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"A COMPARATIVE STUDY OF ENGINEERING EDUCATION IN INDIA UNDER VARIED MANAGEMENT"

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ABSTRACT

India has the opportunity and potential to be a global technology leader. The Indian economy has been growing @8 % per year. The Indian industry has globally competitive in several sectors and can increase its global market share.

KEYWORDS: *Varied Management , Engineering Education , Indian industry.*

1.INTRODUCTION :

- The College of Engineering, Guindy, Madras (1794),
- Engineering College at Roorkee (1847),
- Poona Civil Engineering College at Pune (1854),
- Bengal Engineering College at Shibpur (1856),
- Banaras Hindu University (1916),
- Visvesvaraya College of Engineering (1917) and
- Harcourt Butler Technological Institute, Kanpur (1920).

In 1945, the Sarkar Committee was appointed to suggest options and futurefor advanced technical education system in India. The Sarkar committee recommended and suggested the establishment of higher technical institutes based on the Massachusetts Institute of Technology in the various placesof four regions of India. This resulted in the setting up of the five Indian Institutes of Technology1.

1.I.I.T. Kharagpur in1950,
2.I.I.T. Bombay in 1958,
3.I.I.T.Kanpur in 1959,
4.I.I.T. Madras in 1960 and
5.I.I.T. Delhi in 1961.

2.GROWTH OF TECHNICAL EDUCATION:

After Independence in 1947, Technical Education System has grown into a fairly large-sized system, offering opportunities for education and training in a wide variety of trades and disciplines at certificate, diploma, degree, postgraduate degree and doctoral levels in institutions located throughout the India. In the year 1947-48, the country had 38 Degree level institutions with intake capacity of 2,500 students and 53 Diploma level institutions with intake capacity of 3,670 students. The intake for Post Graduates was 70 students. There was rapid expansion of the education system in the next 20 years. By 1967-68, the number of Degree level institutions had increased to 137 with intake capacity of 25,000 students; and for Diploma to 284 institutions with intake capacity of 47,000 students. In the next 10 years in the Year 1977, the system capacity increased only marginally to admit 30,000 students for Degree courses, 60,000 students for diploma courses and 6,000 students for Post Graduate courses.

The Engineering education system capacity increased very rapidly in the next 20 years, with the major role being played by the Private sector. By 1997, the system had 547 Degree level institutions with admission capacity of about 131000 students and 1100 Diploma institutions with admission capacity of about 184000

students. A admission capacity for Post Graduate courses had increased to 16,900 students. Out turn of Ph.Ds. were about 370 annually and By 2006, the system had 1511 degree level institutions with admission capacity of about 6,59,717 students and 1997 Diploma institutions with admission capacity of about 6,03,318 students.In the year 2013-14, the total number of engineering institutions, not including the IITs, NITs and university colleges rose to 3384 with admission capacity of 16,34,596 students; and 3436 engineering Diploma institutions with admission capacity of 11,35179 students. Approximately, two-thirds of these institutions were in the private sector1.

3.IMPORTANCE AND SIGNIFICANCE OF THE STUDY:

In our country Institutions offering engineering programmes can be broadly classified into four major categories:

1) Autonomous, 2) Government, 3) Aided, and 4) Self-financing Institutions.

These are work under different circumstances with different working styles.

1. Autonomous colleges:-The Autonomous intuitions enjoy academic, administrative as well as financial autonomy.Indian Institute of Technologies (IITs), National Institute of Technologies (NITs) and some other high profile Colleges function as autonomous institutions in India. Most of them are 'Deemed Universities'.

2. Government colleges: -The Central and State Governments administer this category of institutes. All India Council for Technical Education (AICTE), State Governments and Universities, to which these colleges are affiliated, fix pay scales and service rules for the staff employed in these categories of colleges. University is mainly responsible for the framing of rules for the academic part of these colleges. They frame course duration, subjects to be taught, examination pattern, and the grading system. Government, based on merit as well as reservations, carries out the annual admission process of student.

