

Technology Enhanced Teaching with Innovative Practices and its Impact on Engineering Education

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Abstract

In our educational system the teaching and learning process is generally characterized by the traditional lecture in which the teacher explains to the students. In contemporary sphere of engineering education there has been continuous paradigm shift in delivery to the pupils. Consequently modern teaching trends in higher education exhibits paradigm shift from the conventional classroom teaching method to non-conventional teaching aids so as to encourage interactive forms of learning in students through active participation.

These days, with increased adoption of smart phones and computing devices, desktop, laptops tablets etc; students are coming to college already possessing advanced skills and practices regard to electronic learning and communication. Familiarity with basic images of technology are pretty integral to their day to day life styles, be it in home or college. Moreover, the use of multimedia and various tolls help teacher to convey in a better and easier manner and students able to visualize and interact and understand the topic with more clarity. The paper mainly discussed different new methods and innovative practice of teaching which is adopted in this new normal situation and its impact in engineering education.

Keywords: Conventional, traditional, interactive, Facebook, MOOC

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I. Introduction

Education is a light that shows the mankind the right direction to surge. The purpose of education is not just making a student literate but adds rationale thinking, knowledgeable and self-sufficiency. When there is willingness to change, there is hope for progress in any field. Creativity can be developed and innovation benefits for both students and teachers. Education is only that option or tool which develops the traits of the nationality among the citizens to make good leading person.

“Education is the manifestation of perfection already in man” – (Swami Vivekananda). Islam also gives such a great importance to knowledge and education. In Quran the first word of its first verse in ‘IQRA’ that is, reads means in Islam education is thus the starting point of every human activity. A scholar (Alim) is accorded great respect in Hadith. According to Hadith the ink of the pen of a scholar is more precious than the blood of a martyr.

Education is a light that shows the mankind the right direction to surge. I education files to inculcate the self-discipline and commitment to achieve in the minds of student, it is not their fault. We have to convert education into sports and learning process has to generate interest in the students and motivate them to stay back in the institution than to run away from it. It is an integral part of their growth and progress of any society. It not only imparts knowledge, skills and in calculate values, but also responsible for building human capital which breeds and drives and sets technological innovation and economic growth. In today’s era, information and knowledge stand out as very important and critical input for growth and survival. Rather than looking at education simply as a means of achieving social upliftment, the society must view education also as an engine of advancement in an information era propelled by its wheel of knowledge and research leading to development.

Traditional Method of teaching :

An evaluation in pre-technology education context, the teacher is the sender or the source, the educational material is the information or me receiver message, and the students is the receiver of the information. In terms of the delivery medium, the educator can deliver the message via the “chalk – and- talk” method and overhead projector (OHP) transparencies. This directed instruction model has its foundations embedded in the Behavioral learning perspective (The Skinner) and it is a popular technique which has been used for decades as an educational strategy in all institutions of learning. In other words, the teacher delivers the

lecture content and the students listen to the lecture. Thus, the learning mode tends to be passive and the learners play little part in their learning process. It has been found most universities by many teachers and students that the conventional lecture approach in classroom is of limited effectiveness in both teaching and learning. In such a lecture students assume a purely passive role and their concentration fades off after 15-20 minutes.

- Teaching in Classroom using chalk and talk is “one way flow” of information. Message
- Sender (Teacher) -----□ Receiver (Student)

Medium

- Teachers often continuously talk for an hour without knowing students response and feedback
- The material presented is only based on the lectured notes and textbooks.
- Teaching and learning are concentrated on “plug and play” method rather than teaching practical aspects.
- There is insufficient interaction with students in classroom.
- More emphasis has been given on theory without any practical and real life time situations. Learning from memorization but without understanding.

