Chapter 2: Review of Literature

Introduction:
The aim of the researcher during literature survey was to understand how higher education is different in India as compared to International scenario. The focus was on engineering education. During literature survey, the researcher was trying to understand (i) the meaning of quality in education, quality teaching, the various systems to ensure the quality in engineering institutes, Key Performance Indicators (KPIs) with the focus on Teaching Learning Process, (ii) effective teaching learning methods & processes, (iii) Availability of teacher, measurement of performance of a teacher and student (iv) Quality Management Techniques available at present such as Total Quality Management System (TQM), role of ISO, six sigma concepts, to improve the quality of teaching learning process. (v) The researcher has also tried to identify needs of students and their perception regarding teaching learning process. The ultimate aim, kept in mind was, to identify the factors that will attract 100% student for admission in an Institute, which will fulfill their wish of getting job placement and methodology to enhance the Teaching learning processes as a final outcome.

2.1 Literature Review

Definition of Quality in Education:
As per Oxford dictionary “quality is degree especially high degree of goodness and worth”. Juran defines quality as “fit for its purpose”. Philip Crosby defines as “Conformance to specification”. For education, “the quality is degree to which education prepares students to be personally effective and capable within the circumferences of their work”.

As per report of the working group on technical education for the XII five year plan for strengthening Private Technical Institutions in the Country where, more than 90% institute are private unaided institutions (PUIs), and their challenges with respect to achieving ‘Quality’ in private engineering education have to deal with 1) Strengthen Faculty, 2) Provide colleges with more academic autonomy, 3) Enhance transparency in governance and regulation of these institutions and 4) Improve their finances. [5]
Quality Monitoring Mechanisms in Technical Education

Two autonomous boards, NAAC and NBA have been established to assess quality of education in the country out of which ‘NBA’ accredits the technical programs while ‘NAAC’ assesses the overall performance of any institute or university as a whole.

A) NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL (NAAC)

It was established in 1994 as an autonomous institution of the University Grants Commission (UGC). The framework of NAAC for accreditation is based on five aspects.

(i) Contributing to National Development, (ii) Fostering Global Competencies among Students, (iii) Inculcating a Value System among Students, (iv) Promoting the Use of Technology, (v) Quest for Excellence

NAAC assessment is based on 7 parameters viz. Curricular Aspects, Teaching-Learning and Evaluation, Research Consultancy and Extension, Infrastructure and Learning Resources, Student Support and Progression, Governance, Leadership and Management, Innovations and Best Practices.

The eligible institutes for NAAC assessment are those who are offering degree programs and have passed out at least two batches of the students from the institute. Based on the performance of the institute, the NAAC committee offers grades to the institute as follows. [12]

Table 2.1 NAAC Grading

<table>
<thead>
<tr>
<th>Average CGPA</th>
<th>Grades</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>3.01-4</td>
<td>A</td>
<td>Very good (Accredited)</td>
</tr>
<tr>
<td>2.01-3</td>
<td>B</td>
<td>Good (Accredited)</td>
</tr>
<tr>
<td>1.51-2</td>
<td>C</td>
<td>Satisfactory (Accredited)</td>
</tr>
<tr>
<td>&lt;1.5</td>
<td>D</td>
<td>Unsatisfactory (Not Accredited)</td>
</tr>
</tbody>
</table>

B) NBA Assessment

Due to unprecedented expansion of technical education, it was concern to ensure quality of the education. AICTE has constituted in 1994, National Board of Accreditation (NBA) to conduct evaluation of programs of technical institution on the basis of laid down norms mentioned in manual 2000, 2004, 2009, 2012. Before 2009 accreditation was based on input output approach. Further norms (2009...
onwards) are outcome based in order to make it substantially equivalent to Accreditation Board for Engineering and Technology (ABET) and as per 2015 guidelines which are,

1. Engineering knowledge
2. Problem analysis:
3. Design/development of solutions
4. Conduct investigations of complex problems
5. Modern tool usage
6. The engineer and society
7. Environment and sustainability
8. Ethics
9. Individual and team work
10. Communication
11. Project management and finance
12. Life-long learning

