Proceedings

of

FACULTY CONCLAVE 2017

in association with

Indo Universal Collaboration for Engineering Education (IUCEE)

July 3rd, 2017

SETH JAI PARKASH MUKAND LAL INSTITUTE OF ENGINEERING & TECHNOLOGY (JMIT)
Radaur-135133, Distt. Yamuna Nagar (HARYANA)
MESSAGE

The world needs high quality engineers in order to address the challenges we face such as energy, water, environment, health, security and poverty. In order to produce the type of engineers who can address these challenges, our engineering colleges have to transform their engineering education to more learner-centered approaches. The faculty of these colleges need to be able to redesign curricula and delivery methods so that their students acquire not only technical and design skills but also professional problem solving and entrepreneurial skills, making them more employable and relevant to the needs of society.

I am happy to note that the Faculty Conclave at JMIT on July 3 is organized as an important step towards this objective. I wish the Conclave success and I congratulate the management and leadership of Prof. Nidhika Birla for making this possible.

Best wishes

Prof (Dr.) Krishna Vedula

Executive Director, Indo Universal Collaboration for Engineering Education (IUCCE)
MESSAGE

Engineering education is very important for the transformation of our nation, India, as a developed country. Engineers, technocrats and technologists play a vital role in society, because this force is the key to develop the basic amenities in various fields, namely, education, healthcare, infrastructure, green energy, environment, agriculture, irrigation and digitization, for a developed and planned living. In light of the above, it is sure that the quality engineering education will be the base for India to develop in the coming years.

For India to compete globally, advanced technologies that are developed, used and practiced by the corporate world must be in association with the academia. The academic world will have to engage the youth and evolve the education system to learn, grow and produce.

I am sure that the efforts of our faculty members, on the Faculty Conclave platform, would enhance the outcome based engineering education and sustain the academic standards which strongly fulfil a basic demand of competitive global market. I am hopeful that this event will explore the hidden teaching skills, innovative and elective ideas and put them forward to the teaching fraternity.

I heartily congratulate each one of those who have worked hard and contributed towards the transformation of engineering education.

Best wishes to all the participants and the organizers.

Prof (Dr.) Sanjeev Kumar Garg
Director
JMIT, RADAUR
From the Organisers’ Desk

The on-going developments in the arena of technology, the exponential growth in information and progressive changes in industrial needs have resulted in imperative for the engineering students to learn a diversified set of real-world skills. This results in serious challenges to teaching in general, and to pedagogy in particular when the curriculum is viewed as packed and bound by time constraints.

With this fact in mind along with our visionary ideal “Excellence through Creativity & Innovation”, we the Mukandians are committed to produce World Class Engineers and Managers. To cater this requirement, we have been actively engaged with Indo Universal Collaboration for Engineering Education (IUCEE).

IUCEE emphases four pillars for the quality of engineering education: learning, research, accreditation and entrepreneurship. Initial emphasis is on building capacity to improve the teaching quality of faculty in the engineering colleges. This is implemented with the leadership of experienced Indian faculty in collaboration with US faculty experts. This association between the US and Indian institutions has thereby increasing the ability of the Indian institutions to engage in world-class research and generate innovative solutions for crucial problems in India and the world.

To promote quality technical education, identifying challenges involved and discussing their possible solutions, we are making a modest contribution through the Faculty Conclave 2017. This conclave would provide an interactive platform for researchers and educators to share and explore various aspects of Engineering Education, namely, Pedagogies in engineering education, technology enhanced learning, research and graduate program experiences.

We are grateful to Prof. (Dr.) Krishna Vedula, Executive Director (IUCEE) and Dr. S.K. Garg (Director, JMIT) for encouragement and guidance at every step in the organization of this conclave. We are thankful to all the Deans, HoDs, faculty members and the supporting staff for their efforts and support that have ensured the smooth conduct of this conclave. The authors who have contributed their papers in this conclave need a special appreciation for leading and enlightening the path towards outcome based education for our fellow colleagues.

We are confident that the discussions held during the conclave will lead us to move a step forward to provide quality technical education. We wish the participants a productive and successful session.

Thank You

Dr. Nidhika Birla (Associate Prof., Dept. of Electrical Engg.)
Er. Nitin Goyal (Assistant Prof., Dept. of Computer Science & Engg.)
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Transforming Engineering Institutes for Outcome Based Education

Dr. S.K. Garg (Director, JMIT, Radaur)

Abstract: The Outcome Based Education (OBE) is a methodology for education that enforces the design of syllabus / curriculum to achieve predefined learning outcomes. This approach facilitates the continuous quality improvement in the imparted education. To adopt this approach a transformation in the teaching-learning and academic policies is required. This paper puts forward the suggestions for the transformation of Engineering Institutes for OBE.

OBE model of accreditation concentrates on objectives and outcomes of an engineering programme. The fundamental difference between OBE and traditional learning is that OBE is ‘Skill Centric’ and focuses on what knowledge a student has gained rather than what the faculty teaches. The student is expected to be an active participant in the OBE education process. In the traditional method of teaching, an instructor is the one who disseminates truth whereas in OBE methodology, the faculty is a mere facilitator or mediator of the learning process [1]. Students are motivated to take greater responsibility for their learning outcomes. The Graduate Attributes of engineering programs as identified by NBA (January 2013) are [2]:

The transformation of present engineering institutes for OBE requires a transition that starts with making appropriate changes in our academic policies and teaching-learning process to inculcate the above attributes in the graduates.

The academic policies should focus on 3H – Training Module,
1. Heads-on Training – Emphasis on both teaching and research, Skill Enhancement, Instructional Methods must include case studies, live projects and real-life problem solving.
2. Hands-on Training – Practical work should lead to a product, Project work should be on real-time problems with interdisciplinary project teams and labs must be set-up with assistance from industries.
3. Hearts-on Training – Community related projects must be taken up by the departments and NSS/NCC activities must be utilized to inculcate the social service zeal in the students.