Student Interest

Transfer of learning has been described as the ultimate aim to teaching (Macualay 2000). Transfers refers to a phenomenon in which something is learned in one situation is carried over to another. The student capability to recall what he learned in teaching learning process is always depends upon only by chance. Generally the students want to utilize the information which he obtained in the classroom is real life situation. The problem occurs when the student is unable to identify what knowledge is needed to address the problem outside the context in which it has learned. It is well known that pupil learn more when they are involved actively in learning than when they are passive recipients of instruction. Active learning strategies can be designed to target visual learners through models demonstration, auditory learners through discussion, debates and games and kinesthetic and tactile learning through models and role playing.

It is quite natural that the innovative teaching practices would certainly have greater impact on the learning habits of pupil and consequently its influence on their performance in examinations, life skills and other related aspects. In other words the innovative practices of teaching help the students to achieve either desired level or enhance the learning skill so as to excel in their examinations as well as equipping with better potential to seek either jobs or other professional performance in the life.

Innovative teaching methods are though distinct from each discipline of the education yet there have been central commonalities. For Example, subject- quiz is an innovative teaching method which can be applicable to all the disciplines of teaching practices practiced in science discipline can also be applicable in the field of social science. The innovative teaching practices have strong inter-disciplinary approach.

Many Educators has the opinion that knew methods (ICT) can assist pupil in engaging cognitive taxonomies such as provided by Bloom (1964).

Bloom Theory Of Education

1. Knowledge: The Learner must recall information (bring mind to appropriate material)
2. Comprehension: The Learner understands what is being communicated by making use of communication.
3. Application: The learner uses abstraction (e.g. Ideas) in particular and concrete situations.
4. Synthesis: The learner put together elements or parts to form a whole.
5. Evaluation: The Learner makes judgments about the value of material or methods for given purpose.

Based on this work on innovative teaching practices in higher education in India, Prateek Shah (2004), opined that the innovative teaching practices enable the learner to understood the difficult task much faster than the usual traditional teaching methods. He argues that given the technological application in teaching, there is need to introduce new methods of teaching in higher education in India, assessed on the extensive research in the classroom, the conclusions presented are especially meant for the study by aspiring teacher's foe colleges and universities.

However, the traditional methods of teaching have still been largely practiced in India. The teachers in technical education arena are not aware of the innovative practices of teaching being practices in the country due to lack of documentation of such practices and also lack of publicity in reference to authentic impact of these teaching. Despite best efforts the use of Information and Communication Technology (ICT) in Indian education lagging behind our expectation.

Modern innovative way of teaching :

There are a variety of ways I which these technologies could be leveraged, either individually or

collectively.

To illustrate an instance, today most of the students have Facebook account. It is possible to subscribe to various feeds from institutes of repute in your Facebook account, thereby getting to know about the latest thinking on various subjects which are available. What does this do basically supplement the content taught in college by the faculty and the courseware made available to the students.

This Facebook account is available as a native application on mobile phones across operating systems like Android, iOS etc. Today most of the Smart phones have this feature making it accessible to a wide range of students and serving as an effective tool for learning enhancement.

Incidentally, the same tool can be leveraged by the faculty as well in building up their knowledgebase further to what they are already in know . So a faculty who teaches economics may want to subscribe to information feeds, say from, “Economist Intelligence Unit in his /her Facebook account and keep himself/herself updated on the latest development across the globe. Being at the cutting edge of their perspective subjects is an imperative for the faculty these days.

And above was just one possible use case. Facebook strikes the chord because of its all perspective uses.

Today, there is a homogeneous amount content available on the web, on any subject. Be it Economics, Science, or any subject for that matter. And this content is getting relished as we talk with updating happening almost on a daily basis.

The enriched content available today and accessibility thanks to the advances in technology supplement by the course ware and the pedagogical skills of the faculty can mark a significant breakthrough in teaching and learning enhancement.

MOOC

Another very successful use case of leveraging technology for both teaching and learning is enhancement is widely popular MOOC, which means Massive Open Online Course. A massive Open Online Course is an online course aimed at unlimited participation and open access via web. In addition to traditional course materials like readings, problems sets, several courses on offer, also provided interactive user forums where students for the particular course can interact with each other as also with the faculty for the course.

