

CONTEMPORARY ISSUES IN TECHNICAL EDUCATION -- IUCEE , July 2, 2009

1. Some Current Issues in Technical Education
2. On World-class Universities
3. The Importance of Innovation
4. Perspectives on Industry – Academe Collaboration
5. TEQIP Phase II – Faculty Development Initiatives

I SOME CURRENT ISSUES IN ENGINEERING EDUCATION

- The (generation gap) between:
 - ❖ those who teach and those who learn
 - ❖ those who recruit and those who seek jobs
 - ❖ those who frame policies and those who function within the system
 - ❖ theory and practice of assessment of learning, and of performance on the job
- How do we close these gaps?

In the New Millennium, significant changes have taken place in the *Practice of Engineering as a Profession*:

- ❖ Constraints imposed by environmental considerations
- ❖ Customization demanded by diverse customers
- ❖ Opportunities offered by technology developments in several sectors
- ❖ Availability of sophisticated diagnostic and computational tools
- ❖ Wide choice of materials
- ❖ Implications of Globalization, such as , for example, Innovation as the basis of Competitiveness

DIFFERENT COMBINATIONS OF BUZZWORDS IN TECHNICAL EDUCATION

•Access	•Equity
•Inclusion	•Expansion
•Excellence	•Affordability
•Diversity	•Quality
•Employability	•Relevance
•Global Engineer	•Innovation
•Glocal	

LIBERALIZATION OF HIGHER EDUCATION

- ❖ Freedom to charge Fees
- ❖ Freedom to select and admit Students
- ❖ Freedom to appoint Faculty and Staff
- ❖ Freedom to collaborate with foreign institutions
- ❖ Freedom to expand capacity
- ❖ Freedom to diversify program offerings
- ❖ Freedom to operate multiple shifts

AUTONOMY

- ❖ Whom to teach – Students
- ❖ What to teach – Curriculum
- ❖ Who will teach – Faculty
- ❖ How to assess – Exams

- ❖ Academic
- ❖ Administrative – Managerial
- ❖ Financial
- ❖ Functional

II CREATING INSTITUTIONS OF
EXCELLENCE

ON WCUs AND INSTITUTIONS OF EXCELLENCE

ON WCUs AND INSTITUTIONS OF EXCELLENCE

RECENT PERCEPTIONS OF WORLD-CLASS UNIVERSITIES : SHANGHAI RANKINGS

A few years ago, the first Shanghai Rankings made quite a big splash among world-wide Universities.

The Shanghai Jiao Tong University in China announced a list of the top 500 Universities in the world on the basis of 4 criteria.

Here are some of the results:

□ Top 5 World-Class Universities :

1. Harvard (USA)
2. Stanford (USA)
3. Cambridge (UK)
4. UC – Berkeley (USA)
5. MIT (USA)

- Top 5 Asia – Pacific Universities (with World Rank) :
 1. Tokyo U (Japan) (WR: 14)
 2. Kyoto U (Japan) (WR: 21)
 3. Australian National U (Australia) (WR: 53)
 4. Osaka U (Japan) (WR: 54)
 5. Tohoku U (Japan) (WR: 69)

- Only three Indian Universities were listed in the Top 500
 - ❖ Indian Institute of Science (WR : 251 – 300; APR : 27 – 36)
 - ❖ IIT Delhi (WR : 451 – 500; APR : 78 – 92)
 - ❖ IIT Kharagpur (WR : 451 – 500; APR : 78 – 92)

Statistics by region reveal that North & Latin America are on top, while country-wise, the rankings are:

1. USA
2. UK
3. Japan
4. Germany
5. Canada

❖ India ranks 29, below China (19), South Korea (20) and Singapore (23).

1.1 THE RANKING CRITERIA AND WEIGHTS

❖ Criterion 1: Quality of Faculty:

□ Indicators:

- ❖ Faculty of an Institution winning Nobel Prizes and Field Medals : (20%)
- ❖ Highly-cited Researchers in 21 broad subject categories : (20%)

❖ Criterion 2: Research Output:

□ Indicators:

- ❖ Articles published in Nature and Science : (20%)
- ❖ Articles in SCI – expanded and Social Science Citation Index : (20%)

❖ **Criterion 3: Quality of Education:**

□ **Indicator:**

- ❖ Alumni of an Institution winning Nobel Prizes and Field Medals : (10%)

❖ **Criterion 4: Size of Institution:**

□ **Indicator:**

- ❖ Academic performance with respect to the size of an Institution : (10%)

- ❖ “There are extremely few WCUs that are not also strong research universities”.

