

ENGINEERING EDUCATION IN INDIA -NEED FOR INDUSTRY-INSTITUTE INTERACTION

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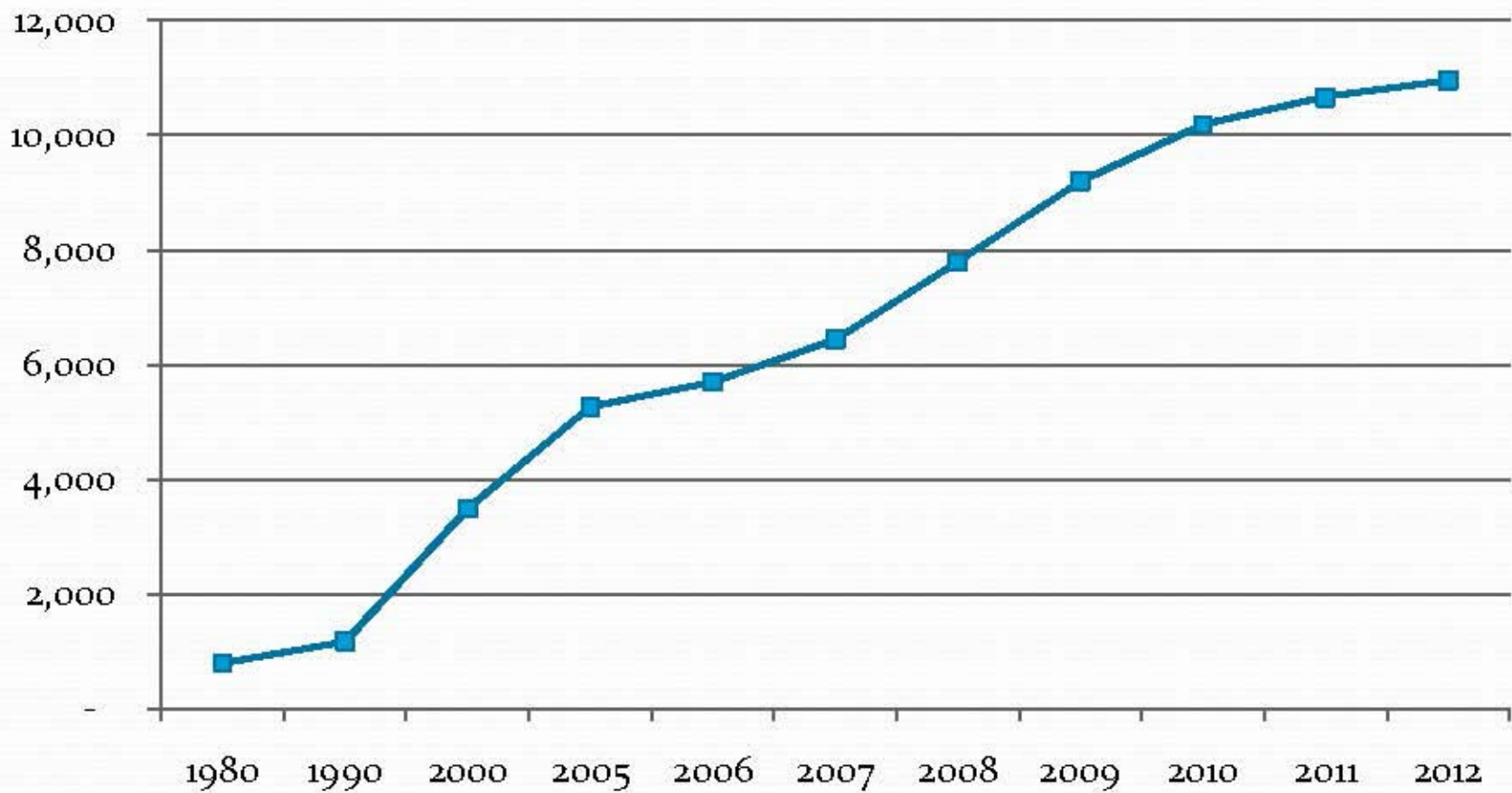
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INTRODUCTION