Alongside the development of these open courses, other E-learning platforms emerged-Such as Khan Academy, Peer-to-Peer University (P2PU).

According to The New York Times,2012 became” the year of the MOOC” as several well financed providers associated with top universities emerged, including Coursera. MOOC’s are widely seen as major part of larger disruptive innovation taking place in higher education led by disruption and advances in technologies.

EFFECT(European Forum for Enhanced Collaboration in Teaching)

This project another success in the area. The development of the pedagogies and didactics for the higher education teaching in an area of growing importance n universities, which responds to larger and more diverse students body with strong emphasis on the student- centered and learning outcomes.

However, often little attention is given to the role and situation of teachers. The Project EFFECT aims to facilitating exchange of experience in staff development of university teachers. It draws upon good practice of European and international institutions and organization and will probe their transferability in other disciplinary, institutional and national contexts.

It also to assess the feasibility of a European level structure that would support the enhancement of the University teachers. The projects brings together experts, dedicated networks , organization and institution from different parts of Europe, provide an innovative and transferrable approach to higher education teaching and staff development.

It has the Following Features:

Facilitates exchange and collaboration between European actors and stake holders the enhancement of the higher education teaching.

Identify good practices and develop new and innovative approaches to learning and teaching enhancement.

Support institutions development in the development of strategies approaches to the enhancement of learning and teaching.

Develop a model for a sustainable European structure for the enhancement of learning and teaching.

Some Other technologies and types of teaching and learning tools

The different types of teaching and learning tolls which can be harnessed for enabling enhancement in teaching are as follows:

Presentation Software

Sometimes it's helpful to provide visual aids to complement teaching, stimulate discussions, or allow out of class teaching. Tools designed for this purpose, such as PowerPoint, can be used well or used badly.

Classroom Response systems ("Clickers")

One way to encourage students engagement is by using electronic devices that allow students to record their answers to multiple choice question and allow you to instantly display the results. The anonymity encourages the participation and their helps the teacher to know when further discussion is needed. Use of clickers can also serve as a catalyst for discussion.

Online Projects and Collaboration Tools

Technology can support student collaboration on creating new knowledge, reflecting on what they are learning or working together to achieve a deeper understanding of course materials.

Information Visualization Tools

Technology can also clarify and stimulate thought through transforming words into pictures. Many tools are available to help lead the student to think more critically by encouraging them to visually structure information.

Games

What could be more engaging than a good game, used well? A game may lead to deeper learning and give some examples of their use in higher education. The methods of using game in academic content is called gamification. In recent days teachers are trying to gamify the core subject for better learning and better understanding as well as promote individual span of attention.

Converting a Face-to Face Course to an Online Course

Teaching online, whether in a hybrid course or a wholly online course, requires different techniques and different tools. Without F@F contact, professors will need to be even clearer about setting and articulate expectations for digital work and participation. Encouraging interaction between professor and student and among student is an additional challenge, as is monitoring student learning as the course progresses. The online environment requires basic technologies to digitize the course materials as well as mastery of the university's learning management system. And various tools like Skype allow synchronous communication, while blog and Twitter can encourage asynchronous interaction.

Collaborative Multimedia Tool:

Voice Thread: It come in both free and paid versions. It is flash board toll that allows you to use multimedia creativity. You can use over 50 different file types and create immersive experience with your course content. Additional feature in Voice Thread include ability to collaborate with other content creators, commenting, sharing and analytics on user use. Voice Thread is available in mobile devices as an app for your convenience and one of its major strengths is how it integrates with many Learning Management Systems, including Canvas. Voice Thread provides you support for educators as well, most notably a series of webinars that showcase the strategies for using Voice Thread to enhance instruction inside the classroom. Voice Thread is mostly free, but some feature requires licensing.