Table 2.2 Comparative study of criteria of NBA assessment

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<tbody>
<tr>
<td>1</td>
<td>Organization and Governance, Resources, Institutional Support, Development and Planning (100)</td>
<td>Organization and Governance, Resources, Institutional Support, Development and Planning (150)</td>
<td>Organization and governance (80)</td>
<td>Mission, goals and organization (100)</td>
</tr>
<tr>
<td>2</td>
<td>Teaching and Learning Processes(100)</td>
<td>Evaluation and Teaching-Learning Process (175)</td>
<td>Finance, resources, allocation and utilization (70)</td>
<td>Financial &amp; physical resource &amp; their utilization (100)</td>
</tr>
<tr>
<td>3</td>
<td>Students’ Entry and First Year Performance(75)</td>
<td>Students’ Entry and Outputs (150)</td>
<td>Physical resources (central facilities) (50)</td>
<td>Human resources (200)</td>
</tr>
<tr>
<td>4</td>
<td>Students’ Performance in the Program(75)</td>
<td>Faculty Contributions (150)</td>
<td>Human resources: faculty and staff (200)</td>
<td>Students (100)</td>
</tr>
<tr>
<td>5</td>
<td>Faculty(150)</td>
<td>Facilities and Technical</td>
<td>Human resources: Teaching learning (350)</td>
<td></td>
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<tr>
<td></td>
<td>Support (75)</td>
<td>students(100)</td>
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<tr>
<td>6</td>
<td>Facilities and Technical Support(75)</td>
<td>Continuous Improvements (75)</td>
<td>Teaching learning processes(350)</td>
<td>Supplementary processes(50)</td>
</tr>
<tr>
<td>7</td>
<td>Continuous Improvements(75)</td>
<td>Curriculum (125)</td>
<td>Supplementary processes(50)</td>
<td>Industry-Institute Interaction(70)</td>
</tr>
<tr>
<td>8</td>
<td>Curriculum(100)</td>
<td>Program Educational Objectives – their Compliance and Outcomes (100)</td>
<td>Research and development and interaction effort(100)</td>
<td>Research and development(30)</td>
</tr>
<tr>
<td>9</td>
<td>Program Educational Objectives(150)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>Program Outcomes and Assessment(100)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
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And the program in the institution will be awarded accreditation status on the basis of:
1. Score $\geq 750$, accreditation will be for 5 years.
2. Score between 600 - 749, accreditation will be for 2 years.
3. Score < 600, program will not be accredited.[13]

**C) Other Mechanisms**

Every AICTE approved institute in the state has to follow the norms and standards prescribed by DTE, Maharashtra and affiliating universities. Majority of these norms are based on:
- To follow the norms and standards as per University Act 1994
- To establish a Local Management Committee (LMC)
- Provision of suitable and adequate physical facilities such as buildings, laboratories, library, equipments, computers, gymnasium, etc.
- Financial provision of funds for working and maintenance of an institute
- Recruitment of teaching and non teaching staff as per the norms.

At the outset, affiliation and recognition of the institute is strictly based on the implementation of academic, administrative and financial standards. [http://www.unishivaji.ac.in/MUAct1994_040114.pdf](http://www.unishivaji.ac.in/MUAct1994_040114.pdf) [14]
D) National Project Implementation Unit (NPIU) - Impact evaluation of TEQIP-I

In 2002-03, the Government of India with the financial assistance from the World Bank launched a Technical Education Quality Improvement Programme (TEQIP) in three phases. In the first phase of TEQIP (2003-09), 127 institutions were selected based on eligibility criteria to take part in the program. It includes 18 centrally funded institutions, 68 State funded institutions, 22 private unaided institutions and 19 Polytechnics spread across 13 States of India. The objective of TEQIP was focused on pedagogical training of faculty for effective teaching and enhancing institutional and system management effectiveness along with the better employability.

TEQIP was implemented on five components such as:

a. Institutional reforms
b. Institutional governance
c. Academic Excellence (Accreditation, Revision of programs, tribal development plan, faculty training, faculty qualification improvement)
d. Networking of the institutes and
e. Services to community and economy

M/s Spectrum Planning India Ltd, (SPIL) carried out data analysis of above five components and declared institutional scores on a 10 point scale for 127 Institutes. Out of 127, only 17% of the institutions are at highly satisfactory range and 24% in satisfactory range.