3 Aided colleges: -These category of colleges is coming under Grant-in-aid sector. Education various societies or private bodies are managing these institutes. They take the responsibility of providing capital investment/assets like land, buildings, etc. Government provides salary and other working expenses to these category colleges. AICTE, State Governments and Universities, to which these colleges are affiliated, fix pay scales and service rules for the faculty and staff employed in these colleges. University frames the course duration, subjects to be taught, examination pattern, and grading system. Government and Management, based on merit as well as reservations, admit students to these colleges.

4 Self-financing colleges: -These category of colleges is working fully under self-financing basis. The Various Education societies or private bodies which take up the responsibility of running these institutes are mainly responsible for providing physical facilities like land, Building, labs & other assets, teaching staff and other supporting staff for these programmes. University frames the rules for the academic part of these colleges. Students are admitted partly from the merit list prepared by the government and partly from a list prepared by the management under management quota.

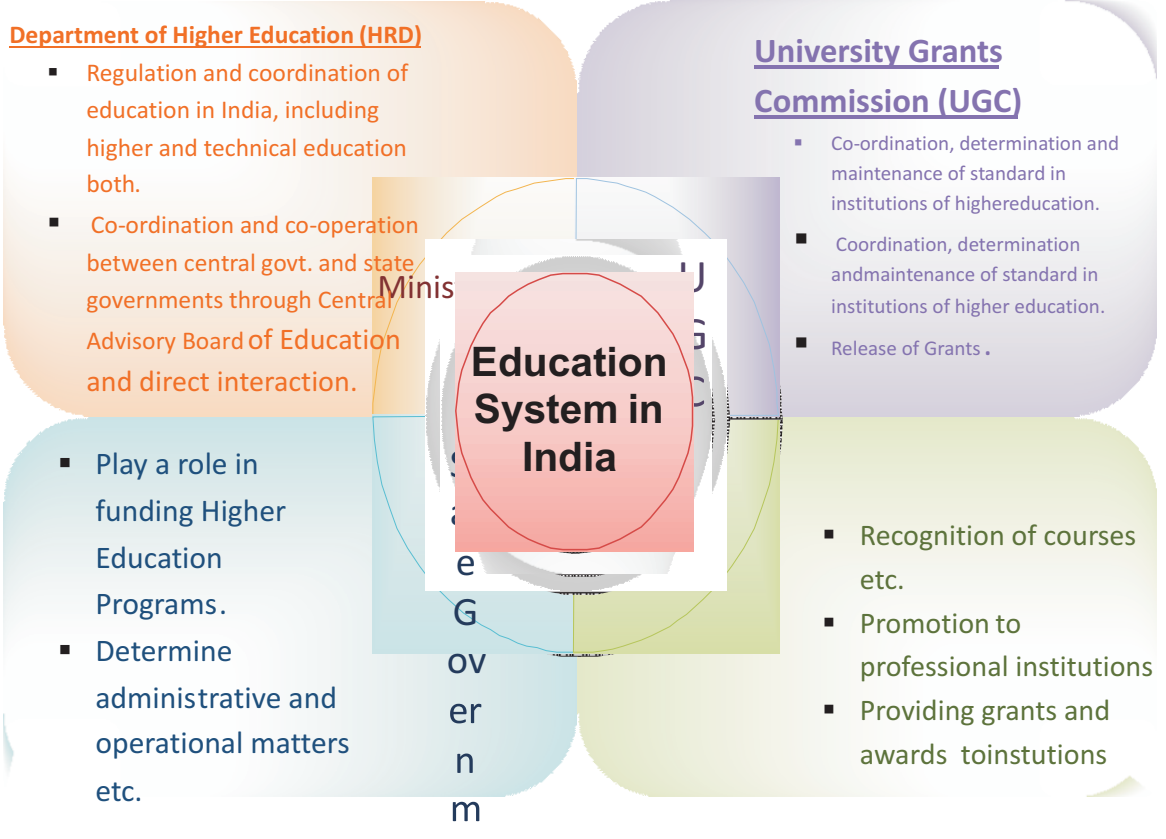
4. ENGINEERING COLLEGES IN THE DEVELOPMENT OF NATION:

1.Local self-government bodies at village and semi urban level lack funds and they find acute shortage of technical manpower. Engineering students and faculty need practical experience for value addition. Both these objectives can be meet if students do Engineering Projects for communities. If the projects are introduced at an early stage substantial work can be done. The new batches can built on the work done by earlier batches so that there is continuity. Those projects which contribute to social, economic and environmental development should be promoted.