The improvement in the teaching – learning process can be obtained by modifying the pedagogy techniques that are followed in traditional classes and practicals. The suggestions made in this regard are as below,

1. Conduct of Lectures and Tutorial Class

The guidelines include the encouragement of active participation, giving clear objectives and expectations for keeping and sustaining the students' interest through the use of following guidelines.

a. Start with outcome of the subject, chapter and topic.
b. Create interest by showing certain application through PPTs, Video/ multimedia aids.
c. The lecture scheduled should include recap of previous lecture by students (assistance if required), discussion of new topic, conclusion of lecture and queries of students. Every student should be involved in recap of the previous lecture.
d. Inform the reference to the students. Mention the reference of standard / text books and research papers for latest updates.
e. Extempore / Seminar / Quiz must be a regular feature to evaluate the involvement and performance of students.
f. Use of online resources, journals and other literature of repute must be encouraged to make the students habitual of self-learning.

2. Conduct of Practical Classes

To develop the essential technical skills that the students will require for graduate employment & to bridge the gap between the theory and their real-world implementation, the below mentioned recommendations may be followed.

a. Outcome and application of lab experiments should be discussed.
b. Experiments must be converted to problem oriented experiments.
c. Application based prakticals beyond syllabus must be included.
d. Discussion should be made regarding sources of errors and variations to the experiment objective.
e. Videos / PPTs should be prepared for easy demonstration of practicals.
f. In order to facilitate learning at student’s own pace and without the limitation of space and time Virtual Labs platform may be used.

3. Learning beyond curriculum

The graduates are expected to explore new perspectives, pursue novel research and add fresh voice to the community in their field of expertise. To accomplish this requirement, the following notions may be utilized.

a. Key-Industry related skills should be provided to the students through specific courses / workshops.
b. Labs must be set-up in association with the industries.
c. Interdisciplinary and different year students should be involved in projects.
d. Concept of industry collaborate live projects or society need based projects should be promoted.
e. The competitions motivate the students to adopt innovative techniques and develop their ideas and skills. So, participation in National & International competitions organized by the industrial giants and the institutes of repute must be encouraged.
f. Professional Societies like ISTE, IETE, SAE, etc. should be utilized to network the students to the global leaders for their personal and professional growth. The competitive and participative activities must be promoted among the students.

4. Personality Grooming Activities

Personality development helps to develop an impressive personality and makes the student stand apart from the rest. The following suggestions are presented to furnish this essential requirement.

a. Regular interactions through professional trainers for developing a student’s personality, i.e. appearance, characteristics, attitude, mind-set and behaviour with others.
b. Students must be delegated the responsibility to manage and participate in Clubs for developing their leadership skills, time management, gaining self-confidence and learning real world skills.

c. Involve every student to participate in the club activities according to their hobbies and needs.

d. Societal Projects must be a regular feature, undertaken in association with NCC, NSS, etc., to make the students aware of their professional ethics, environmental responsibilities, safety and welfare of the society.

5. Involvement of Stake Holders

The use of stake-holders has proven to be useful for improvement of the institutes and organizations. The following methods may be used for involving the stake-holders for success of the institute & service to the society.

a. Maintaining strong Alumni network helps in developing professional networks and on-campus expertise. The alumnus may be involved with the institute for Expert Lectures, Pre-placement talk, Curriculum development, Live Projects, Skill Workshops and trainings.

b. An open and positive communication between parents and the institute is important for improvement of a student’s and the institute’s performance. Parent Teachers Meeting should be a regular feature in this context. The institute should be open to hear the suggestions and incorporate them to the extent possible for the best outcomes.

c. Students must also be given an opportunity to speak about their problems and ideas through e-suggestion boxes.

d. Interaction through HR Conclaves and framed feedback from the industry in context of the students’ under-gone training and placed with the industry must be collected and the performance must be analysed properly to ensure professional development in experiential learning environments.

The implementation of the points above will help the institute inculcate the graduate attributes (as stated by NBA) in their graduates.

Conclusion: The transformation from traditional to OBE is the need of the hour. This process has a positive impact on the faculty, as well as, the students. The students would be encouraged and motivated to use collaborative learning techniques, enhance their learning ability and depth of knowledge, while the faculty would get an opportunity to excel in developing professional skills of a graduate.

References

Electrical Engineering Through Modern Tools: An OBE Approach

Mitrabinda Singh Assistant Professor, MBA Department (JMIT, Radaur)

Dr. Nidhika Birla, Associate Professor, ELE Department (JMIT, Radaur)

Abstract: This work is an effort to put forth the need & benefits of outcome-based engineering education (through examples) in front of teachers from the technical education. Engineering education demands practical understanding and practice minimums within a stipulated time and limited available resources. One of the graduates’ attributes of an engineering student as identified by National Board of Accreditation (NBA) is “use of modern tools” which has been specifically explained through the examples taken from electrical engineering. Use of MATLAB as a modern tool is shown as an example for two of the subjects “Control System” and “Electrical Measurements and Measuring Instruments”.

Indian technical education system is going through a gradual transformation with an aim to make our graduates globally employable. After many national surveys reported many critical issues that hamper imparting quality education, MHRD in 2013 decided to make the accreditation system outcome-based. Global acceptance of the graduates on the basis of their knowledge gained during their programme is one of the major agenda of OBE [3] - [6]. Implementation of OBE requires effective teaching practices in theory as well as in laboratory course. Limited resources and stipulated time poses pressure on teachers from technical education to deliver content through innovative practices and with the use of modern technology & tools to achieve the course outcome.

One out of the twelve graduate attributes identified by the National Board of Accreditation (NBA) is “use of modern tools”. This attribute is important for the students as they become acquainted to the new technologies available in the market. Also, this boosts the understanding of the concepts, being equipped with better mathematical expressions and graphics, that help them in problem based learning. The use of modern tools turns a regular PC into a virtual lab. Thus, optimal use of these tools can optimize the cost problems of the engineering equipment, along with providing enough practice for the graduates.