The impact of implementation of TEQIP was measured on 76 parameters and the outcome in terms of 11 performance key indicators (KPIs). [15]

The graph depicts the KPI’s of 17 institutes which have participated from Maharashtra as compared to India on average basis.
Dr. Medha Gupte mentioned that in India, the majority of the population is residing in rural area but the adverse part is the Gross Enrollment Ratio (GER) is much lesser in rural area as compared to urban area. It is desired to have at least 20% GER for rapid development of the nation as per the UNESCO guidelines. The reason for low GER includes inadequate quality institutions, high level of dropouts, high cost of education, lack of equity, political intervention, inadequate infrastructure and absence of competent and qualified faculty. In addition to this, students and parents are not willing to join the higher education due to family burden, lack of monetary support and wrong attitude which leads to high dropout rates. The qualified and quality teachers always prefer a job in the urban area since they also expect management support, better physical facilities, etc.[16]

Since the education as a service industry, is a part of the globalization process under the umbrella of General Agreement on Trade in Services [GATS], what Challenges that Teachers is facing in the era of Globalization, and the challenge in front of the institutes is to remain in the world of competition. It is expected that the challenges are to be met with a joint effort by the government, students and teachers. This is going to result in a pleasant scenario says Daware Surendra. [17]
Study done by Gautam Chandra Deb identifies the growth of higher education, its problems and government initiatives towards improvement of higher education in India. Since immense growth is observed in the higher education in India, the key challenges to institutes offering higher education are demand-supply gap, quality education, research and development and faculty shortage. Various committees have recommended the Government to take steps like establishment of National Commission for Higher Education and Research (NCHER), independent regulatory authority for accreditation and national database of academic qualification, increase in number of universities including IITs, IIMs, and NITs during 11th five year plan and increase in the number of seats in existing institutions. [18]

The decade of 1951-1961 has established a great reputation for undergraduate engineering not only in India but across the world by establishing Indian Institute of Technology (IIT) at various locations across India. But this has not happen for PG & PhD education. E.C.Subbarao has analyzed the reason for the same. 1983 onwards, due to expansion of technical education, institutes are producing bulk graduates of a poor quality which results in un-employability. The critical reasons for this situation are rapid expansion without adequate qualified teachers and lack of academic autonomy. In addition to this, poor linkage with industry, poor quality publications and no international collaboration for teaching and research. [19]

Anil R. Sahu et. al have developed a mathematical model to implement Total Quality Management in the institute, based on Administration, Infrastructure, Teaching Effectiveness, Students, Interaction with Industry and Society, Extra Curricular Activities, Research and Development to monitor the progress of the institute. [20]

To develop excellence in the institute, it is necessary to identify the problems/ issues that the institutes are facing. These are categorized in four major categories as academics, administration, research and development as well as infrastructure development by Rohit Manjule et al. and suggested a Total Quality Management (TQM) as a tool for solution of the problem and thereby enhancing the quality of an institute. [21]

Pradeep Khanna proposed factors for improving and enhancing quality of education through job security of faculty, rewards and awards system, industrial training to teachers, academic environment of Institute, motivation to faculty, effective student feedback system, developing positive attitude to work with efficiency, productivity and excellence. [22]
Offering of the quality of education and overall performance of engineering institutions is not satisfactory. Failures of student in the university examination and less placement opportunities are considered as defects. For improving quality level of performance in the academic activities for achieving quality assurance in technical institutions. A combination of TQM and Six Sigma is proposed by A. Pal Pandi et al. [23]

Vidya Yerneni et al. defines higher education as education beyond school. Also mention need to bring clarity and a common understanding of higher education in India and it is required to develop different kinds of model to improve the quality of higher education Using combination of six sigma, lean management, lean six sigma as the tools and techniques to improve higher education. [24]

To understand what is Six Sigma and how it can be applied in educational field to participate in today's competitive world. The parameters of six sigma were proposed for implementation and monitoring are: clear definitions of roles and responsibilities, evaluation of SWOT analysis of institute and control on processes and documentation. It has been concluded by Varsha Patil et al. that, The success depends on every employee of the organization and requires serious commitment and consistent effort from all who are involved... management, faculty, staff and students to achieve excellence in education [25]

The main purpose of quality assurance in education is to provide confidence to all stakeholders viz students and their parents, employers & professionals, govt. society etc. that the requirements for quality education are met continuously. The experience of ISO 9001:2000 based quality systems will contribute to improve quality and a dynamic of continuous quality improvements in an institute says, Manpreet Kaur et al.[26]

The review report addresses three simple questions to define a framework for professional learning:

   a) How to achieve great teaching?

   b) What are the methods or mechanisms to achieve great teaching?

   c) How to promote better learning?