- ❖ What about cultural diversity?
“World-class is not a synonym for cultural diversity, but it does include diversity”.

- ❖ What does “world-class” actually mean?
- ❖ And should it matter?

- ❖ Guardian Unlimited talked to academics and students, university leaders and government officials all over the world to find out what they thought a WCU is.
- ❖ The results were as diverse as the people they talked to.
- ❖ It was akin to the six blind men and the elephant!

This clearly shows that:

- ❖ “WCU” is a multi-dimensional concept.
- ❖ Like Beauty, it lies in the eyes of the beholder.
- ❖ It is largely a matter of perception.
- ❖ It is a composite index, covering a wide array of parameters.
- ❖ “World-class” (or Excellence) is neither uniform across all components of the Institution, nor steady over time.

- ❖ It can vary widely depending on :
 - o who does the ranking,
 - o what parameters are used,
 - o weightage factors for each parameter,
 - o the spectrum of stakeholders, etc.

Professor Sharon Ahmad (former VC of USM, Malaysia) has this to say:

- ❖ “Many politicians and university administrators say: that we must make our universities centres of academic excellence, and that we should build “world-class universities”.

❖ The likely truth is, these advocates of “world-class universities” would stammer when challenged what characteristics a world-class university must have.

❖ A world-class university must be given time to evolve
where its rightful attributes must first be put in place”.

Philip Altbach has critically analyzed the “Costs and Benefits” of WCUs. In his article in *Academe*, he points out that :

- ❖ “Everyone wants a WCU; no country feels it can do without one.
- ❖ The problem is that no one knows what a WCU is, and no one has figured out how to get one.
- ❖ Everyone, however, refers to the concept. Many of those seeking to identify “world-classness” do not know what they are talking about”.

❖ Altbach tries the impossible: to define a WCU, and then to argue that it is just as important to have a “national-class” or “regional-class” academic institution as it is to emulate the wealthiest and, in many ways, most elitist universities

There have been other explicit criticisms too.

- ❖ “Putting too much stress on attaining world-class status may harm an individual university or an academic system.
- ❖ It may divert energy and resources from more important, and perhaps, more realistic goals.
- ❖ It may focus too much on building a research-oriented and elite university, at the expense of expanding access or serving national needs.
- ❖ It may set up unrealistic expectations that harm faculty morale and performance”.

WHAT IS WORLD CLASS ?

1. *Alan Johnson (UK Minister for Lifelong Learning and Higher Education) :*

“World class means a higher education sector that meets the needs of the economy in terms of research, knowledge transfer and teaching, and enables all people to realise their potential.

(It’s) one that attracts the best students and researchers and staff from around the world and provides the necessary storehouse of expertise in science, technology and the arts and humanities, which defines our civilization and culture”

WHAT IS WORLD CLASS ?

2. *Christine King (VC of Staffordshire University, UK):* “We are world class in that we have students from all over the world, and, importantly, we have partnerships with universities, colleges and businesses all over the world; and we have 8000 students studying for our degrees abroad.
World class for us is about the right teaching, innovation and skills, rather than Nobel Prizes”.

WHAT IS WORLD CLASS ?

“We are not based on Nobel Prizes, but student success and skills, as well as rebuilding and regenerating communities.

That’s the lifeblood of what we do and you need more of that than you need Nobel Prize winners”.

WHAT IS WORLD CLASS ?

5. *Amartya Sen (Nobel Prize –winning economist):*
“A world-class university is one that is recognized across the world as a centre of excellence in terms of research and in terms of teaching.
The two are often inter-related”.

WHAT IS WORLD CLASS ?

7. *Prof. John Sutherland (Lord Northcliffe Professor of English at University College London):*

“The question ‘what makes a university world class’ is increasingly, what philosophers call a category mistake.