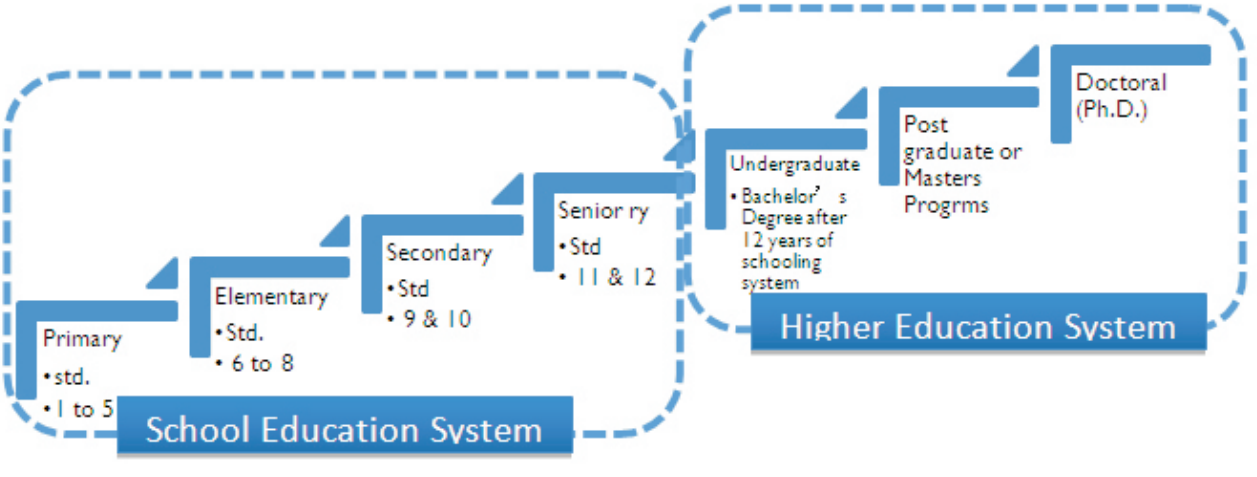
2. The Taking inspiration from P M Clean India Mission, Civil Engineering students can work on projects for water treatment plant, wastewater treatment and recycling, Solid waste treatment and recycling etc.

3. Computer Engineering (CSE & IT) students can take projects to for office automation of Municipal Councils, Tahshis and Gram Panchayats. These projects contribute to skills and sustainable development of nation.

