

Objectives

- Understand the views and perceptions of engineering undergraduate students on
 - excellence in engineering education
 - educational technology

Research Questions

- What is excellence in engineering education from the students perspective?
- Are the views proposed by educational researchers in agreement with undergraduate engineering students' perception?
- How students define educational technology?
- What are the students' perspective on educational technology and educational methods, goals and objectives?

Methods

Methods

- Participants
 - 22 undergraduate engineering students
 - 7 females and 15 males
- Focus Group
 - 1 hour long each
 - 3 to 8 participants per group
 - Individual Brainstorming
 - Group Discussion

Data Analysis

- Content Analysis Technique:
 - Method used to analyze text data and making inferences from data to their context
- Keyword Frequency Count:
 - Main keywords: Summarize and group the answers into meaningful categories
 - Recording units: Nouns, verbs or adjectives written by the participants when answering each question

Brainstorming

Study Questions:

"In the next 3 minutes write 10 words or phrases that comes to your mind when you hear the following phrases": Excellence in engineering education, educational technology, students' role within the engineering college and professors' role in the engineering college.

Engineering Education

Characteristics: Personal and professional skills, personal characteristics, resources, professor characteristics, need for examples or applications, hard work, knowledge, community, competition, hands-on, cost, degree, grades, pressure, accreditation and advising.

Participant Responses	Gender
Up-to-date learning	F
Personalized instruction	M
Money	M
Degree/diploma and obtaining an engineering education	M
Hard work and effort	M
Oriented to improving current knowledge	M
Excellence in people/students and peers	M,F
Student-teacher ratios	M,F
Creativity, honesty, and interested students	M,F
Motivation, and willingness to learn/teach	M,F
Real life applications	M,F
Problem solving, networking, responsibility, doing well in classes, and career beyond formal schooling	M,F
Good and responsible professors	M,F

Students' Role

- Learn
 - prepare for the future
 - Be a student
- mentor others
 - contribute
 - develop skills
 - represent their race or college
 - earn a degree
- participate in extracurricular activities make friends
- network
- pay tuition
- compete
- experience college
- maintain good *grades*
- do *research*
- make good use of resources

Engineering Technology

Characteristics: Advanced, different from lecture, engaging and interactive, hands-on, providing independence, could be used as help, increasing and facilitating knowledge, enhancing level of understanding, being up-to-date and varied.

Categories	Only males	Both males and females	Only females
General Character.	Advanced, applications, specific to career, enhance communication, anything different from lecture , engaging, interactive, varied, providing independence, increasing knowledge, unique	Hands-on , used to help or aide in the process of learning, gives exposure to real-life situations, related to equipment used for the purpose of teaching and learning, used to increase understanding and being up-to-date.	used in the workplace, helps in learning for the future , a method of teaching , a resource for learning .
Examples	creative learning , used for scientific data, learning and problem solving	used in laboratories and courses , and as resources for homework	feedback, play games and read professional magazines
Internet	class websites or resources and providing new possibilities for studying	distance learning and course tools	Chatting, discussion , scheduling classes
Tools	specific names of instruments such as projectors and meters used in laboratories	calculators and computers , use of video , programming software and course oriented software programs, such as Power Point	

Professors' Role

- Teach & Educate
- Help & Mentor
- Work in research
- Encourage & Motivate
- Model/ inspiration
- Facilitate
- Learn
- Enforce & Grade
- Explain & Prepare
- Develop personal relationships
- Create tests/homeworks
- Understand
- Share information/knowledge
- Available
- Contribute
- Be up to date with real world and technology

Group Discussion

Study Questions:

- What are the goals of teaching engineering and what types of skills and attitudes do students need to learn?
- Which methods are used to present information, and how would students like information to be presented?
- What are teaching methods that work in the classroom?

- Methods to present information: board (45%), power point(23%), transparencies (23%), computer, lectures, websites, examples/ applications, and handouts.
- Students' preference of presented information: examples, stories, websites, notes, any form of visual display, handouts, group work to write papers, and do oral presentations.
- Teaching methods that work: examples/applications, clear objectives, presenting information in both concrete and abstract ways, and recaps of information taught at the beginning or end of class.
- Interactive Methods: working in groups, in class demonstrations, experiments, internet or any type of work that is hands-on.

Research Perspectives

Study Participants—Excellence in Engineering Education	Fromm 3—faculty perspective on student characteristics	The Millenium Project 4—characteristics of education	NAE 1—goals to achieve excellence in engineering education
<ul style="list-style-type: none"> clear complex comprehensive costs creative detailed diverse efficient interactive interested and motivated students international multidisciplinary personalized precise scientific specialized stimulating 	<ul style="list-style-type: none"> advance knowledge of selected professional-level technologies historical and societal perspective of the impact of technology sense of corporate and business basics capacity to apply these fundamentals to a variety of problems creative culture for life-long learning enthusiasm for learning intellectual spirit knowledge and experience in experimental methods knowledge and skills in the fundamentals of engineering practice social, ethical, political and human responsibility strong foundation in basic sciences, math and engineering fundamentals strong oral and written communication skills unifying and interdisciplinary broad view 	<ul style="list-style-type: none"> adaptive affordable asynchronous collaborative diverse intelligent interactive learner centered provides for lifelong learning seamless web ubiquitous 	<ul style="list-style-type: none"> convergence with other relevant non-engineering disciplines course integration within programs depth-of-knowledge diversity effective instruction efficient instruction engaged instruction ethical awareness flexible connectivity across programs and institutions professional discernment provides professional and personal satisfaction reduced attrition reduction in costs sensitivity to society impacts

Conclusions

- Students are eager to participate, share their insights and give input in the system.
 - Emphasized both the physical and learning aspects of educational technology (Educational technology is not only multimedia and audiovisuals but it is a process of teaching and learning).
- Other than the word "students", use of "examples" was a recurring theme throughout the responses.
 - Students would like to see more examples because this is a method that works for them.
- Building a "community", was another important theme that reflected excellence in engineering education.
 - Interactions of students and professors were considered important to the learning process and to the creation of community of learning and peers.
 - Research literature on excellence in engineering education stresses the importance of skills and knowledge, but leaves out the technology component and the building of relationships that seem to be important to the participants of this study.
- Views of students overlap with, but not always identical to, those of the educators.
- There were differences in the keywords and terms used by gender which should be further studied.