It makes much more sense, especially in science and social science – which are the most globalised fields – to think of where and when, in a career, in historical time, is the best work done.

WHAT IS WORLD CLASS ?

10. Jeronimo Castro (Executive Director of Colfuturo, a private foundation in Columbia that gives education loans):

“What makes a university world-class?

The quality of its professors; the quality and diversity of its students; the level of competition at entry; the quality and influence of the research done; the reputation of the university, the programs and the faculties and how easy it is for graduates to get jobs when they finish their programs”

SOME CHARACTERISTICS OF INSTITUTIONS OF EXCELLENCE

- ❑ What do exemplary colleges do right?
- ❑ One study identified *four* key features as sources of faculty morale and satisfaction:
 - ❖ They all had distinctive organizational cultures that were carefully articulated, nurtured and sustained.
 - ❖ They had strong participatory leadership which provided direction and purpose.
 - ❖ They had a firm sense of organizational momentum; they were institutions on the move.
 - ❖ The faculty of these institutions had an unusually compelling identification with the institutions.

SOME CHARACTERISTICS OF INSTITUTIONS OF EXCELLENCE

- ❖ The cultures of these colleges included a commitment to the student.
- ❖ These colleges had strong leadership, but flat hierarchy.
- ❖ The Presidents and Deans of these institutions knew how to empower the faculty.
- ❖ Information was shared through frequent meetings.

❖ The administration -- faculty relationships were characterized by features, such as:

- ❖ mutual trust
- ❖ openness
- ❖ fairness
- ❖ caring
- ❖ a 'truthful' atmosphere
- ❖ lack of antagonism
- ❖ concern
- ❖ responsibility
- ❖ accessibility

SOME CHARACTERISTICS OF INSTITUTIONS OF EXCELLENCE

- ❖ These institutions had committed faculty development programs.
- ❖ The satisfaction of the faculty, in fact, the excitement of the faculty about their work, is critical to the attainment of academic goals.
- ❖ The top universities in the US are able to hand- pick their students; few, who are accepted, decline the offer.

❖ Some of the characteristics of high morale institutions :

- greater involvement of faculty in decision making.
- environment supportive of faculty and their work.
- collaborative environment
- encouragement of risk-taking
- anticipatory long-range planning
- administrators and faculty have similar views about the academic workplace.

SOME CONCLUSIONS

- ❖ While it is easy to be a critic, it is difficult and often impossible to create something better than what is being criticized.
- ❖ “Making sure that rankings are designed properly is the responsibility of those who create them;
- ❖ Making sure that they are utilized properly is the responsibility of :
 - o Counsellors
 - o Librarians,
 - o Teachers, and
 - o Administratorswho recommend them as sources of information”

SOME CONCLUSIONS

- ❖ Unquestionable Quality and Excellence reputations have been established in several products, processes and commodities.
- ❖ For example, Rolls Royce, Chivas Regal, Parker pens, Sony, Kodak..
- ❖ In some cases, brand names even take over product names.
- ❖ For example, Xerox, BandAid, Chesterfield.
- ❖ The Fortune Magazine produces lists of the top 500 companies at regular intervals.

- ❖ Ranking reports may be compared to Consumer Reports, reporting on the strengths and weaknesses of different consumer products.
- ❖ The aim is to assist the consumers in their selection of products on the basis of a cost-benefit analysis.
- ❖ Increasingly, students are being compared to consumers with associated rights and expectations.

❖ Whatever their shortcomings, the very existence and compilation of rankings lists infuses quality-consciousness among the institutions, their administrators, and faculty; and also quality -literacy among the public.

❖ In order to be acceptable to the majority, the methodologies must be :
transparent, and thus verifiable

SOME REASONS FOR OUR LACK OF EXCELLENCE

- ❖ Lack of Vision.
- ★ Lack of Autonomy.
- ★ Lack of Leadership.
- ★ Lack of Appropriate Governance
- ★ Big gap between planning and implementation.

SOME REASONS FOR OUR LACK OF EXCELLENCE

- ★ Lack of commitment, dedication.
- ★ Lack of Resources-: Physical, Human, Financial.
- ★ Lack of Teamwork (Individual vs Institutional aspirations)
- ★ Complacency, lack of ambition, diffidence, Fatalistic approach to life and work.
- ★ *Sab Chalta hai* attitude.