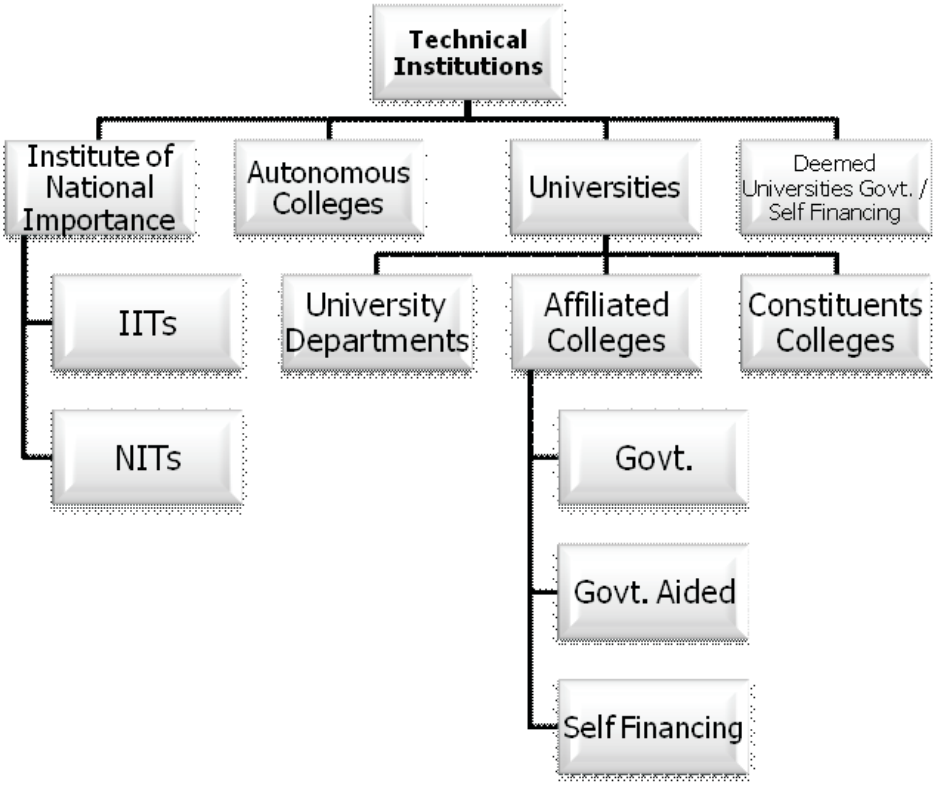
5.HIGHER EDUCATION SYSTEM IN INDIA:[1]



6.EDUCATION SYSTEM IN INDIA:



7.TECHNICAL EDUCATION INSTITUTIONS IN INDIA [2]:



8.TECHNICAL INSTITUTIONS – IITS:[2]

- Institutions of National Importance through an Act of Parliament.
- Indian Institutes Of Technology(IITs): Started in 1950.
- First IIT established in Kharagpur in 1951.
- Other IIT's set up in Kanpur, Bombay, Madras and Delhi between 1953 -1961.
- There are 16 IITs in the country at present.
- The respective Senates have full control of their curriculum, conduct their own examinations and issue their own degrees.
- Fully autonomous each having an independent Board of Governors.

9.TECHNICAL INSTITUTIONS2–NIITS :

- National Institutes of Technology (NITs): Started in 1959 as Regional Engineering Colleges (REC): as joint ventures of Govt. of India and the respective state Governments.
- The first REC was established at Warangal.
- RECs re-designated as NITs and are now fully funded by the Central Govt.
- There are 30 NITs in the country at present.
- NITs are controlled by NIT Council enacted through an Act of Parliament, similar to those of the IIT's.
- The respective Senates have full control of their curriculum, conduct their own examinations and issue their own degrees.

10.TECHNICAL INSTITUTIONS2 - UNIVERSITIES

- There are Central/State Govt. funded universities with many different academic programs including technical programs.
- There are also exclusive technical universities in the state Govt. sector conducting engineering programmes.
- Some universities also have affiliated colleges under their academic control for curriculum, examination and

granting of degrees.

11.TECHNICAL INSTITUTIONS[2]–DEEMED UNIVERSITIES

• There are Govt. and Self financing deemed universities.
• Indian Institute of Science, Bengaluru and School of Planning & Architecture are two examples of centrally funded deemed universities.
• There are more than 100 Self financing deemed universities - These universities do not receive Government funding and depend on tuition fees and other resources for funding.
• Both Government and Private universities have their own curriculum, conduct their own examinations and issue their own degrees.
• These universities do not have affiliating power.

12.TECHNICAL INSTITUTIONS [2]–AUTONOMOUS INSTITUTIONS

• These institutions have limited affiliation with state universities.
• Have full control on their curriculum, examination and also enjoy financial autonomy.
• The degrees are awarded by the State universities.
• There are more than 60 such autonomous institutions in the country.

13.TECHNICAL INSTITUTIONS[2]–AFFILIATED INSTITUTIONS

• There are 177 Government, 54 Government aided and 3073 Self financing colleges in the country offering programs in Engineering which are affiliated to state universities.
• Govt. institutions are funded by the State/Central government.
• The State universities control the curriculum, conduct the examination and award the degrees.

