CONTINUOUS QUALITY IMPROVEMENT IN ENGINEERING EDUCATION

AWAIS M KAMBOH

DIRECTOR QUALITY ASSURANCE

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY, ISLAMABAD

PAKISTAN
AT A GLANCE

NUST
Defining futures

796,096 km^2

Pop: 243 million

64% below 30 years

4^{th} Largest in Freelancing

7^{th} Largest Pool of Scientists and Engineers.

ENGINEERING EDUCATION IN PAKISTAN

- **Accreditation**: Accreditation is a crucial factor in determining the quality of engineering programs. Accredited programs generally adhere to national and international standards for curriculum and faculty qualifications. The Pakistan Engineering Council (PEC) accredits engineering programs in Pakistan.

- Pakistan is a signatory to the Washington Accord.
  - Guarantees a certain minimum standard of processes and quality of education

NOTABLE SIGNATORIES TO WASHINGTON ACCORD

Similar processes for quality assurance leads to acceptability

- United States
- United Kingdom
- China
- Russia
- Australia
- Canada
- Japan

- South Korea
- Malaysia
- Indonesia
- Turkey
- India
- Singapore
- **Saudi Arabia
- **Thailand

Europe, Mid-East and Africa have less representation

**Provisional Signatories

IMPORTANT FACTORS IN QUALITY EDUCATION

- Academics / Curriculum
- Human Resource & Faculty
- Management
- Infrastructure
- Campus Life
- Finances

Washington Accord and other accreditations are like a certificate that a minimum passing criteria is met,

but are we happy with the minimum passing grade?

Continuous Quality Improvement

VARIATION IN QUALITY OF ENGINEERING EDUCATION IN PAKISTAN

- Variation in Institutional Culture
- Faculty Qualifications
- Infrastructure and Facilities
- Research Opportunities
- Industry Connections
- Curriculum
- Quality of Student Intake

HOW TO IMPROVE QUALITY?

- **Enforce Accreditation and Quality Assurance**: Establish and enforce accreditation standards and update accreditation criteria to keep pace with evolving industry needs.
- **Invest in Faculty Development**: Ensure that faculty members are well-qualified, capable of providing quality education and , up-to-date in their fields.
- **Ensure Access to Modern Infrastructure:** State-of-the-art laboratories, digital libraries, etc.
- **Updated Curriculum**: Align with the latest industry trends, interdisciplinary and practical components.
- **Promote Research and Innovation**: Provide funding and opportunities for faculty/students to engage in research.
- **International Collaboration**: Learn from global best practices in engineering education.

HOW TO IMPROVE QUALITY?

- **Foster Academia - Industrial Linkages**: Practical experience, internships, and exposure to real-world engineering challenges. Encourage collaboration between academia and industry to address real-world problems.
- **Incentives to Industry for Engagement:** Actively participate in education, providing training opportunities, internships, and research collaborations with engineering students and faculty.
- **Enhance Employability and Job Placement**: Soft skills training, career counselling, and job placement services.
- **Financial Support**:
  - Financial aid and scholarships to underprivileged students
  - Support institutions to raise and maintain higher standards.

HOW TO IMPROVE QUALITY?

- **Transparency**: Promote transparency by making information about the quality of engineering programs and institutions publicly available.
- **Accountability**: Institutions and accreditation bodies to be accountable for their performance.
- **Incentives for Quality Improvement**: Implement a system of rewards and incentives for institutions. Carrots and Sticks.

THE DESIRED OUTCOME - ENGINEERING GRADUATE ATTRIBUTES

Technical Skills

- Engineering Knowledge
- Problem Analysis
- Design / Development of Solutions
- Investigation
- Modern Tool Usage

Soft Skills

- The Engineer and Society
- Environment and Sustainability
- Ethics
- Individual and Teamwork
- Communication
- Project Management
- Lifelong Learning

HOW TO MEASURE WHERE DO WE STAND?

- **Accreditation**: The formal process of evaluating and recognizing the quality of engineering programs.
- **External Evaluations**: Experts from industry to assess the quality of engineering programs.
- **Student Outcomes Assessment**: Evaluate the knowledge and skills students acquire during their engineering education. This can be done through:
  - **Graduation Rates**: Measure the percentage of students who complete within a specified timeframe.
  - **Employment Rates**: Assess the rate at which graduates secure employment in their field after graduation.
  - **Alumni Success**: Career achievements of alumni.

HOW TO MEASURE WHERE DO WE STAND?

- **Stakeholder Feedback:** To determine if the system is really working
  - **Student Feedback**: Satisfaction levels, challenges, and suggestions for improvement.
  - **Graduate & Alumni Feedback**: Applicability of their education to their careers.
  - **Employer Feedback**: Skills and preparedness of new hires.
- **Accomplishments and Awards**: Awards, recognition, and accomplishments achieved by the institution, its faculty, and its students in engineering-related fields.
- **Research and Innovation**: Examine the research output.
- **Industry Engagement**: Evaluate the level of collaboration and partnerships between engineering institutions and local industries. Strong industry connections can provide students with valuable practical experience.

CONCLUSIONS

- We are going in the correct direction

But

- We need to adopt the culture of quality
- We need to set higher targets
- We need to keep improving