SOME ISSUES FOR REFLECTION AND INTROSPECTION

- India has announced the establishment of a dozen WCUs in the near future –
- Is it realistic to be able to start an institution as a WCU?
- Has any other country succeeded in doing so?
- cf. UGC identifies Universities for special funding as Institutions with “ Potential for Excellence”
- Do we have a concept or defining characteristics of a WCU?
- Is it similar to what Shanghai Rankings employ, or THES?

SOME ISSUES FOR REFLECTION AND INTROSPECTION

- Is the academic performance of our Universities – in terms of : Research, Innovation, Technology Transfer, International Fellowships and Awards – comparable to those of Universities held in high esteem across the world?
- Are our Universities as attractive to Students and Faculty as those considered to be WCUs?

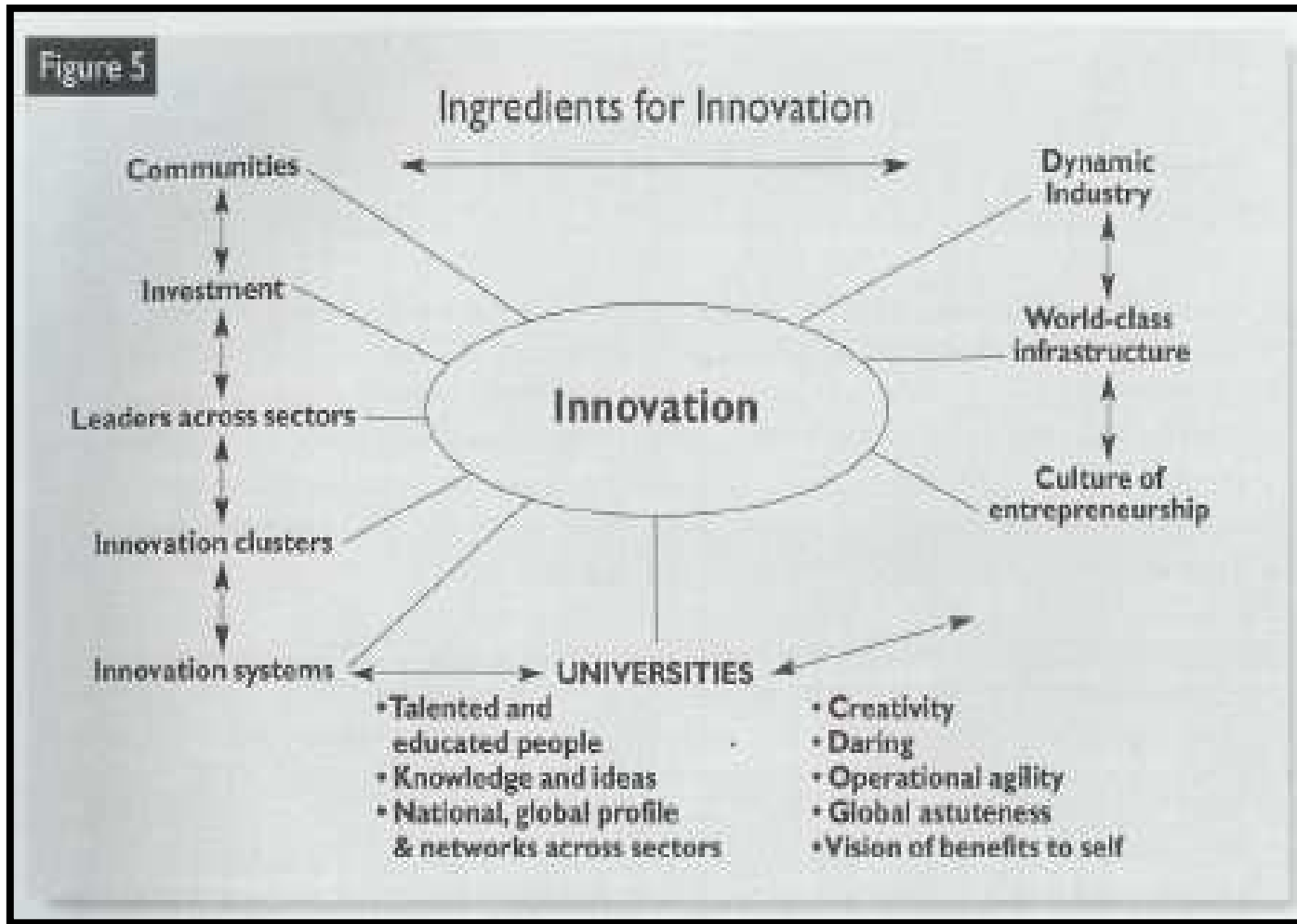
SOME ISSUES FOR REFLECTION AND INTROSPECTION