There are various tools that are important for an electrical engineer and faculty to use and master, namely, LabVIEW, PSCAD, ETAP and MATLAB / Simulink. This paper proposes the use of MATLAB / Simulink as a modern teaching tool for electrical engineering programme. MATLAB (Matrix Laboratory) is a multi-paradigm numerical computing environment and Simulink is a graphical programming environment for modeling, simulating and analyzing multi-domain dynamic systems.

Demonstrated through the subjects “Control Systems” and “Electrical Measurements and Measuring Instruments”, MATLAB can be used to develop self-extracting packages for the problem-based experiments / assignments. The steps involved in developing these packages are:

1. Develop the model for the problem and build a Graphical User Interface (GUI) for it in MATLAB.
2. Create a self-extracting package for the GUI using “deploytool”.
3. Distribute the package to the students.

The students need not to have the MATLAB software to run this package. The freely available “MATLAB Runtime Environment” may solve the purpose. The students need to execute the package by double-click and the pre-inserted code will turn the PC into an experiment table for the students to understand the topics.

The use of modern tools,
- Enhances the involvement of the students in learning process.
- Improves students’ understanding of the concept.
- Students get enough practice that is required and is relevant for engineering.
- Students are able to test the learning of technical concepts.

Relating the use of modern tools to the graduate attributes of OBE, it inculcates Engineering Knowledge, Problem Analysis, Design and development of solution and knowledge of Modern Tool usage.

**Conclusion:** Outcome based education is important to make our education system valuable in real terms. This requires teachers from technical education to deliver content through innovative practices and with the use of modern technology & tools to achieve the course outcome. Through this paper, we have proposed and demonstrated the use of MATLAB as modern tool for the achievement of the graduate attributes.

**References**


Teaching Approach, Method and Technique

Nitin Goyal, Assistant Professor, CSE Department (JMIT Radaur)

Monika, Assistant Professor, CSE Department (JMIT Radaur)

Abstract: In teaching methodology usually detail of theoretical approaches is explained. Also the comparison and contrast of various approaches takes place. The discussion of features, positive and negative points are taken place. Furthermore, if subject is numerical then directly the problem solving methods are explained. But the main point of basis clarifying still remains untouched in classroom teaching which creates the interest of students in subject. This paper is to explore those points.

Introduction: A common mistake during teaching is like using interchangeably terms like technique, method, and approach. Such weak points should be removed by teachers. In a paper titled “Toward a Theory of Instruction” Smith (1963) defined teaching as a “system of actions intended to induce learning”, and strategy as “a pattern of acts that serves to obtain certain outcomes and to guard against certain others”. It is obvious that Smith was adapting military concepts to a classroom setting. Thus, some other teaching methods to be followed are also briefed further which will help in teaching improvement.

Related Concepts: Some existing theories related to teaching methodologies exist are listed below.

A theorist, Taba (1969) also focused attention on the concept of teaching strategy. In her view, it was useless to study teaching as a global process; rather, it was necessary to identify particular teaching strategies required for particular types of instructional objectives. The main aim of strategies, she proposed, was the development of children’s thinking skills. Aber et.al (1971) defined teaching strategy as: teaching strategy is a purposefully conceived and determined plan of action. Ideally, the strategy is designed to facilitate a particular kind of learning in a given situation and in terms of a specific learning objective. The strategy is selected for use after a comprehensive assessment of the specific situation prior to the actual instructional art. The operations of assessing the situation and selecting the strategy represent the “professional expertise” that the teacher brings to the instructional setting.

Another definition of teaching strategy was given by McCloskey (1971): teaching strategy is a teaching approach that is used either in solving a classroom problem or in improving instruction. According to Fraenkel (1973), teaching strategies represent the combinations of specific procedures or operations, grouped and ordered in definite sequence that teachers can use in the classroom to implement both cognitive and affective objectives.

Teaching Methodology: One can adopt the method of present, apply, and review. The concepts should be presented then they should be applied on real/simulation test bed with further reviewing the impact and results. During teaching one should keep in mind that the students don’t know anything so you have to start from basic of the topic. Some other key factors are also explained below:
(i) **Presentation**
Instead of writing and explaining show them as much as you can. This is the basis of teaching methodology. Everything should be presentable so that they can visualize the process. The presentation in addition should be well planned i.e. it should be ordered, systematic and well planned aiming to explain step by step, as we can remember movie.

(ii) **Interest of Students**
Students should be given general life example that lay down in their daily life routine. The example should be well known to the students so that they can analyze the problem easily and try to give their own solution.

(iii) **Practical Exposure**
To make it as an effective learning, show the resultant instrument/software for demo so that they can think of making it more effective with their abilities. It will lead to the research activities of the student.

(iv) **Motivate and Praise**
If any of the students performs better then praise him/her. It will motivate the others too. They will start performing better and at last whole class will give better results.

(v) Teaching by asking is the recognized method

(vi) Class brainstorm by tricky questions

(vii) Put the students in groups and give a task to analyze. Further they should put their individual views via presentation.

(viii) Compare and contrast the facts

(ix) Take your own feedback

More so, the teaching methodologies aim to achieve greater teaching and learning output. It directs and guides the teacher and the students in undertaking any class lesson or activity easily understandable. There is no single correct way to teach a class. Instead, there are many good ways of teaching the students.

**Summary:** Learning the various terms presented and discussed earlier would mean a lot in teaching. A good teacher needs methodologies during teaching should be patience to listen and answer, intellectual classroom teaching, and heuristic discovery approach. Teacher should develop in students’ a systematic approach in day-to-day activities, work collectively in a team. Recognizing the prominence of these tactics surely put teacher to better plan, implement and evaluate his instruction.

**References**


Enhancing Engineering Knowledge Through Cognition

Charu Singla, Soft Skills Trainer, PDP Department (JMIT, Radaur)

Dr. Nidhika Birla, Associate Professor, ELE Department (JMIT, Radaur)

Abstract: Outcome based learning (OBE) paradigm helps students to achieve the purpose or goal of learning. Students often find learning trivial task as it is difficult to memorize many things at a time. Cognitive theories like Neuro Linguistic Programming (NLP) could help them to learn in a systematic way to achieve their goals with ease. Few of the graduate attributes as defined by National Board of Accreditation (NBA) like Engineering Knowledge, problem analysis, design & development of solutions, lifelong learning which can directly be linked to NLP. Through NLP we can inculcate these graduate attributes in an engineering graduate and thus this paper suggests the ways through which cognitive learning can enhance student’s learning capacity.