According to Lankshear & Snyder 2000, the job of teaching is device in nature with each teacher bringing to it their own meaning and set of belief they have about teaching learning upon which they base practice. Effective use of ICT is matter of becoming proficient with a range of interlocking, complementary procedure, between ICT, curriculum and pedagogy.

The opinion of the pupil that the traditional method is knowledge oriented and modern and innovative teaching methods provides employment-oriented skills development. The teachers feel that by adopting innovative teaching in learning process, the students has advantages like (Vasudeva Rao, 2012)

Advantages in Innovative Teaching

1. Student Motivational Levels Increases: Easy to manage student direct towards the task Students had a chance of distraction the computer from tasks the teacher wanted to.
2. Removing Stressful tasks: Better satisfying experience to teachers to direct less tedious tasks. Few teachers may prefer o students to busy and engaged.
3. Self or independent learning: Learning may not be directed towards teacher's objectives classroom. More Extra coordination of classroom.
4. Extension of Students Thinking: Ideas and thinking of students may go beyond teacher's capabilities and experience which may bring & provide double confidence of levels of teachers.
5. Active Learning Process: Students may go beyond the teacher's own subject of Expertise. More complex to direct and manage student learning.
6. Instruction to the right learner: Teachers feel easy to spend time with students that need extra attention and practice to catch us with the subject.

7. Attention: Slow learners have also concentration on the teaching –learning process without deviation and distraction.

II. Conclusion:-

Ideas are everywhere, and innovation, technology, and accountability are their critical components. But they require tough choices and skins to survive the attack of antibodies against change. Some university constituents hear dreaded word “productivity” as euphemism for bigger classes or just classes taught on backs of already overworked, underpaid adjuncts. In defense of the university they head rampant to demands increased states financing and cuts in administrator salaries, as if those were the only solutions. As demand for technology continues to rise the colleges, and universities are moving all sorts of students service from laundry monitoring to snack delivery online. At Coloumbia University a system to see which washing machines are free before they head laundry room. They can monitor their wash and can even program the service to e-mail them when their load is done.

Technology is also changing the classroom experience. The classroom at University to Strathclyde, Glasgow, all sorts of conveniences for students and teachers for instances the room is wired with cameras for photographing, whiteboards. So students can receive the images as the digital files. In addition, tablets PC’s, compact computers that allow you to write notes directly on to screen with special pen, replace the archaic projector.

From above, we can make out that the Information communication technology has made many innovations in the field of teaching and also made drastic change from old paradigm of teaching and learning. In the new paradigm of learning, the role of student is more important than teachers. The concepts of paperless and pen less classroom are emerging as an alternative to the old teaching learning method. Nowadays there is democratization of knowledge an the role the teacher is changing to that of facilitator. We need to have interactive teaching and this changing role of education is in evitable with the introduction of multimedia technology and the sprawling on a technology- savvy generation of youths.

The analysis reveals some of the suggestions that the teaching community can practice in the classroom. Ultimately the teaching processes are satisfied when he could reach the students community with his ideas an views. So teaching depends upon successful made of communication and innovation though we mean the changes we purpose to be included in our medium of communication or even inclusion of some other elements in communication information.

Technical education in India is at view of the new policies laid down and the globalization processes. Indian Technical education needs to orient itself to new challenges and enable its pupil to complete level. The pupil who are pursuing teacher education are required to place community and future citizens at higher place by possessing new skills and attitudes as well as competitive knowledge in the stream of practices in Teacher Education. If innovative teaching being vogues as there is every possibility that these practices would certainly attract the attention from innovative teaching practices for teacher education or eschew new path of innovative teaching at their respective institutions.

The researchers believe that the core objective is passing on the information and knowledge to the minds of the students. Any method using computers or modifying the existing conventional chalk-talk method are innovative if they ultimately serve the attainment of core objective teaching.

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