- Are our Quality Assurance and Accreditation systems for identifying and assuring Quality globally compatible and competitive?
- The result of NBA's application for Washington Accord Membership will be one of the pointers.
- What are our Universities currently well-known for?
– our Undergraduates; Post- graduates; Research Scholars; Faculty ?

SOME ISSUES FOR REFLECTION AND INTROSPECTION

- How confident is our Industry of the Academe's ability to solve its problems?
- What is India's position in relevant international comparisons/ :
 - World Competitiveness Rankings
 - Human Development Index
 - World Innovation Rankings
 - Nobel Prizes, Field Medals; FRS ...

III THE IMPORTANCE OF INNOVATION



THE SIGNIFICANCE OF S&T INNOVATION

- ❖ In the knowledge-based economy and society,
Innovation – and Productivity – are the strongest
determinants of :

Technology and Business Competitiveness

- ❖ The 3M company defines Innovation as:
“New ideas + action or implementation ,which results in
an improvement, gain or value addition”.

STRATEGIC RESOURCES FOR S&T INNOVATION

❖ Research and Development:

□ Universities and University R&D are the major suppliers of a nation's:

Knowledge

Knowledge workforce; and

Innovative technologies

STRATEGIC RESOURCES FOR S&T INNOVATION

❖ Talent:

- ❑ Talented people are at the heart of:
 - Innovation
 - Sustainable growth of good jobs; and
 - The competitiveness of nations

THE STRATEGIC ROLE OF UNIVERSITY RESEARCH

Report on “**Growing Ontario’s Innovation
System**”:

Heather Munroe-Blum, James Duderstadt &
Sir Graeme Davies – Dec. 1999

THE STRATEGIC ROLE OF UNIVERSITY RESEARCH

Recommendations in the Report:

- Create an optimal university Research Policy-environment for Innovation
- Grow Talent and University Research Competitiveness
- Construct a world-class Infrastructure
- Expand the impact of university research
- Foster Entrepreneurship
- Foster local, national and global innovation *networks* and global profile
- Celebrate *people*, achievements and success

PRINCIPLES OF STRATEGIC UNIVERSITY RESEARCH POLICY

- Academic/Scientific Autonomy
- Competition
- Disciplinary Inclusion (multi- and inter-disciplinary areas)
- Excellence
- Distinctiveness
- Vision

PRINCIPLES OF STRATEGIC UNIVERSITY RESEARCH POLICY

- Teaching/Research Synergies
- Means of recognizing, rewarding and celebrating Talent and Achievement
- Attracting and retaining superb Grad. Students is essential to growing the next generation of Talent
- Proliferation of regulation and bureaucracy paralyze and stifle Innovation

INNOVATION – PROMOTING ENVIRONMENTS

- Innovation is more about creating environments that foster innovations than about brilliant individuals.
- It is often observed that the same creative individuals will be more creative in certain environments than others.

Wm. Wulf (NAE, USA):

- There is no simple formula for Innovation
- However, a “multi-component environment” appears to collectively encourage or discourage Innovation.

SOME ESSENTIAL COMPONENTS OF THIS ENVIRONMENT:

- A vibrant research base
- An educated workforce
- A culture that permits, even encourages, risk-taking.
- A social climate that attracts the best and brightest from anywhere in the world to practise engineering.
- “patient capital” available to the entrepreneur.
- Tax laws that reward investment
- Appropriate protection for IP.