NLP & Learning

LEARNING depends on our INTEREST and the interest depends on ASSOCIATION and maximum use of our three senses out of five.

There are various patterns of thoughts, beliefs, values or habits the students grow up with. These patterns of thoughts and behavior set up neural pathways in our brain. (Neural pathways are nerve cells that transmit nerve signals to and from the brain. The pathway along which information travels through the neurons (nerve cells) of the brain is a neural pathway). These patterns of thoughts could be positive or negative. The positives are to be retained and negative ones are to be changed as they affect the learning. This could be one reason why some students learn with ease and others find it difficult to learn.

The shift or change in these pathways helps in learning with ease. Some pathways are stubborn and take time to change because of the overuse of these get deeply embedded in our brain.

Ways to develop Neural Pathways: These pathways can be developed by energizing or triggering the brain through challenges like solving complex problems, strategizing, learning to play new musical instrument, finding ways through maze, regulating emotions, exercising self-control etc.
For example: Say, we have a problem that needs to be solved through microprocessor-based system. In this regard, there are numbers of microprocessors available through which the solution can be derived, however, the best option can only be chosen if a student is well aware of the technicality (Example: Pin Description, Input-output Configuration etc..) of the microprocessor. Remembering all technicalities and implementing those to an optimum solution is a challenge for students. Developing these pathways would definitely help students take this challenge to deliver the best outcome. In this way, we can inculcate the graduate attributes like Engineering Knowledge, problem analysis, design & development of solutions, lifelong learning in our graduates.

This helps the new neurons to develop and strengthen to connect to the existing pathways. As Swart explains, “Depending on the complexity of the activity, [experiments have required] four and the half months, 144 days or even three months for a new brain map, equal in complexity to an old one, to be created in motor cortex.”

References


Soft Skills- A New Expectation of Employers in India

Shikha Benson, Soft Skills Trainer (JMIT, Radaur)

Abstract: India is one of the developing country providing lot many job opportunities to the youth. The young generation is very well versed with enough qualification and technical skills; however a very less percentage of youth is able to get employment in their core field. A New Delhi-based employment solutions company, Aspiring Minds, conducted an employability-focused study last year, based on 150,000 engineering students and found barely 7 per cent suitable for core engineering jobs. The issue of employability has become very serious and critical. There are several reasons behind this huge gap and one of the major reasons for this is lack of soft skills amongst the graduates. Graduates are academically competent in terms of hard skills but seriously are not good in soft skills.

Employers prefer to recruit, retain and promote those who are skillful, ready to learn new things, adaptable to changing situations, ethical and self motivated with good soft skills. Soft skills can be broadly defined as personal attributes that enhance an individual's interactions, job and career prospects. According to Hewitt Sean (2008) soft skills are "non-technical, intangible, personality specific skills" which determines an individual' strength as "a leader, listener and negotiator, or as a conflict mediator". Soft skills are different and distinct from hard skills. Soft skills are those skills that add more value to the hard skills.

The term soft skills is defined as “desirable qualities for certain forms of employment that do not depend on acquired knowledge: they include common sense, the ability to deal with people, and a positive flexible attitude.” (The Collins English Dictionary)

HR departments of organizations rate soft skills, such as interpersonal skills, communication skills and management skills as few of the highly desired skills they look for while selecting new employees. However it is very hard to find such type of employees possessing both hard skills & soft skills. Soft skills are critical to showcase one’s hard skills, both can be considered to be the two sides of same coin- one without the other has no impact.

According to a survey, which had about 750 respondents, says 60% employers feel soft skills are very significant while hiring employees but of this, the majority (70%) find it extremely difficult to find these skills in potential employees (Times Jobs survey: Economic Times, Dec 2016).
It shows that there is a huge gap between demand of soft skills by employers and skills possessed by employees. There's a saying that hard skills can get you hired, but lack of soft skills get you fired.

The employability skills of employees may be improved by inculcating soft skills like: communication, responsibility & accountability, problem solving & decision making, innovation & creativity, critical thinking, interpersonal, team dynamics, stress & time management, values & ethics.

This paper attempts to discuss the meaning of soft skills, importance of soft skills in modern era for engineering & management students and methodology through which these skills may be inculcated in students. This work will also throw some light on objectives, areas of focus, myths & truths of soft skills along with its an attempt to emphasize the necessity of incorporating soft skills training programs in curriculum. The full work will be presented at faculty conclave.
Improvement of Students Enrolment and Quality in Engineering and Technology Education with Industry Institute Collaborations

Vikas Gupta, Assistant Professor, ECE Department (JMIT, Radaur)

Abstract: Engineering and technology is passing through a very tough phase today. The enrollment of the students towards technical education is reducing drastically and the students are moving towards other traditional courses even if a bright future still exists for a good engineer. This situation is not only bad for the career of the future generations but also harming the financial health of self financing institutes. In the present paper the author has identified various shortcomings and tried best to find the remedies so that a new beginning could be seen in future.

Introduction: Private engineering education has seen a remarkable growth in the last two decades but the quality of colleges and the students has become suspect. Even a survey shows that only quarter of the engineering graduates are employable [1] and [2]. Few years back after enrolment of the students in the engineering college irrespective of the government funded or self-financing the students work here for the four years and get degrees and get placed in the good industries for employment. But the time has changed so fast that technology is changing day by day. Now obtaining a B. Tech. degree do not assures good placement. It has now become compulsory to learn the things as per the need of the industry. Moreover the health of a large number of self financing institutions is not well as the brilliant students take admissions in the centrally funded reputed institutions through their performance in the entrance examination JEE (main and advanced) conducted by the central board of school education (CBSE) all over the country. Other reputed aided or private universities set up by the industrialists also take students through their own entrance test. But rest of the self financing institutions are left with little choice as the state technical board of the respective state allow them to admit students on the basis of performance in qualifying examination or in qualifying examination and JEE (main) both. Falling admissions in self financing institutes is an alarming situation all over the country. In this year only, 122 private engineering colleges [5] in the country have chosen for progressive closure. This means that these colleges would not be doing any fresh admissions from 2017 onwards and would close once the existing batches complete. The reason behind such closure is nothing but decline in the admissions in these engineering colleges. Decline in the admissions in the colleges leads to financial crisis and colleges fails to survive, and ultimately either seek progressive closure or move towards other courses.