- ❖ 13,500 Million Population
- ❖ 10,950 Technical Institutes at UG Level (90% Private)
- ❖ 25% of UG Emmployable (MCKinsey and NASSCOM report)
- ❖ Quality of Technical Education in India at UG,PG,&Ph.D. levels
- ❖ Severe Shortage of Qualified and Competent Faculty & Infrastructures
- ❖ Need for Industry-Institute Interaction
- ❖ R & D IS IN VERY POOR STATE

GROWTH OF TECHNICAL EDUCATION IN INDIA



COMPARISON OF ADMISSIONS BETWEEN INDIA AND USA AT UG,PG & Ph.d LEVELS

	INDIA	USA
□ UG Level	15,00,000	75,000
□ PG Level UG)	7,500 (5% of UG)	37,500 (50% of UG)
□ Ph.D.Level	1,500 (0.1% of UG)	7,500 (10% of UG 500% of India)

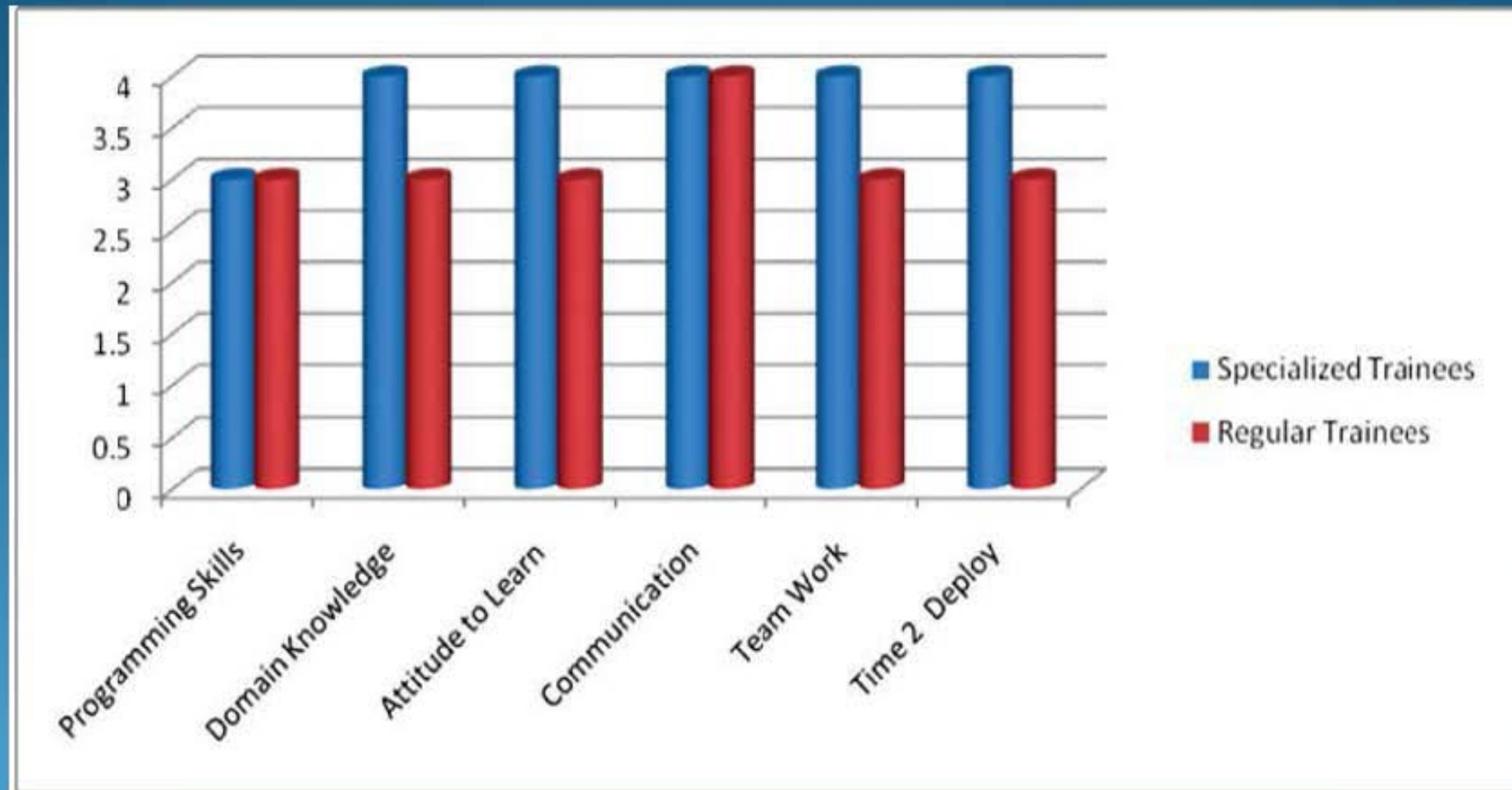
DEFICIENCY IN CURRENT ENGINEERING EDUCATION