14.TECHNICAL INSTITUTIONS[3]:

1.Govt. Aided Institutions:

• These institutions are managed by a society/trust and are funded by State Government for recurring expenditure.
• The State universities control the curriculum, conduct the examinations and award the degrees.

2 Self-Financing Institutions:

• These institutions are established by private Societies/Trusts and the companies registered under section 25 of Companies Act.
• These institutions do not receive any financial assistance from the Government. However, they are eligible for special grant on a competitive basis.
• The State universities control the curriculum, conduct examinations and award the degrees.

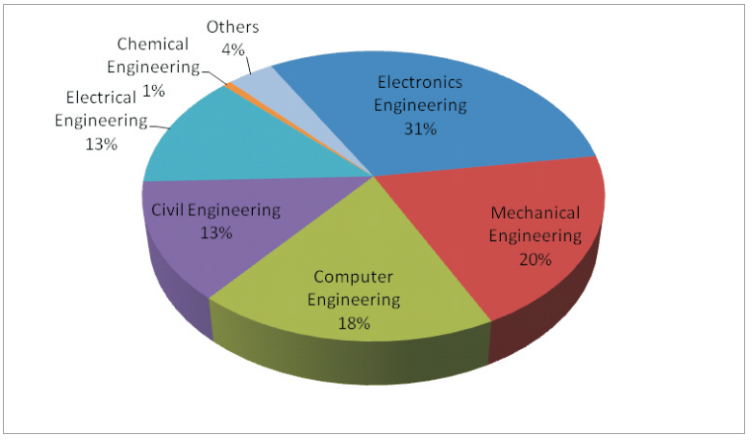
15. Role of AICTE in Technical Education:

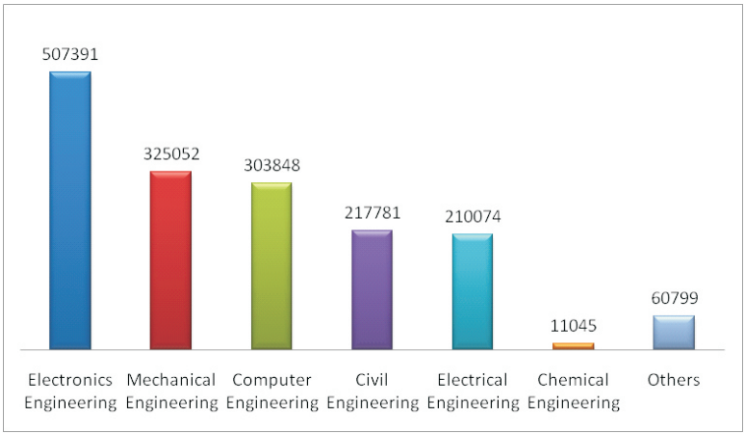
• Grant approval for starting new technical institutions, for introduction of new courses or programmes.
• Formulate schemes for promoting technical education for women, handicapped and weaker sections of society.
• Promoting innovations, faculty, research and development, by providing grants to technical institutions .
• Coordinate the development of technical education in the country at all levels.

16.Entry Qualification4:

Diploma level	Under Graduate level	Post Graduate level	Doctoral level
• 10 years of schooling with Science & Math subject	• 12 years of Schooling with Physics, Chemistry &Math's subject OR • Diploma holders are eligible for admission in 2nd year of Under Graduate Programs	• Under graduate	• Typically a Post Graduate Degree