IDENTIFICATIONS OF THE REASONS FOR POOR PERFORMANCE

Students Quality: Large number of students prefers to take admission in prestigious institutes like IITs, NITs and other centrally funded institutions, and rest of the students are left in the fray to settle for private colleges [3][4]. Those entering in the private systems are those who did not perform well in the qualifying examination or entrance test conducted by various agencies. But still this factor can be controlled with student’s hard work.
Syllabus Taught: The syllabus being taught in these institutions are not matching the syllabus required as per industry need.

Quality of Faculty: Because of financial crisis institutes are not able to hire good quality teachers. This further affects the knowledge base of students.

Unavailability of Latest Equipment: If the latest equipment required to perform the experiments is not available then it became impossible for the students to learn new things.

Absence of Industry Linkage: If the institutes are not able to provide the industrial environment to the students either by inviting the industry or through industrial visits.

Lack of Communication Skills: Most of the students are rejected by the corporate sector as they are not able to express themselves because of the lack of communication skills in them.

Unavailability of Digital Resources: If the proper digital resources are not available for the students they are not able to access the learning resources on internet.

Lack of Coordination among Stakeholders: A proper coordination is necessary among the students, teachers, management and industry to run the institutes with respect to the planning and implementation of the policies. If the coordination is not good this leads to failure of the system.

IDENTIFICATIONS OF THE STEPS FOR IMPROVEMENT

Infrastructure: The infrastructure of the institute must be very good and all kinds of latest laboratories, methods, machines must be made available to the students.

Faculty: Highly qualified faculty must be hired by the institutes so that good quality education could be made available to the students.

Curriculum: The curriculum of the institute with respect to different engineering courses must be designed in such a way that it directly linking the students with industry even resource persons from industries must be on panel forming the syllabus so that industry ready work could be done by the students.

Methods and Tools Used: The latest machinery or hardware or software must be made available to the students for doing their work. Because if they are working on the latest models or the software on which industries are working then it becomes easy for them to get absorbed easily.

Industry Interaction: There must be regular interactions of the students with industry personals so that they could understand easily the work or the projects going on in the industry.

Training and Placements: There must be regular interactions of the training and placements cell of the institute with the corporate. Every kind of feedback received from them must be conveyed to the students so that corrective measures could be taken.

Library Resources: Good quality books and journals should be made available to the students for deep understanding of the subject.
Resources Available on Internet: All kind of resources available on internet must be made available for the students so that they could access the various online research articles available on world class journals like IEEE, Springer, Science Direct etc. and video lectures available on YouTube or NEPTEL etc.

Industrial Training: During the course of study there must be a regular training of the students in industries so that they could acquaint themselves very well with the environment, working, and culture of the industry.

R & D Activities: The research and development activities are the most important part of engineering education. The industries must be persuaded to set up their research centers in the institute so that students could do work directly on the live projects.

Entrepreneur Development Cell: The aim of the entrepreneur development cell is to provide the skills to the students to help them to become an entrepreneur by exploring the science and technology methods [6] and [7].

Conclusions: In the present paper two issues namely improvement of engineering and technology education and protection of technical institutes from failure has been discussed. The factors behind the poor performance and improvement of the system have been presented. It has been established that linkage of institute and industry is quite important for the technical education system to flourish and to enhance the employability of students by improving the quality of engineering education.

References


Development of computer assisted instructional material on Nanotechnology

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Abstract: This study describes the development of an interactive, educational computer assisted instructional material (CAIM) on Nanotechnology. The material was developed and evaluated through a pre- and post- test on the topic ‘Nanotechnology’. The study was carried out with 100 students of B.Tech 1st year. Evaluation findings demonstrated an increase in the knowledge and awareness of engineering students about nanotechnology.

Introduction: Nowadays science and technological education is considered and realized to be very important in all over the world (Y. Akta-Arnas, 2005). Nanotechnology is regarded as one of the key technologies of the future and is associated with high expectations by technologists, scientists and economists. The National Science Foundation (NSF) projected that nanotechnology will become “a trillion dollar industry” worldwide by 2015, which will reach $340 billion annually. Nanotechnology for materials, as an innovative technology in the twenty-first century, is expected to revolutionize materials technology. The development of nanomaterial’s is an area which has gained a great deal of attention in recent years (Chawla, Lochab & Singh, 2010, 2010, 2010), attracting researchers and scientists from various fields such as material science, biotechnology and genetics (Chawla, Lochab & Singh, 2011; Chawla, Sharma, Lochab & Singh, 2009).

As it is known college students are very curious to their environment and enthusiastic to learn. Engineering students have innate curiosity to discover the events around them. They are always eager to try new activities. For this reason, education is very crucial to enable young children to understand their environment. It is known that early years are the important years to develop concepts, also critical and creative scientific thought processes (Watters & Diezmann, 1998). Engineering students need the opportunity to apply their skills in a variety of learning environments. The main purpose of this study is to improve the knowledge and attitude of engineering students towards the emerging technology of 2020 i.e. ‘Nanotechnology’.

Method: In this study experimental research design was used. A sample of 100 engineering students (17-18 years-old) from JMIT was chosen for the experimental survey. CAIM was applied in the experimental group. In the experimental group a worksheet with PowerPoint slides was used as CAIM. Furthermore, the effectiveness of CAIM was administered in the form a pre-test and post-test. A criterion test was used to compare students’ success before and after the exposure to CAIM. Interviews were also done to determine children’s preferences and attitudes towards CAIM. As Tytler (2000) stated, it is suitable for young students. Both qualitative and quantitative data were analysed statistically in order to determine the efficiency of CAIM.