- ❖ The Greatest Deficiency of Engineering Education in India is lack of Industrial Experience
- ❖ Currently, undergraduate program in engineering/ technology is overloaded with heavy dose of theory in diverse subjects of stereotyped nature - often unrelated to the discipline of their specializations.
- ❖ Most of the teachers and instructors have little or no industrial experience.

COMPULSORY PAID INTERNSHIP FOR ENGINEERS

- ❖ Medical Graduate has to undergo compulsory Internship in Hospitals prior to graduation
- ❖ Likewise Engineers must complete one year paid internship in Industry/Research Institutes/Consultancy/Educational or Research Institutes etc. to become eligible for a degree.
- ❖ Academic process must be fine tuned to produce Industry ready graduates. Some of the Attributes a Trainee Engineers must possess are

ATTRIBUTES TO BE FULFILLED BY A TRAINEE ENGINEER



QUALITY OF ENGINEERING EDUCATION

- ❑ One of the most important factors for deterioration of quality of engineering education is the mushroom growth of engineering colleges without requisite infrastructures
- ❑ Universities offering degrees have very little say or control in those engineering colleges which are neither financially nor administratively controlled by the university with which they are affiliated to.
- ❑ Such affiliating type universities should be replaced with technical universities, offering courses in diverse disciplines with research facilities for achieving quality of technical education in India.
- ❑ Proliferation of private commercial type profit making engineering colleges in the city areas should be stopped.

QUALITY OF POST GRADUATE EDUCATION

- ❑ Postgraduate education, research and consultancy in engineering and technology in India are confined to only a few institutions like IITs and NITs and few universities.
- ❑ Despite attractive scholarships, nearly 60 per cent of over 19,000 sanctioned postgraduate seats (in 191 institutions) remained vacant while less than 7,000 completed the PG courses annually (Kakodkar-2011, Subbarao-2013).
- ❑ Very few UG students from IITs and NITs join PG courses there. Majority of their PG students come from private/state run colleges for getting an IIT/ NIT stamp.
- ❑ There is no motivation and students are reluctant to do any hard work partly because of their poor UG background but mostly due to want of proper guidance.
- ❑ They utilize the scholarship, libraries and hostel facilities for preparing for IAS and similar examinations for an assured future.

QUALITY OF POST GRADUATE EDUCATION (Cont.)

- ❑ Postgraduate students who mainly perform teaching and R&D works join the PG program as a last choice only when they do not qualify in other all India examinations like IAS, IES, IFS, etc. or do not get any appropriate job.
- ❑ PG education in India is definitely substandard when compared with that in developed countries like USA, Europe, Australia, Canada, etc.
- ❑ Majority of the bright and meritorious students in engineering and technology leave India for higher education and research abroad due to their better infrastructures, quality teaching and research guidance, higher remuneration and due recognition of their work.

QUALITY OF POST GRADUATE EDUCATION IN INDIA -LACK OF INFRASTRUCTURES

❑ Some of the factors responsible for poor quality of PG Education in India are (Ashok, 2007):

- ❑ Inadequate and Incompetent Faculties,
- ❑ Inadequate Physical Infrastructure and Funds,
- ❑ Lack of Autonomy,
- ❑ Rigid and Outdated Curriculum,
- ❑ Poor Quality of Industrial Training,
- ❑ Absence of R & D activities,
- ❑ Poor learner Quality,
- ❑ Ineffective Linkage with Industry

QUALITY OF POST GRADUATE EDUCATION IN INDIA -LACK OF ADEQUATE AND QUALIFIED FACULTY

- ❑ The biggest problem of engineering education in India lies in non-availability of quality faculty
- ❑ An Institute can never grow and develop with part time and ad-hoc type old and retired teachers alone.
- ❑ Young post graduates with strong fundamentals and motivation for research and development form the backbone of any technical institution.
- ❑ Faculty should be recruited very carefully and trained under the careful supervision of senior faculty members. AICTE may introduce earlier Teachers Training Scheme
- ❑ Faculty should be paid salaries and perks as enjoyed by their counterparts in Industry.
- ❑ It is the teachers who mould a student to be professionally competent to deliver the goods to our society.

