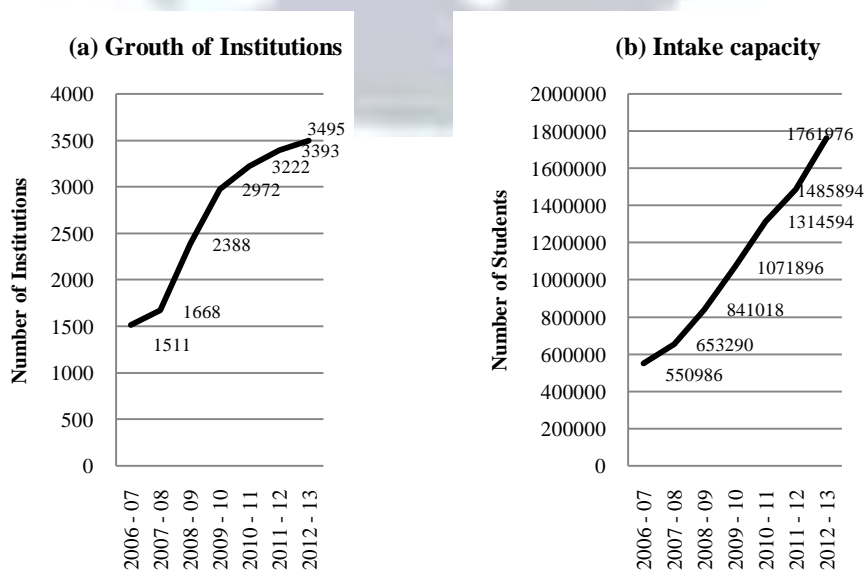


Figure 2: Growth of Engineering Institutions and their intake capacity in India

Pankaj Jalote [16] has explained the challenges in industry – academia collaborations. Research needs interest, motivation, academic, administrative and financial support. Local level engineering bodies, state government bodies, central government bodies, international bodies and company based research and development authorities will provide funds for research work. Government sector tie-up is essential for creating learning resources, carrying out research works or projects, guiding people for research, conducting extension programs, and carrying out consultancy services based on research output.

Requirements for Students

Students need enthusiasm in studies and awareness about job opportunities in their field. Initially the faculties should not enter directly for engineering topics in the class room, because students will feel difficulty in studies and may score less marks in the beginning itself. Instead of that they must give awareness about the importance of engineering studies before adopting the college environment. Once the students will obtain less mark in his first year, then automatically he or she may lose their interest in studies, so the initial period is very important immediately after join for engineering studies. In Tamilnadu, students were studying basic subject like physics, chemistry, basic engineering and language subjects as per AICTE norms. But generally students were not aware about the importance of practical applications of basic subjects. Because of this reason, the interest in basic engineering subjects will decrease. In higher secondary level, the students might study their subjects in their mother language itself. But in engineering colleges, all subjects are educating in English language only. If any student joins in engineering college from other than English medium school, they must take care separately by counseling or special classes if necessary. When the students enter in to the new department they must aware the department activities, studying methods and jobs offers in the particular field. The faculties must care their students through interaction during the class sessions. The college departments must invite the parents to inform about the performance of their son or daughter atleast monthly once or in quarterly basis. Team members will be allotted for conducting faculty, parents and class committee meeting with senior & junior students to discuss about educational and disciplinary activities. Fig. 3 (a) and (b) shows the pass details of engineering students from non autonomous engineering colleges in Tamilnadu during 2012–2013 as per Anna University statement [9]. It shows approximately 50 percentages of students are passing and also same situation has reflects in autonomous, government and private university results in that period.

Placement Requirements

Placement training is important to get a job and to enhance the student’s life for any working environment or to start any business after completion of engineering studies. As a first step of training, responsiveness must be given to the various kinds of students to recognize the importance of the placement classes. If necessary, psychological counseling may give to the students utilize the placement classes effectively. The available working opportunities must explain to the students to create the interest in the placement classes.

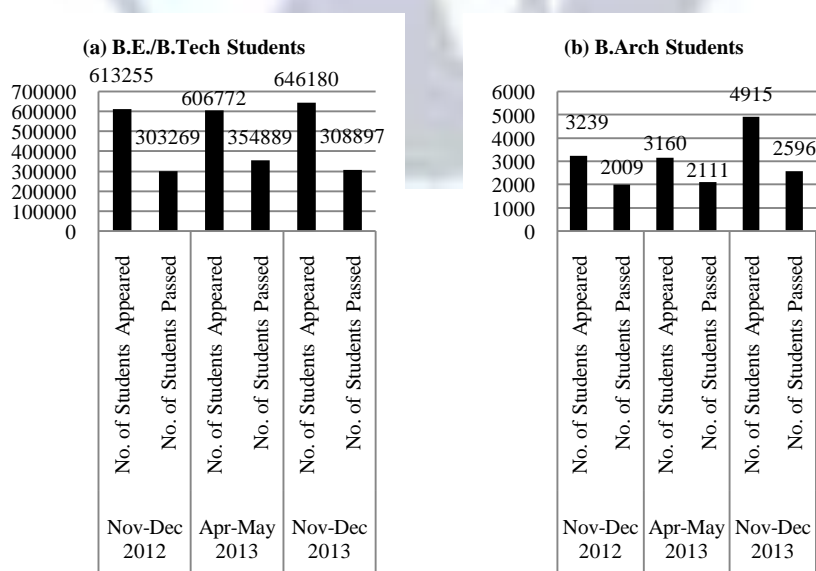


Figure 3: Pass details of engineering students from non affiliated engineering colleges in Tamilnadu during 2012 – 2013

The job recruiters will expect following personalities from the engineering candidates for placement.