Results: The efficiency of the C.A.I.M. is measured in terms of the gain ratio i.e. the ratio between the amount learned and the amount that could possibly be learned. The evaluation of
the efficiency of C.A.I.M. is done on the basis of learners’ performance in the criterion test. The post-test scores are used and their mean value is computed. A good C.A.I.M. should have 75% performance. The arithmetic means of the Post test scores is higher than the pre test scores. It means that computer promotes the students’ level of understanding. The scores of experimental group were enhanced drastically with the use of C.A.I.M. The level of performance is more than the criterion level (75%). It shows the effectiveness of the C.A.I.M. Thus the research confirmed the positive effects of computers as a tool for learning in a manner that increased interest in students.

**Discussion:** For this phase of the study, a one-group, pretest-posttest design was applied. After participating in the CAIM, the knowledge aspect showed significant improvement about nanotechnology. It was concluded that CAIM is effective in engineering courses to teach the technological concepts. The qualitative and quantitative data of the study showed that engineering students like CAIM. According to data, it was determined that CAIM have more effect on the student’s performance.

**Conclusions and Recommendation:** In this study, we found that CAIM education is effective on improving knowledge towards Nanotechnology. This educational CAIM not only provides information about nanotechnology, this may also be used as a resource material for educators, administrators, and other agencies requiring a program to promote the emerging technologies. The results of this study suggest that teaching and learning of different concepts can be improved by using CAIM. For this reason educators should be trained with the abilities to apply these technologies and to interact with the students during learning process.

**References**


Different Pedagogies in Engineering Education

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Abstract: Teaching and instructional patterns are changing time to time. Now a days there are so many engineering colleges. Each year, there has been outflow of thousands of engineering graduates. The ratio of graduates who approach industries for placement are simply turned down because of lack employability skills. The skill shortage is still one of the major shortcoming in most industries in India [1]. Therefore, by using pedagogy in engineering we can improve employability in each sector. Current practices in teaching sustainable management are replete with scientific facts, analytical tools, optimization models, and management techniques. To improve the quality of engineering education, a conceptual framework i.e. Extreme Pedagogy is developed which is based on XP philosophy by overcoming the many limitations of traditional pedagogy. The qualities of Extreme Pedagogy are: Students Teachers Interactions over administrative processes, working knowledge over grades, and collaboration with students.

Introduction: Pedagogy is the discipline which deals with the method and practice of teaching. [3] Pedagogy explains teaching strategies, teacher actions, and teacher judgments and decisions by taking into consideration theories of learning. Our main motive is to educate engineers to be able to integrate two kinds of complexity: the complexity essential in the newest technologies and the complexity essential in the multiplicity and diversity of Social needs and aspect in relation to those technologies. In yesterday scenario education was teacher centered and its main focus on lecturing. But nowadays our society is now entering a new chapter of scientific achievements that brings with it not only new frontiers for technology, but also a new set of summons for this engineering education [2]. We should apply resources to access high quality learning which is also available on Internet. We should do efforts to bring research conclusions to classrooms. Project Based learning is very important and effective tool to do research work.

In extreme pedagogy, goal oriented teaching is cumulative.

- First, learning purpose must be explained to students before every lecture.
- Second, instructional information is carefully designed to highlight learning goals and objectives.
- Third, instruction is delivered making use of different kinds of methods such that students find lectures more interesting, useful and motivating.
- Fourth, it is very necessary for all of the instructors to assess whether students have obtained the objectives of the lecture, so a short evaluation in the form of decisive assessment is conducted at the end of the class.
In extreme pedagogy, all academic tasks like programming, laboratory experiments, projects, solving mathematical computations etc. are done by pairs of students working together as well as worked by programmers in XP. Pair learning is special type of cooperative learning. Positive interdependence, promotive face-to-face interaction, individual accountability, social skills and group processing are the five useful and important elements of co-operative learning [4]. As pair learning is a special type of cooperative learning, all the above mentioned elements of cooperative learning will also be applicable to pair learning.

Fig. 1. (T = Teacher, S = Student) Learning in a traditional classroom

Fig. 2. (T = Teacher, S = Student) Learning in an Extreme Pedagogy classroom

These pedagogies are based on discoveries and experiences from many sources, including engineering design, engineering education research, and the practical experiences of engineering instructors and their students.[5] Other techniques for teaching engineering design focus for helping students develop intellective skills that support engineers during the design process.[6]

**Conclusion:** Not only being as a developer of technology, engineer must be redefined as being a contributor in social process through which technology of science and the humanities formulate the shape of society. Therefore to achieve this goal, there should be integration of science and humanities and that would be able to attract wide range of interest for students.

**References**


Pedagogies in Engineering Education

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Abstract: This paper discusses the application of teaching and learning methods in engineering education, examines the difference between them. It reviews some examples where they can be been used and discusses the effectiveness and relevance of each method for engineering education.

Introduction: Life is ever learning process. We learn in many ways by books and by our society. In the same way students learn in many ways—by seeing and hearing; reflecting and acting; reasoning, memorizing and visualizing and drawing analogies and building models. Now a days the lack of professional awareness and low levels of communication and team work skills in engineering graduates have been reported frequently and publically by corporations and employers[1,2].

One factor that influences the employability of the students is teaching –learning methods. Also, there is variation in teaching methods. Some instructors take lecture, others discuss or demonstrate; some focus on principles and others on applications; some emphasize memory and others on understanding. How much, a student learns in a class depends partly by that student’s ability and prior preparation and also on the compatibility of his/her learning style and the instructor’s teaching style.

Mismatches between learning and teaching styles of instructor’s leads the students to boredom and inattentive in class, poor test performance and get discouraged about the courses, the curriculum, and themselves. Professors, also face low test grades problem, unresponsive classes, poor attendance and dropouts, know something is not working, they begin to wonder if they are in the right profession[3, 4]. Most seriously, society loses potentially excellent engineers. In discussing this situation, we should explore:
1) Which aspect of learning style is particularly significant in engineering education?
2) Which learning styles are preferred by most students and which are favoured teaching styles by most of the professors?
3) What can be done to reach students whose learning styles are not addressed by standard methods of engineering education?