IV THE SYMBIOTIC AND SYNERGISTIC RELATIONSHIP BETWEEN UNIVERSITY AND INDUSTRY

- ❖ University is the intermediary between two important stakeholders:
 - *Students*
 - *Employers*
- ❖ It is increasingly being recognized and acknowledged that University and Industry are co-producers of engineering competencies and capabilities.

- ❖ They are highly eligible partners for collaboration
- ❖ The two partners need and depend on each other, and derive mutual benefit from the partnership – **symbiosis**.
- ❖ The overall impact can be much greater when the two partners function in phase and in resonance – **synergy**.
- ❖ Necessary to create a *win-win* relationship for both partners.

Some Questions:

- ❖ How *close* should the (research) university get to industry/business?
- ❖ How *similar* should they become?
- ❖ MIT President – Emeritus, *Charles Vest* (“Unlocking our Future : Toward a New National Science Policy”, 1999)
“Universities should work synergistically with Industry. Unless universities retain their culture – base of fundamental research, and educational mission – they will not have value to bring to the partnership”.

SOME MUTUAL DISSATISFACTION

INDUSTRY ABOUT INSTITUTIONS

- ⊙ Institutions produce engineering graduates, not practising engineers
- ⊙ Students learn only theory, largely unrelated and irrelevant to solution of industry problems.
- ⊙ The faculty possess only bookish knowledge ; they must spend time in industry periodically.
- ⊙ Too many faculty are chasing problems irrelevant to Indian Industry.
- ⊙ “Out here in the real world” attitude
- ⊙ Partial commitment and part-time availability of University Professor is frustrating.
- ⊙ Institutions have no appreciation of time-frames ; and are too bureaucratic.

SECTOR

STUDENTS

FACULTY

OVERALL SYSTEM

INSTITUTIONS ABOUT INDUSTRY

- ⊙ Industry is unreasonable in expecting ‘tailor-made’ products, and must accept responsibility for orienting them to suit their needs.
- ⊙ A considerable portion of work in industry is routine, unexciting, and does not involve advanced technology
- ⊙ Indian Industry is more dependent on adopting foreign technology and uninterested in indigenous technology development.
- ⊙ “Holier than thou” attitude.
- ⊙ Industrial consultancy is but one of the responsibilities of University Professors. Industry is not bothered about thorough investigation of problems, but demands instant solutions, even if only approximate & incomplete ; this goes against the central theme of R & D as academics perceive it.
- ⊙ Industry demands short-cut methods which can not be accommodated. While they put up with foreign consultants, they are inconsiderate toward University Professors.

COMPLEMENTARY ROLES FOR INDUSTRY AND INSTITUTIONS – II (1)

INDUSTRY STRENGTHS / RESOURCES

- ⊙ Stock of practical knowledge and skills ; wealth of experience.
- ⊙ Topics and problems for project / thesis work.
- ⊙ Wealth of practical knowledge and experience.
- ⊙ Funds for R & D.
- ⊙ Experts with specialized knowledge
- ⊙ Strategies for enhancing productivity & quality.
- ⊙ Manufacturing facilities; hardware.
- ⊙ Direct contribution to industrial production and economic development.
- ⊙ Funds for support of mutually beneficial activities.

SECTOR (Avenues)

STUDENTS

(sandwich programs ;
lectures by industry
professionals)

FACULTY

(sponsored R & D ;
consultancy ;
short-term
secondments ;
lectures by industry
professionals).

OVERALL SYSTEM

(curriculum develop-
ment ; endowments ;
industry chairs)

INSTITUTIONAL REQUIREMENTS

- ⊙ Industry demands short-cut methods which can not be accommodated. While they put up with foreign consultants, they are inconsiderate toward University Professors.
- ⊙ Lack of awareness and knowledge of industrial practices and needs.
- ⊙ Inadequate funds for R&D.
- ⊙ Lack of industrial orientation in lectures.
- ⊙ Lack of correlation of theory & professional practice.
- ⊙ Lack of awareness of the employment opportunities for students.
- ⊙ Lack of understanding of the role of industry professionals.
- ⊙ Lack of industrial orientation of curriculum.
- ⊙ Inadequate funds for several academic activities.