An acceptable teaching leads to improved student progress which is based on the following factors: Pedagogy, Quality of Instruction, Classroom climate and management, professional behavior, etc.
On the other hand the mechanisms for capturing good teaching is based on classroom observations by peers, principals or external evaluators, value-added inputs, student feedback, downward appraisal and self appraisal.

To promote better learning, teacher feedback can be used as a tool with the focus on improvement in student outcomes, self learning rather than comparisons with others, encouragement for continual learners, an environment of trust and support, and academic and administrative support by the institutional leadership.[27]

National Institute of Education (NIE), Singapore has developed Values, Skills and Knowledge (VSK) model which consists of Values (care and concern for all students respect for diversity, commitment, dedication, collaboration, sharing, team spirit etc.), Skills (Pedagogical, interpersonal, reflective, personal, administrative and management skills) and Knowledge (content, curriculum, educational policies) for preparing quality teachers particularly for fresh teacher to meet the challenges says Sylvia Chong et. al.[28]

The Indo US Collaboration for Engineering Education (IUCCEE) has taken an initiative with an objective to improve the academic activities like Research and Development, Curriculum and Technology Enhanced Delivery, Innovation and Entrepreneurship, Quality & Accreditation Processes and Industry Participation. Through this program, the concept of ‘Train the trainer’ was successfully implemented in India which resulted in improving students’ performance and satisfaction with the use of the teaching techniques. [29]

S. K. Saha suggested implementation of teaching learning with some innovative practices which will create fun like game, puzzles, dumb charades as a replacement for chalk and talk traditional method for effective teaching learning in engineering. It was implemented to a particular course and was found useful by the students. [30]

The present method of teaching learning can be more effective by using ICT enabled teaching learning to enhance the productivity of the teacher and students at large in a short period as well as use of technology like VSAT will facilitate the beneficiaries at remote places, says Deepak Phatak.[31]

Jamaliah Abdul Hamid et.al conducted study on 1552 student from business study program in three public universities in Malaysia. He identified the student’s perspective about effective teaching learning with the parameters such as Lecturers’ Factor, (Appearance, fairness, helpfulness, care, friendliness, communication, reliability, and credibility), Teaching Methodology (Competence, course delivery),
Course Relevance. Further it is mentioned that the students' perceptions of all three factors are based on their gender, ethnic background, highest academic qualification, and current CGPA scores. Teaching Methodology and Course based on their level of English proficiency. [32]

In view of Dr. Shahida Sajjad, Lecture, Group discussion, Individual presentation, Assignments, Seminars, Workshop, Conferences, Brainstorming, Role play, Case study are the various methods to make teaching effective where lecture method is still a preferable method by the students as compared to other methods mentioned above. This study was conducted on 220 UG student of Arts faculty in 11 different department.[33]

Total Quality Management (TQM) tool based on limited approach is suggested by Boom Han Yeap for managing the needs, expectations of the students, problems of the students and collecting feedback information. This will lead to continuous improvement in teaching and learning process. This will ultimately lead to refining, designing and redesigning the improved teaching learning process of the institute.[34]

Addressing the issue of various attributes of effectiveness and efficiency of teaching, R. Renjith Kumar suggested the attributes to measure the performance of a teacher in terms of Communication, Team effort, use of appropriate pedagogy, commitment to the profession, Classroom behavior, and Teaching efficiency. And it is a need of the hour to have multiple measures to measure different parameters of teaching effectiveness. [35]

Further, Linda Tyler suggested parameters of measuring effectiveness of teaching as: Student-performance data, classroom observation and feedback from students. The assessment of teacher effectiveness can be based on technical requirements like generalization, evaluation, extrapolation and implication. [36]

Lawrence Ingvarson et al mentioned the parameters for evaluating the teacher such as Government regulations and requirements, Professional standards, Outcomes of teaching, Theories grounded in practice, What teachers are doing, What others would like teachers to be doing and What teachers should be doing.[37]

T.H. Nguyen developed an electronic tool for measuring the teaching performance for a particular engineering course based on selected learning objectives and actions to be taken for improvement of course quality Communication skill, Student focus, Knowledge/Expertise, Attitude about enhancing student learning, Interaction with students, Teaching performance improvement. These parameters and its evaluation is
in tune with ABET requirement. The Performance Index of an engineering class was an outcome of the experiment conducted.[38]