Instructional methods that meet these criteria\(^{(5, 6)}\):

1. Formulate and communicate clear instructional objectives
2. Establish relevance of course material and teach inductively
3. Balanced, concrete and abstract information in every course
4. Promote active learning in the classroom
5. Use cooperative learning
6. Give challenging but fair tests
7. Convey a sense of concern about the students’ learning

**Conclusion:** It should be ensured that there should be a two way process in teaching and learning in which the learner and instructor participate equally or learner’s participation can be more as his/her detail conversation between them will lead to better/employable engineering education.

**References**


Cloud Computing for Education

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A country’s economic growth depends upon the education. Now technology has become a part of our daily life, so it is very important to inculcate latest technologies in learning and teaching processes. Cloud computing is one of the latest technology that can help educational institutes to succeed in this area, as it can provide better tools for students, staff and faculty. Every educational institute needs ample of investments along with skills for hardware and software requirements and also for their procurement and maintenance. Cloud computing can provide solution to these problems by providing a network of remotely located sharing resources those can be accessed from anywhere.

Cloud computing can handle all these issues by providing a platform from where authorities can manage, inspect and guide the education system from each and every aspect. By cloud, faculty, students, parents and staff can have on-demand access to critical information like notes, attendance, assessments etc. from anywhere using any device. So cloud computing can provide the quality education to each student along with effectively managing their class performance and attendance as well without worrying about the infrastructure and financial issues.

Cloud computing is Internet-based computing that provides on demand access to shared resources, softwares and information as services through computer or any mobile devices [1]. Educators and learners are using free or low cost cloud based services to support learning, content creation/publishing, social interaction and collaboration. Some of the cloud-based services include Google Apps, Drop box, YouTube and Twitter.

Various types of services [2] provides by the cloud are:

- **Software as a Service (SaaS):** This is currently of most interest in education as it provides anytime anywhere applications access through web browser. Its examples are MicrosoftLive@edu and various Google Apps for education.

- **Platform as a Service (PaaS):** Cloud provides the users with the application development tools for creating, deploying, testing, collaborating, hosting and maintaining applications. For examples Microsoft's Azure, Salesforce's, Amazon's Relational and Rackspace etc.

- **Infrastructure as a Service (IaaS):** Cloud provides on-demand resources like storage, processors, data centers etc. as service. Client can run their own applications and operating systems on them on pay per usage basis. For example Amazon’s Elastic Compute Cloud.

   Even if an educational institute hosts their own processors, hardware, expensive softwares, data centers, servers etc., they are rarely fully utilized. Thus cloud can plays a vital role by providing on-demand resources on pay per usage basis. The main users of any education system like faculty, students, administrative staff, examination and admission branch have
separate logins to cloud as shown in Fig. 1. Students can access and response to all assignments, tests, study materials and tutorials provided by their teachers from anywhere and anytime through cloud. Students can also check their attendance and performance online.

Fig 1: Services through Education Cloud

Some of the benefits of using cloud for education institute are as follows:

- **Improved Learning**: Through wide variety of services to suit student’s learning style.
- **Minimum Cost**: Besides accelerating the use of new technology, cloud also helped the institute by reducing cost.
- **Accessibility**: Anytime and anywhere availability of services without failure.
- **No Extra Resources**: Institutes can avail services from cloud with minimum infrastructure.
- **Go Green**: Carbon footprint will be surely reduced.
- **User Friendly**: As it is easy to understand and operate.

Thus cloud can benefit educational institutes a lot but still security and privacy of data on a third party’s site is also a major issue. That should be taken care through proper documentation and service level agreements (SLAs).

**References**


Prospectives of Technical Education in India

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India’s higher technical education system is on the threshold of major institutional reforms. It is the right time to envision a bright future. Technical education in India has confronted significant adjustments after independence to these days. The exponential growth in technical schooling has, however, now not translated into any full-size boom inside the number of first-rate graduates proper to industry; causing a large unemployment because of degradation of excellent education on the enter degree as well as on the output level[1].

The various issues which have an effect on the excellent of technical education are: lack of curriculum making plans, inadequate bodily sources & loss of most efficient usage of infrastructure, Ineligible/fresh pass out joining the coaching profession, trainer targeted educational processes, extra emphasis on concept, in place of realistic performance, assessment machine encouraging memorization at the part of college students, insufficient physical sources & lack of most advantageous usage[2].

Education in India is provided by the public region in addition to the personal zone, with manipulate and funding coming from 3 degrees: central, state, and local. There are masses of problems being faced in Technical education. It’s been remarked that ‘India can emerge as a knowledge power only if an appropriate architecture for higher education is put in place. Indian youngsters have demonstrated their inventiveness and energy in the beyond. Better education that channels this capability for innovation will unleash the latent capacity of India’s demographic dividend. Engineering education, which is part of higher and technical schooling, is passing through a critical segment and it's far vital for the system to improve pleasant [3, 4]. Revolution in the records technology zone over the past decade has been phenomenal. It has enabled the brand new area of assist for verbal and written communiqué thru internet. It has now come to be a necessary part of the technical education. It has lot of useful records, reference materials, encyclopedias, books, studies articles, journals and records that may be needed to the scholars. There also are case researches, answers, institutional and industrial information. It allows and presents possibility to the scholars to get better pictorial presentation of the processes, structures, machines, devices and connection diagrams. The social sites, organizing, visiting and web surfing just to serf have turned out to be one of the greatest time enemies of the understudies. Technical education plays a major role in any country’s economy. It is considered relatively tough in India as compared to the other courses such as Bachelor of art, Commerce, Law, religious, physical education and even different disciplines of the sciences. The better opportunities have been created to join the course during the last decades but the infrastructure has not been created or grown adequately for the proper growth of the students. Now the root cause of drawback of system lies in the Quality of Technical education. Now it is time to accelerate the reforms process to improve the quality of technical education [5]. Government

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ought to manage the quantity of graduates in a specific train as indicated by the quantity of occupations accessible around there and Affiliation should just be given to those universities just which guarantee the Quality benchmarks of the teach. Organizations neglecting to do as such ought to be prohibited for approval [6]. Not only focusing on institutions, government should improvise the Curriculum and make it more Industry friendly. Emphasis should be on the latest technologies and not be an outdated learning. Institutes should focus on more of practical work than the theory part as followed in developed nations [7]. Engineering and technology education and research cannot flourish without effective linkages and mechanisms for collaboration and cooperation between universities and institutions in India and at the global levels.