COMPLEMENTARY ROLES FOR INDUSTRY AND INSTITUTIONS – II (2)

INSTITUTIONAL STRENGTHS / RESOURCES	SECTOR (Avenues)	INDUSTRY REQUIREMENTS
<ul style="list-style-type: none"> ☺ Educating competent manpower. ☺ Academic and sponsored research, consultancy expertise. ☺ Specialized knowledge in the areas of expertise of faculty. 	<p style="text-align: center;"><u>STUDENTS</u></p> <p style="text-align: center;"><u>FACULTY</u></p> <p>(sponsored R&D ; consultancy ; joint projects ; continuing education)</p>	<ul style="list-style-type: none"> ☺ Manpower ☺ Access to timely R&D results and information. ☺ Solution to immediate problems. ☺ Refresher courses, and state-of-art information and techniques for industry personnel.
<ul style="list-style-type: none"> ☺ Wealth of faculty expertise and R&D facilities. ☺ Library. ☺ External Registration Programs 	<p style="text-align: center;"><u>OVERALL SYSTEM</u></p> <p>(curriculum development ; continuing education ; external registration for research degrees ; library).</p>	<ul style="list-style-type: none"> ☺ Industrial orientation to graduating engineers. ☺ Continuing education of industry professionals. ☺ Access to textbooks and journals. ☺ Advanced degrees for industry personnel.

INDUSTRY Vs. INSTITUTE

In some areas, the Institutes are ahead of Industry, and vice versa.

Industry ahead in

- ❖ Management
- ❖ Safety
- ❖ Reliability
- ❖ Cost Consciousness
- ❖ Inter-personal relations
- ❖ Standardization
- ❖ Use of Codes and Standards
- ❖ Time Consciousness
- ❖ Quality Consciousness
- ❖ Commercial Considerations
- ❖ Skills development and application
- ❖ Repair and Maintenance

Institute ahead in

- ❖ Knowledge creation
- ❖ Knowledge transfer
- ❖ Rigor of study
- ❖ Communication skills
- ❖ Research
- ❖ Publications
- ❖ Conferences
- ❖ Long-term issues.

DIFFERENCES IN PERCEPTIONS OF UNIVERSITY AND INDUSTRY

<u>CHARACTERISTIC</u>	<u>UNIVERSITY</u>	<u>INDUSTRY</u>
1. Values	❖ Altruistic, Scientific	❖ Business, Commercial
2. Activity	❖ Generation and Dissemination of Knowledge and Ideas.	❖ Application of Knowledge for Economic Gain.
3. Objective	❖ Excellence in Academic Activities.	❖ Customer Satisfaction, Profit.
4. Role	❖ Academic philosophy requires keeping up with Theory and Applications.	❖ Corporate philosophy involves new design and manufacturing processes, innovations, software development.
5. Motivation for Learning	❖ Knowledge for its own sake ; Continuous learning to upgrade knowledge	❖ Need-based ; learning as necessary.

DIFFERENCES IN PERCEPTIONS OF UNIVERSITY AND INDUSTRY

6. Horizon	❖ Long-term	❖ Short-term
7. Output	❖ Academic Degrees, Publications, Patents	❖ Cost-effective Quality Products and Processes.
8. Openness	❖ Keen to publish results expeditiously.	❖ Keen to keep know-how secret.
9. Attitude	❖ ‘Holier than thou’.	❖ ‘Out here in the real world’.
10. Process of HRD	❖ Education : open-ended process leading to the development of mind ; involves inputs in cognitive and affective domains.	❖ Training : specific goal is to impart technical skills ; involves inputs in the psychomotor domain.

COMPARISON OF UNIVERSITY AND INDUSTRY R & D

UNIVERSITY R & D

- ❖ Essentially long-term.
- ❖ Carried out by graduate students under the guidance of faculty supervisors, with the objective of fulfilling degree requirements.
- ❖ Maintaining continuity is more difficult.
- ❖ Output is more in terms of research papers.
- ❖ Scope is more deep and detailed.

INDUSTRY R & D

- ❖ Essentially short-term.
- ❖ Carried out by professional personnel with the objective of satisfying customer needs.
- ❖ Continuity is maintained in proportion to the industry goals.
- ❖ Output is more in terms of products and processes, and patents.
- ❖ Scope of solution is determined by the extent of need.