Pradipeta Biswas et al identified a metrics for evaluation of teacher and student’s performance by a novel approach of on-line examination held at different time of a course. It is based on case study at a premier engineering institute for 4 courses. [39]

As per the notification issued by UGC, http://www.ugc.ac.in/pdfnews/3375714_API-4th-Amentment-Regulations-2016.pdf

student feedback is an integral part of academic development and in fostering quality education. Student feedback on teaching, delivery, methodology, pedagogy play pivotal role for quality education. UGC has proposed academic performance indicators (APIs) for evaluation of teachers for recruitment, career advancement and promotions on 3 criteria, out of which T-L process has 60% weightage:

(a) Teaching, Learning And Evaluation Related Activities (Minimum API required 75 out of 125): is based on direct teaching, examination work, innovative T-L process adopted, teaching new courses, mentoring, updating of domain knowledge.

(b) Co-Curricular, Extension And Professional Development Related Activities (minimum API required 15 out of 50): is based on student related Co-Curricular activities, administrative responsibilities, professional development activities, seminar, training courses, conferences, workshops, expert talk, refreshers courses, faculty development courses etc.

(c) Research And Academic Contributions: It has 3 components

i) Publication of research paper in referred journal, publication of book or chapter of book.

ii) Research projects include sponsored and consultancy projects, outcome of Research projects in terms of patent, transfer of technology, product development.

iii) Research guidance: guiding student of M.phil, PhDs, Receipt of fellowships and awards, development of e-learning resource study materials.

All these APIs are based on the teacher’s self-assessment records which are verified by screening /evaluation committee. The minimum API score required is different for different levels of promotion and between university and colleges. Teacher will have to score minimum APIs related to respective criteria, to become eligible for the scheme mentioned. [40] [41]

Student evaluation is useful, convenient, reliable, and valid means of self assessment and improvement for the teacher which motivates to improve faculty performance.
The quality of teacher, quality of the students, infrastructure, administration and extent of training and placement decides the performance of an institute. For evaluation of performance of the teacher, Avijit Muzumdar has applied Multi-Criteria-Decision Making (MCDM) technique by COPRAS method is useful to prioritize attributes which influences performance level of a teacher.[42]

The teacher assessment should be done with clear purpose to evaluate summative assessment) or formative assessment. It is recommended by Richard Felder et al. that student feedback must be averaged over at least a period of two-years.[43]

The students are the prime beneficiaries of any institute. The main role of any educational institute is to provide the best education for its students and improve their performance which leads to the best possible employability. Kinjal Jakhariya et al. suggests the prediction system through data mining for tracking the performance of students which will help to improve student’s performance by the teachers of the institute.[44]

The student’s performance is also dependent on environmental factor and psychological factor in addition to the factors identified by other researchers. A. Dinesh Kumar et al. claimed that the data mining technique will be useful to predict these factors and the performance of such weak students can be improved through counseling by a teacher.[45]

To serve the best purpose of education, the policy of compulsory attendance with a threshold is more advisable to improve the performance of students says Rudina Guleker .[46]

Patrick Purcell claimed that regular attendance in a class has a significant and positive effect on examination result.[47]

Sarth Chandar Rao Sanku et al., proposed solution for improving students’ performance. The teacher must prepare a semester plan with continuous assessment, lesson plans and guidelines, aligning the student learning outcomes with an effective pedagogy method and to take efforts to improve English communication (oral and written) are the methods for significant improvements in student performance and motivation also.[48]

Elaine Keane et al. proposed the course based model for student feedback system to improve the quality of course contents. He claims that students’ evaluations of teaching are reliable and valid. To get unbiased feedback care should be taken to ensure that students remain anonymous and that faculty is not present during
administration of any feedback mechanisms used. Also the purpose of the evaluation should be clearly explained to students and information should be provided regarding the analysis of their feedback and corrective actions & plans for received information to students  [49]

It is a universal truth that, a person will perform with his fullest capacity provided he/she is satisfied and derives happiness from his work. The study has shown that, the factors which affect job satisfaction positively are Work Environment (Fellow Employees, Ambiance of work place, Safety Measures, Administrative Workload, Teaching Workload), Compensation (Timely payment of salary and increments, Remuneration Satisfaction, Transparency in remuneration, Monetary incentives, Leave/Funding for research activity), Self Development opportunity (Advanced job training, Development of professional skills, Modern pedagogy approach) and Appraisal (Open appraisal, Timely redressed of problem, Transparent and fair system of feedback, performance evaluation, reward of good work, dealing with personal issues). The job satisfaction of employees is collective efforts of management and the faculty members say Mishra Sarika. [50]