References


Achievement of attributes of National Board of Accreditation through Teaching and Learning Skills

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Abstract: Engineering education is a combined responsibility of academia, industries, professional associations and Government. The engineering education in India is accredited by National Board of Accreditation. The attributes of national board of accreditation can be achieved by following cognitive domain levels of Bloom’s Taxonomy of Educational Objectives. The levels of blooms taxonomy which are higher levels of learning skills can be attained by the use of active and cooperative learning methods.

Introduction:

Engineering graduates have a strategic and direct impact on productivity and growth of industrial sector of any country. India requires a high number of well qualified and highly skilled engineering graduates, to produce sophisticated industrial products and services that are acceptable in the international market. A constant interaction among Educational Institutes, Industries and Government through seminars and workshops is necessary to produce employable engineers.

In our country MHRD governs the engineering education through the All India Council for Technical Education (AICTE). AICTE sets the guidelines for starting new programmes in technical education and is also charged with accrediting the programmes through the National Board of Accreditation (NBA).

The NBA an autonomous body came into existence, with effect from 7th January 2010, with the objective of Assurance of Quality and Relevance of Education, especially in professional and technical disciplines. The graduate attributes as per NBA are as follows.

Engineering Knowledge: To apply the knowledge of mathematics, science and basics of engineering education and an engineering specialization for the solution of complex engineering problems.

Problem Analysis: Survey, Identify, hypothesize, analyze and solve complex engineering problems.

Design/ Development of Solutions: Design parts or components of instruments, processes and solutions to meet the environmental, cultural and public health and safety aspects of the society.

Conduct: This includes use of research based methodology like designing of experiments, analysis and interpretation of data.
Modern Tool Usage: To create, select and use resources and tools with an understanding of the limitations usage of these tools.

The Engineer and Society: To assess environmental, social, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.

Environment and Sustainability: Analyze and understand the effect of implementation of professional engineering solutions in societal and environmental contexts. Use and demonstrate knowledge for sustainable development.

Ethics: Use ethical principles and commit to professional ethics and responsibilities and norms of engineering practice and society.

Individual and Team Work: Work effectively and efficiently as an individual, and as a member or leader in teams.

Communication: Communicate effectively with the engineering community and with society at large. One should be able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.

Project Management and Finance: Apply knowledge and understanding of engineering and management principles to manage projects and their finances.

Life-long Learning: Recognize the need of hour and have the aptitude and ability to strive for learning higher levels of skills.

But the actual level of graduate attributes which are followed in Institutes is as presented in the figure:

GRADUATES ATTRIBUTES FOLLOWED IN INSTITUTES

- Engineering Knowledge
- Problem Analysis
- Design / Development of Solution
- Conduction
- Modern Tool Usage
- The Engineer and Society
- Environment and Sustainability
- Ethics
- Individual and Team Work
The graduate attributes as per NBA can be achieved by following the instructional objective. These instructional objectives are grouped in six categories which are the cognitive domain levels of Bloom’s Taxonomy of Educational Objectives (Bloom 1984).

1. Create: Creation of a product or solution by arranging ideas, thought and information

2. Evaluate: Judgement and evaluation on the basis of inputs and outcomes.

3. Analyze: Separate whole into parts until structure of whole and relationship between parts is clear for professional benefits.

4. Apply: Use knowledge in the discovery of new product or methodology.

5. Understand: Grasp meaning, explain, interpret and translate

6. Remember: Recognize, recall facts

These instructional objectives can be attained by the use of different teaching and learning methods. Students learn in many ways—by seeing and hearing; discussing and acting; reasoning logically; memorizing and visualizing, using mathematical models; steadily and in fits and starts. How much a given student learns in a class is governed not only by the student’s native ability, but also by the compatibility of his or her learning style and the teachers’s teaching style.

The use of active and cooperative learning methods can improve the retaining and learning capability of students. Most students cannot remain attentive throughout a lecture. After sometime their attention begins to drift, first for brief moments and then for longer intervals, and by the end of the lecture they are taking in very little (McKeachie 1999). Students’ attention can be maintained throughout a class session by frequently asking them do some exercises. Many different activities can serve this purpose (Bonwell and Eison 1991; Brent and Felder 1992; Felder 1994a; Johnson et al. 1998; Meyers and Jones 1993), of which the most common is the small-group exercise. By using active learning methodology a variety of learning objectives can be addressed like recalling prior information, responding to questions and this also improves analytical, critical and creative thinking. Along with active learning cooperating learning can play important role in improving retaining capability of the students. Cooperative learning (CL) is instruction that involves students working in teams to complete an assignment (e.g., a problem solution, critical analysis, laboratory report, or process or product design) An extensive body of research confirms the effectiveness of cooperative learning in higher education (Johnson et al. 1998). In comparison to students taught conventionally, cooperatively-taught students tend to show better analytical, creative, and critical thinking skills, deeper understanding of learned material, motivation to learn and achieve, better relationships with peers, more positive attitudes, lower levels of anxiety and stress, and higher self-esteem (Johnson et al. 1998; McKeachie 1999).

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**Conclusion:** Thus if active learning is used in concert with cooperative learning, the potential for improvement and achievement of graduate attributes is great. This can also be helpful in prevention of societal loss of potential excellent engineers as well as we will be able to produce well trained and extremely qualified engineering graduates.

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