ANATOMY OF A TYPICAL UNIVERSITY-INDUSTRY COLLABORATION

UNIVERSITY

☉ **Make collaboration with Industry a strategic and core activity of University.**

☉ **Generate consensus among faculty and staff on the benefits of collaboration.**

☉ **Learn more about industry-complementary strengths and opportunities.**

☉ **Identify benefits of collaboration.**

☉ **Commit resources.**

INDUSTRY

☉ **Make collaboration with University a strategic and core activity of Industry.**

☉ **Generate consensus among colleagues on the benefits of collaboration.**

☉ **Learn more about University-complementary strengths and opportunities.**

☉ **Identify benefits of collaboration.**

☉ **Commit resources.**

V TEQIP – II

WG 1 : FACULTY DEVELOPMENT

TEQIP – II PROJECT DEFINITION: FACULTY DEVELOPMENT ISSUES

The stated Project Objective is to:

“increase production of high-quality engineers and engineering R&D in technical areas demanded by the private and public sectors”.

The three Project Components are:

- ❖ *Improving Quality, Relevance and Effectiveness of Engineering Education.*
- ❖ *Research, Development and Innovation.*
- ❖ *Systemic Improvements through Capacity Building, Project Management, Monitoring and Evaluation.*

TEQIP – II PROJECT DEFINITION: FACULTY DEVELOPMENT ISSUES

There are two sub-components under:

*Improving Quality, Relevance and Effectiveness of
Engineering Education:*

1. Faculty Development:

- ❖ Large-scale training of faculty in modern pedagogy
- ❖ Qualification up-gradation of existing faculty
- ❖ Professional development through both
contact and distance modes

TEQIP – II PROJECT DEFINITION: FACULTY DEVELOPMENT ISSUES

2. Strengthening of Institutions:

- ❖ Improving teaching/training facilities and infrastructure for UG and PG programs.
- ❖ Improvement of curricula for increasing their relevance to the labor market.
- ❖ Introducing institutional reforms.

WG 1 : FACULTY DEVELOPMENT

Problem Definition:

Large-scale shortage of qualified teachers.

Objectives:

- ❖ Up-gradation of the qualification of existing teachers.
- ❖ Continuous up-gradation of teaching and professional competence of existing and new teachers

KEY ISSUES TO BE ADDRESSED

❖ Be aware of existing and planned faculty development programs in India, including the QIP program and special programs run by AICTE and IUCCEE and other organizations:-

A continuously up-dated Data Base to be created and maintained by a suitable agency, such as FD Bureau of AICTE, ISTE, Coordinating QIP Centre...

MAJOR PARAMETERS FOR ASSESSING ANNUAL FACULTY PERFORMANC IN THEIR DIFFERENT ROLES

- ❖ Teaching
- ❖ Research Guidance
- ❖ Publications
- ❖ Consultancy Assignments
- ❖ Sponsored Projects
- ❖ Administrative Duties
- ❖ Achievements
- ❖ Awards, Honors, Fellowships, Patents

FACULTY CRUCIAL FOR FUTURE PLANS

Expanding Access and Ensuring Equity

- If we want high - quality (professional)education for the largest number of our deserving youth, we need many more high-quality institutions.
- What is the most important pre-requisite for this to happen?

- **Faculty:**
- *Quantity*
 - Many times the current stock.
 - As it is, there is a shortage of $> 25\%$.
 - Attraction and retention are serious problems.
- *Quality*
 - Mediocre, by and large
 - The best are not attracted to teaching.
- *Qualifications*
 - Very few Ph.D.s produced in engineering.
 - The best are not attracted to research.
 - Inverse correlation between Ph.D. enrolment and availability of jobs.

– **Why are our youth not attracted to teaching?**

- Inadequate compensation and career progression opportunities, public perception, lack of good-quality institutions to work in.

– **Barriers to higher salaries:**

- Government / Public institutions – limited by (periodic) Pay Commission recommendations, which are linked to salaries of bureaucracy.
- Private institutions – constrained by availability of resources, which are limited by ceiling on fees prescribed by regulatory authorities.
- For-profit education is illegal and also frowned upon.
- **The Way Forward: ???**