Retaining such satisfied employees is a key challenge in front of management of private institutes. The success of any institute depends on attracting, developing, and retaining competent and qualified teaching staff. Beyond monetary quantification, such faculties need to be valued and trained. Such a satisfied and happy group of faculty will definitely lead the institute to the new heights. While an opposite action may hamper the institute badly. Dolly Lavina et al. proposed the methodology for retaining the talented faculty.[51]

Manoj Kumar also suggested the strategies for attracting, and retaining the best performing faculties such as recruitment and selection process, offering an attractive compensation package, creating best physical infrastructure, academic planning, work load, transparent performance appraisal system, faculty freedom and pro-active retention endeavors. [52]

In view of Dr. V.P.Gosavi, private institutes have increased in number, it is a fact that, maintaining expected quality and attracting meritorious students as well as faculty is a critical challenge in front of these institutes. Though the monitoring mechanisms and guidelines are provided by competent authorities, the attitude of management is not serious to comply with the lacunas and they adopt delay techniques. On an average 25% seats remains vacant in engineering institutions and may increase in future due
to negligence of the management, poor university result, poor campus placement, no effective teaching learning process and less attention on recruitment of qualified and sufficient number of teaching faculty. It is claimed that, if the management voluntarily and exactly follow the norms laid down by the universities, Government, AICTE, NBA, NAAC, it will have a positive effect on the problem of vacant seats.[53]

In the state of Maharashtra, the admission process for undergraduate engineering courses is conducted through centralized admission system by the state government. Since the students get admission to a particular institute on the basis of marks obtained in the qualifying examination, Hemant Abhyankar et al suggested empirical probability factor for successful completion of undergraduate course of engineering in four years on the basis of marks obtained in the qualifying examination.[54]

Pushkar Dubey studied, Factors affecting choice of Engineering Colleges in Odisha. He has administered structured 200 questionnaires with 27 different variables, to 200 students who came for the final choice of engineering college at 5 different nodal centers. A pilot study was undertaken on 20 respondents to find out the adequacy of questionnaire. Five point scaling was used to rate 27 variables. Analysis of collected data was done by using factor analysis and reliability test. The analysis says following factors have highest priority.

Advertisement, Famous and experience faculty, Number and qualities of faculty, Good infrastructure, Location of the institution, communication facilities, fee structure, older institute, hostel and its facilities, good university results, Good track record of institution, branch result, Good overall teaching, Regular theory and laboratory classes are conducted. Variables with moderate priority are: Elder’s suggestion, availability of branch of my choice, College nearer to home, extracurricular activities in the college. Less significant Variables are: Ragging history of the college, strict college administration, library facilities. [55]

Faculty shortage and quality of higher education are the two issues addressed by Chiranjibsen Sen in terms of ‘demand and supply’ of higher education services. The problem of faculty shortage and implementation of government policies are the key challenges in providing adequate quantity of higher education services and maintaining high quality.[56]

The problem of acute shortage of qualified and competent faculties/teachers is being witnessed at all levels, that is in most premier technical institutions in India, Majority of Institute are failing to meet the guidelines prescribed by the top regulatory bodies.
viz UGC & AICTE. The paucity of qualified faculty is felt even more serious in professional and technical institutions. Due to increase in number of technical Institute and number of student studying, institutions are facing a faculty shortage to the extent of 67% all over the country. As per U N Rao committee in 2000-01, for engineering institutions total teachers required were 60,970 (8,710 professors, 17,420 readers and 34,840 lecturers) with professional qualifications 26,130 Ph Ds and 34,840 M Techs. and available were 5,862 Ph Ds and 11,035 MTech’s, which tends to shortfall of around 70 per cent. So one can imagine the quality of students being churned out due to such huge shortage.