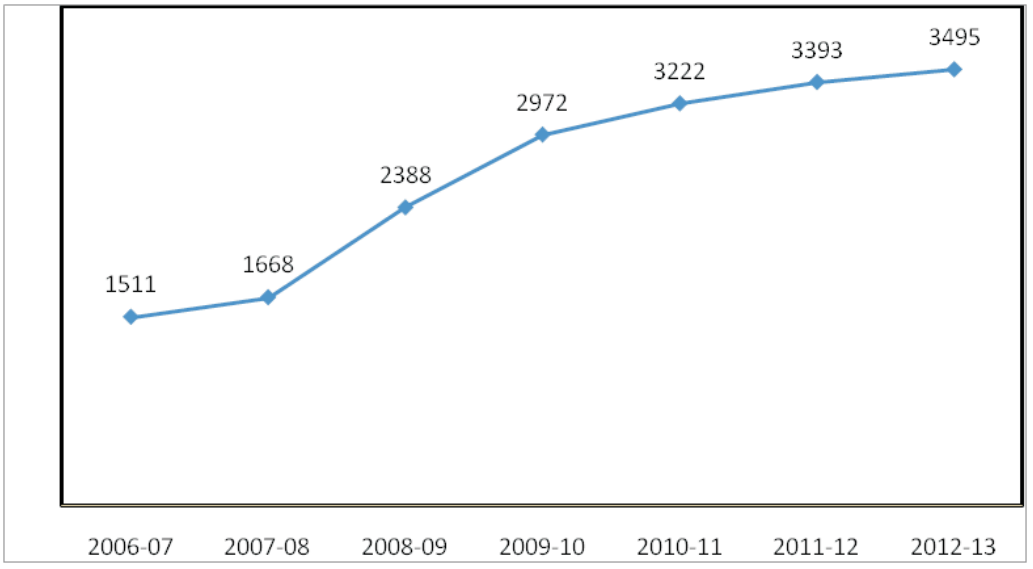
17.Course Wise Approved UG Engineering Intake For the Year 2013-14 :2



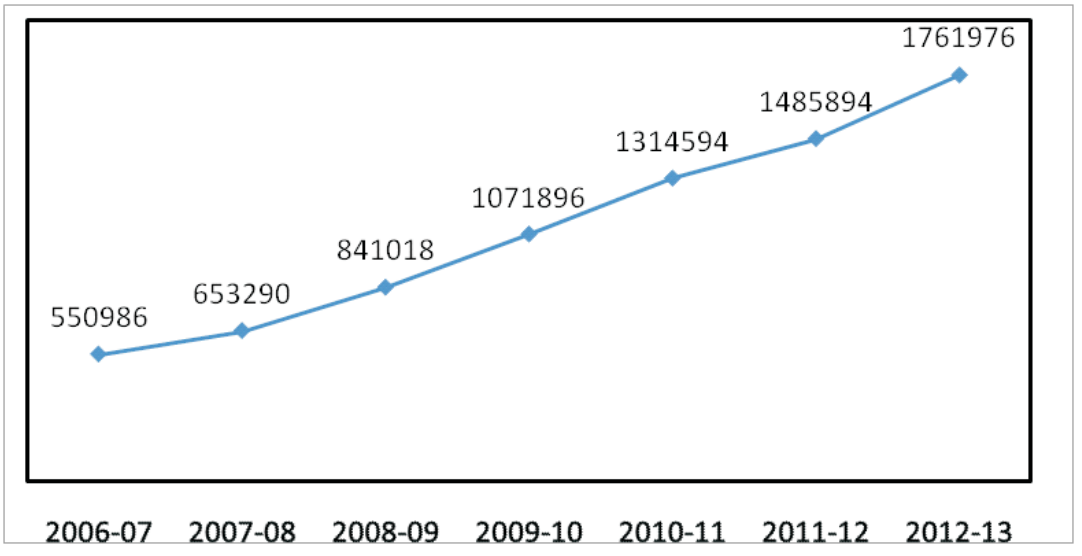


Total Intake – 1.64 Million

18.Growth Of AICTE Approved Technical Institutions :[2](Table/Graphs – 10)



19. Growth Of intake in AICTE Approved Institutions in Last Five Years



20.Overall Picture of Engineering Education:

A complex multi-tiered, multi-layered system; from internationally renowned IIT and equivalent systems to colleges focussing on UG education.