- Basic subject knowledge
- Group working capacity
- Adjustment to their boss
- Good knowledge in subject, communication and language
- Good knowledge updates in present engineering field

Students should satisfy the recruiter's expectations in job opportunities. Senior students should motivate about placement opportunities in engineering industries and they can involve in alumni activities. In Tamilnadu, nearly 497 non-autonomous colleges are affiliated to Anna University and having more than 6,10,000 intake capacity. Every year, more than 7,50,000 engineering students are coming out from various engineering colleges from this state. But in the past two years, nearly 40% of the students coming out from various engineering colleges and other higher educational institutions are become more unemployable [10]. To develop our society, good placement records must show from our engineering graduates.

Conclusion

Education is a powerful tool for human to elite their life in proper manner. Engineering colleges are functioning for providing knowledge in engineering concepts. If the output results from engineering organizations are not satisfying the employment requirements, then the revision is important for rearrange the education system for students. At present situation, the major responsibility for engineering educators is to analyze the current education system for engineering institutions.

References

- [1]. All India Council for Technical Education (AICTE) "Approval Process Handbook" 2013 – 14.
- [2]. Ashish Kumar Parashar and Rinku Parashar, "Innovations and Curriculum Development for Engineering Education and Research in India", *Procedia - Social and Behavioral Sciences*, vol. 56, 2012, pp. 685 – 690 [Digests International Conference on Teaching and Learning in Higher Education 2012].
- [3]. B.M.Gupta, "Ranking and Performance of Indian Universities based on publication and citation data", *Indian Journal of Science and Technology*, vol. 3(7), 2010, pp. 837-843.
- [4]. D.Brahadeeswaran, M.A.Abdul Hakeem, "A Review of NBA's Accreditation Criteria for Bachelor's Degree Programmes in Engineering", *Journal of Engineering, Science & Management Education*, vol. 5(2), 2012, pp. 475-479.
- [5]. D.P.Gupta and Arvind Dewanga "Challenges Before Engineering Education in India", *Journal of Arts Science and Commerce*, vol. 3(2), 2012, pp 100-103.
- [6]. E.C.Subbarao, "India's Higher Engineering Education: Opportunities and Tough Choices", *Current Science*, vol 104(1), 2013, pp 55-66.
- [7]. G.O Ms.No.95, Higher Education Department, Government of Tamilnadu, May 2010.
- [8]. <http://www.aicte-india.org/> accessed on 30.11.2014.
- [9]. <https://www.annauniv.edu/> accessed on 24.06.2014.
- [10]. http://www.business-standard.com/article/economy-policy/engineering-graduates-could-become-more-unemployable-110060200055_1.html accessed on 30.11.2014.
- [11]. http://www.ugc.ac.in/oldpdf/colleges/autonomous_colleges-list.pdf accessed on 01.08.2014.
- [12]. Mala Dutt, "Development and HRD in India", *Proceedings of IDEAS 20th Anniversary Workshop on The new trends in Development and Human Resource Development (HRD) - Nurturing Development Experts for the Next Decade*, Tokio, March, 2010.
- [13]. National Knowledge Commission, "Report of Working Group on Engineering Education", Working Group on Engineering Education, 2008.
- [14]. Nordic Recognition Information Centres "Report on the System of Education in India", 2006
- [15]. Orientation Course (102), "Status of Higher Education in India : Recent advances in frontier areas", Academic Staff College, University of Madras, 2010.
- [16]. Pankaj Jalote, "Challenges in Industry-Academia Collaboration", Guest Article, *CSI Communications*, April 2006.
- [17]. Rangan Banerjee, Vinayak P.Muley, "Engineering Education in India"- A Project report, Energy Systems Engineering, IIT Bombay, 2007.
- [18]. Sajal K.Palit, "The development of Engineering and Technical Education in India" *Global Journal of Engineering Education*, vol. 2(3), 1993, pp. 317-326.
- [19]. Sanjeev Kumar and J. P. Bhukar, "Stress level and coping strategies of college students", *Journal of Physical Education and Sports Management*, vol. 4(1), 2013, pp. 5-11.
- [20]. University Grants Commission, "UGC Regulations on Minimum Qualifications for Appointment of Teachers and other Academic Staff in Universities and Colleges and Measures for the Maintenance of Standards in Higher Education 2010", June 2010.