It is because of inability of institutions to attract and retain qualified and trained faculty of high order, bureaucratic process. Apeejay Stya Education Research Foundation suggested providing autonomy to appoint competitive faculty and offer pay structure comparable with industry, to offer more allowances, freedom to undertake consultancy arrangements and avail of attractive perks such as housing facilities in case higher salaries are not possible. Flexibility in appointment, in age limit and qualification is necessary to ensure quality Faculty. [57]

The experiment conducted by Mike Elmore et al., Binghamton University, suggests that students must have an option of either attending a lecture or preparing through viewing a video recording of the lecture. This experiment concludes that these options do not affect negatively on students performance. [58]

About 86% engineering students takes education in Self financing private engineering colleges. Zakir Husain claims that student passing out from such colleges have poor quality of education due to the reasons viz, Lack of faculty, Poor learner quality, Rigid and obsolete curriculum, Dearth of R & D activities, Poor physical infrastructure etc. Solution to meet the future challenges could be financial incentives/support for setting up campuses of higher education with private or corporate organizations, to offer quality programmes at the less cost. fixation of fees should not be in control of state, Involvement of foreign partnership (FDI) in education, accreditation of courses [59]

2.2 Summary of Literature Survey
Researcher has studied the relevant literature and noted important finding with respect to following.
Meaning of quality and what is expected by quality in education. The present monitoring mechanisms for quality assurance viz. NAAC, NBA, University are studied. The outcome of implementation of TEQIP and its KPI are noted. Factors which affect quality of engineering education and present challenges faced by Institute, particularly those which are located in rural places are studied. These influencing factors are GER, govt. policies and its effect, unplanned growth of engineering Institute, availability of T-L process, shortage of qualified faculties/teachers, job satisfaction and retention of teachers, reasons for unemployment, expectation and commitment of all stakeholders to achieve excellence in education.

Use of TQM, ISO, Six Sigma, SWOT analysis, MCDM as tool to improve quality of education. The methods/procedures to apply these tools for improving academics, research, administration, infrastructural facilities, university result, placement opportunities, expectation of all stakeholders and overall development of Institute.

How values, skill & knowledge (VSK) helps for preparing quality teachers particularly fresh teacher, Use of IUCEE (train the trainer), the necessary framework of professional learning based on pedagogy, training will contribute for improvement. Does classroom teaching is effective over all other methods, effect of student attendance in class, is studied.

Student feedback, its importance, reliability and outcome to improve quality of teaching and for measurement of performance of teacher is studied. Various attributes related to performance of teacher and its measurement, role of teacher, measurement of efficiency and effectiveness of teaching, the applicable APIs defined by UGC are studied.

Further the study contains the literature about what are the parameters to attract meritorious students to an institute during admission process and what are the prioritized influencing parameters considered by student while selecting a particular Institute at the time of admission?

Study indicates that job placement is the topmost parameter to identify quality Institute in addition to existence of Teaching-Learning process, availability of qualified and number of faculty, university result of Institute.

2.3 Gap Analysis in Literature Survey

In the country quality of technical education is monitored through AICTE, UGC, NAAC, and NBA. The overall literature review indicates that the guidelines or Key
Performance Indicators to assure quality are available for the institutes having age more than five years through mechanism of NAAC, NBA and the schemes like TEQIP. Researcher has studied NBA guidelines as mentioned in 2000 till 2010 manual for assessment of Institute. Institute becomes eligible for NAAC & NBA assessment after 2 batches are passed out. The infrastructure requirement is mandatory as per AICTE norms and also considered while establishing the institute without which Institute cannot get permission to function. No doubt, it is mandatory to follow all basic norms of NAAC and NBA, by the Institute. However all the norms may not be so important for newly started engineering institutions. It is to note that the criteria of assessment of institute by NBA have almost 70% weightage (700 marks out of 1000) for Teaching learning process, Human resource (faculty, student). Therefore its major concern that in what way newly established Institute will be strong enough for T-L process, and faculty, student aspect. It is observed as research gap that, no such guidelines or Key Performance Indicators (KPI) for newly established engineering institutes are available. During the literature review, the researcher has noted an important issue that the challenges / difficulties of newly established institutes that to again in rural area, are very much different than established ones.

The gap analysis shows following issues which are not addressed and need consideration:

1. Efforts required ensuring 100% admissions in newly established engineering institutes that to in rural area of Maharashtra.
2. Challenges in front of newly established engineering institute in rural area of Maharashtra.
3. Quality of aspiring candidates interested in teaching profession.
4. Training of teachers who have accepted teaching as profession and are new to the profession.
5. Identification of essential and desirable qualities that a teacher must possess.
6. Method to measure these qualities on scale and to define performance index of a teacher.
7. Monitoring mechanisms to ensure that effective teaching-learning takes place in a newly established engineering institute in rural area.