1. A Very large system

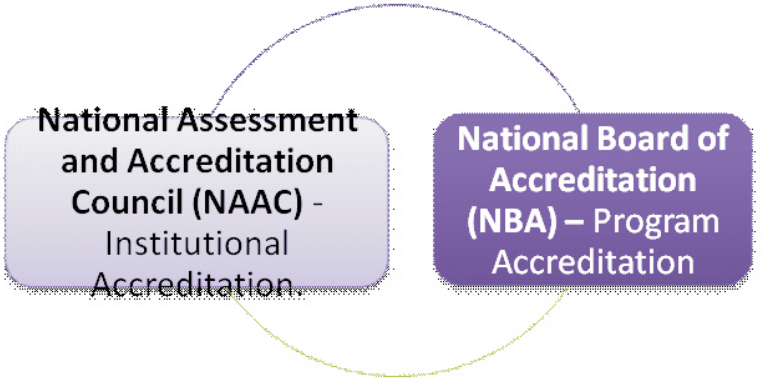
2.A large part of relatively recent vintage. Some definitely suffering from resource crunch, leading to infrastructure issues, but fast improving.

3. Faculty numbers and quality improving, but remain an area of concern.

4. Offers challenges to Government, and also to quality assurance organisations like NBA.

21.Quality Assurance in Higher Education :[2]

Accreditation bodies for Higher education Two main system:



1.Established in the year 1994 under Section 10 (u) of AICTE Act.
2.Nation Board of Accreditation (NBA) became Autonomous in January-2010 and in April, 2013 the Memorandum of Association and Rules of NBA were amended to make it completely independent of AICTE, administratively as well as financially.
3.NBA is now independent in its functioning, decision making as well as financially: does not receive any grant either from the government or from any regulatory body of technical and higher education.

2 .NBA Vision and Mission:6

To become an accrediting agency of International repute and credibility in assurance of quality and relevance of professional education and come to the expectations of its stakeholders, viz., academicians, corporate, educational institutions, government, industry, regulators, students, and their parents."

To stimulate the quality of teaching, self–evaluation, and accountability in the higher education system, which help institutions realize their academic objectives and adopt teaching practices that enable them to produce high-quality professionals and to assess and accredit the programs offered by the colleges or the institutions, or both, imparting technical and professional education."

21.FINDINGS:

Many factor lead to poor quality of education in India. Some of these are:
1) Shortage of quality faculty member.

2) Inadequate physical infrastructure and funds.
3) Lack of autonomy.
4) Rigid and outdated curriculum.
5) Poor quality of training.
6) Absence of Research& Development (R&D) activities.
7) Poor learner quality.
8) Ineffective linkage with industry.
9) Societal Linkages

22.SUGGESTIONS :

Following are some of the suggestion which can improve the present state of affairs in the sector of engineering education in India:

1. To reduce the faculty crunch, retired faculty should be hired and the services of qualified engineers from the industry and Research &Development institutions can be taken in academic institutions.

2.To make teaching profession more attractive, exiting and research-oriented, financial and other incentives such as research grants should be offered to perspective and existing teachers. Better performing teachers should be rewarded with higher remuneration.

4. It should be mandatory for all engineering colleges, private or public, to depute some faculty members per year for obtaining higher degree.

5.Greater autonomy to the institutes and teachers is the need of the hour. The autonomy of a teacher is the precondition for his successful functioning. As a member of society, a teacher has the additional function of facilitating the process of social transformation also. He should not be forced to just follow the instructions of the administrators, but should be given adequate autonomy and academic freedom to carry and express his ideas. The example of IITs is before us to emulate in this respect.

6. The industry and R&D organizations should be encouraged to send their engineers for PG studies with ample incentives. Research projects should involve cooperation and collaboration between academia and industry.

7.Indian academic institutions should be encouraged and facilitated to forge close academic collaboration with foreign universities by way of exchange of faculty and students. More opportunities should be created for joint collaboration and research. One of the factors contributing to the success of IITs is the close collaboration with foreign institutions.

8.Only those engineering institutions should be allowed to function who achieve accreditation of their streams within specified time frame. The main challenge is to create an academic environment and education system that promotes and ensures learning. The process is quite challenging, but not impossible to achieve with honest efforts

9.National Board of Accreditation (NBA) is entrusted with the task of periodically evaluating technical institutions and programs based on the norms and standards laid down by the All India Council of Technical Education (AICTE).

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