QUALITY OF POST GRADUATE EDUCATION IN INDIA -SHORTAGE OF FACULTY

Table 1. Severe shortage of Quality Faculty

Annual intake at UG level	15,00,000 per year
Faculty required for running UG Program (@1:15 faculty : student ratio)	1,00,000
Faculty shortage at UG level	80,000
Shortage at Master's level	20,000
Shortage at PhD level	60,000

POOR STATE OF R&D AND CONSULTANCY

- R&D and consultancy works act as a nucleus in all developmental activities.
- University professors and the young research scholars comprise an enormous pool of expertise and resources.
- It must be tapped to solve many a challenging problems faced by the society in the fast changing world with global competition.
- A major problem being faced by our educational, research, consultancy and industrial institutions today is how to attract and retain qualified and meritorious persons.
- Most of the research works in India end with publications with little or no application in field (Mazumder-1999, 2014).

POOR STATE OF R&D AND CONSULTANCY (contd.)

- A spirit of creativity is essentially needed for pursuing research and development works.
- There is hardly any invention in the large numbers of our universities and technical institutions in the country.
- Unless the quality of our education and research in science, engineering and technology are upgraded further, we have to pay heavily in future for our neglect
- Developed countries will monopolize jobs related to R&D and consultancy works.
- Our country will be compelled to purchase know-how from abroad and will remain ever dependent on foreign technology and foreign products at an enormous cost.

INDUSTRY-ACADEMIA INTERFACE


- Universities and research institutes are good in R&D, but poor in delivery of R&D
- Although efficient in delivery, Indian industries are hesitant to invest in R&D
- **Most of the industries in India today are reluctant to encourage their employees for academic pursuit as evidenced by lack of any worthy publications**
- There is only a one way flow from academic institutions to industries today.
- **Without a two way flow from educational institutions to industries and vice-versa, engineering education can never flourish.**
- General trend is to purchase products of superior quality from abroad at exorbitant costs, although there are large numbers of research institutions and universities in the country and there is no dearth of talent in India

INDUSTRY-ACADEMIA INTERFACE (contd)

- Most of the bright students of India capable for teaching and research go to developed countries every year.
- While India imports equipments and products (developed by Indian scientists and engineers abroad), these countries are importing the best brains from India.
- China has understood this game very well. Most of their reputed scientists and technologists are encouraged/ inspired to return to their homeland
- Talented Indians who go abroad for higher education and research continue to stay and settle there, partly because of high pay and perks but mostly due to a congenial academic environment for research & development and recognition of the work done by them.
- It seems IITs are built to supply requisite manpower for further development of the advanced countries in the world.
- Unless this trend can be reversed, India will continue to remain dependent on foreign knowhow and continue to import foreign products at an exorbitant cost.

Conclusion

- Since the last three decades, Growth of engineering education has been phenomenal
- Quality of most of the engineering graduates and post-graduates is poor as employability among the pass outs is very low.
- Premier institutes are producing a very small number of engineering graduates
- Majority of PG Students come from state run and private colleges to get IIT stamp
- They are neither motivated nor hard working. Bright students go abroad for higher education and settle there , PG Education and research is the last priority
- There is an urgent need to address the problems ailing technical education; otherwise India will miss the opportunity to utilize its demographic dividend of the young work force
- Industry has a major role in improving standard of technical education
- One year Internship should be compulsory before offering degree
- In order to ensure standards as per global norms and mechanism to monitor the same, an uncompromising attitude is essential.
- In this respect, India becoming a permanent member of the Washington Accord (TOI-2014) is a significant step



**Thank You
For Your Attention...**