



Priority towards Subjective and Experimental Framework in Teaching-Learning Process in Engineering Education for Millennial Learners

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ABSTRACT: From the time of 20th century, the world has undergone complete change in the field of Engineering Education. Learning environment in Educational system of Millennial's, for very short concentrated people who prefer interactive, experiential and collaborative learning, usually they are informal and choose to have friendly relationships with teachers. Educational system in engineering classes for such Learners with dynamic and technology driven people do not prefer long lectures anymore. The design objective is to understand the cognitive and social developments in easier way that outcome in faster learning, and also to redesign classrooms and other learning environments. So that Learners can learn more passionately with completeness in the topic/ subject and to make them self Learners. This paper provides a meaningful teaching objective that relates with real-life experiences, Lectures mixed up with methods like video clips, concept charts, and PowerPoint presentations with key concepts based on the summary, also creating collaborative subjective experiences with social networking platforms. Finally, this paper concludes by discussing the experiments being applied in our institution (VIIT) to make engineering education practical by means of experimental learning.

Keywords: Engineering education, Teaching-Learning Process, classroom environment, Cognitive development.

I. INTRODUCTION

Generally, Education is a single word but brings responsible life with good knowledge, enhancing skills, following rules and transforming them. engineering education to engineers to provide them reach their expected educational goals. Engineering minds are full of imaginations, they try to learn interactively by getting feedback which leads to valid outcomes. Educating Engineering students is not making them learn only existing facts but to train their minds. Young minds are like swords, when they set their minds on anything they try to achieve. Engineers with young and energetic minds play a crucial role in the accomplishment of a nation. Therefore, Effective As every individual has not the same capacity of extracting knowledge from teachers, teachers must be aware of simple and attractive attention of children from a low level to high level. One of the procedures for educating students is Teaching- Learning process.

It is an efficient systematic order to obtain predetermined targets and objectives. Millennial Learners are graduates who also try to analyze problems, using knowledge to develop a system. These learners like to communicate with their faculty directly and they wish to have more guidance from the faculty. They want continuous feedback and are lifelong learners. They are committed to their private self-learning and enhancement.

Millennial Learners:

Millennial learners are enforced to prosper with enhancing skills which are significantly essential in the present professional world. Teamwork establishes spark inside the millennial learners. This leads to the gain of knowledge and best communication skills to the millennial learners. Interacting with each other and instant feedback will be provided.

1. Having this group work, millennial learners enjoy learning and thus as a result, their outcome performance shows an admirable improvement.
2. More members of the group work, hands-on exercises that connect with technology provides a friendly learning environment. Modern technology has adopted "flipped classrooms" for millennial learners.
3. Learners are requested to understand the topic before giving the lecture on the next day. By this, the fundamental basis related to the concept could be understood by the students.
4. Based on the improvement of the learning process, time consumption will be reduced for the students to listen long hours and also given chance to clear their doubts and tries to learn in a practical manner. Then the students will have a broad mind to discuss the real-time applications and moves towards the bottom of the subject.

II. LITERATURE REVIEW

(Wilson and Gerber, 2008)[2]: explained that millennial Learners are a type of learners who are very much interested to communicate directly with the faculty and expect to have their guidance and encouragement. They try to have faculty focus on them and to gain special personal concentration. They find themselves in a different world with great Tolerance level. A Classroom is mixed with a combination of all various cultured people. The classroom environment for the millennial learners is quite activating by joining them and getting them with most combinations of knowledge because they are very weak in self-management. (Elliot -year and Sherri, 2012)[3]: explained about the millennial learners that they are affectionate to their parents more than to the popular personalities in 33% of the situations.

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(Allen and Christopher, 2013)[1]: described that millennial learners need a good suitable planning because they did not expect to have as much freedom or responsibility for structuring their educational lives

The Millennial learners are groups find themselves in lacking the control and consider themselves in a confused state of sharing information exactly what they want contact with others. Learners in this group are is very much anxious about obtaining new knowledge. They are very brilliant and active capable of arranging multiple tasks in concurrent time like listening music and working in a system, watching television and eating, etc. These learners are very much focused on learning environment.

Millennial learners have very much concentration in knowing about the estimation process of learning outcomes. They want to be stress-free and without any pressure. In this group information sharing appears in the form of digital media.

(Guest Blogger, 2017): explained that millennial are the most educated generation (in United States). They perform unlimited access to free information because they are addicted to social media. They are visual learners.

Currently, faculty leads a primary role in helping millennial students to examine and perform. The Latest media tools are implemented to support their learning and to locate existing challenges. Teaching by design theory motivates learners to have the concentration to analyze, apply, communicate and create new outcomes.

III. EXISTING APPROACH IN TEACHING-LEARNING BASED EDUCATION IN ENGINEERING:

i. Teaching- Learning Environment

Engineering Education must provide a platform for advance learning; build up knowledge and ability to perform practically. Below are some of the design environments in the teaching-learning process

- *Creating Learning Environment:* Teachers should know the students, what they are trying to reach, and motivate them in solving their problems by creating interest inside them to learn.

- *Design teaching methodology:* Teachers need to mix methods basing on the key characteristics of the students and generate a Reliable Design

- *Open-ended learning:* Teachers should allow students to immerse in active knowledge creation, ability to achieve, resolving problems and public relations.

In spite of all, the millennial learners are normally independent of combinational learning ability and effective classroom exercise.

ii. Teaching-learning Process: Academic Activity in current Institutions

Practical teaching and learning process is suitable in the institutional settings. Academic teaching process is a set of principles, ideas about the quality of learning which is interpreted into the classroom.

- *Teacher characteristics* - knowledge to teach, skills to teach in effective ways, efficiency getting good outcome

- *Student characteristics*- prior knowledge of the student, able to understand, Learning style.

- *Teacher behavior*- proper planning of teaching, managing of time, concepts as well as students and following instructions.

- *Student behavior*- conceptual overlap, involvement in the subject, obtaining success.

- *Memory-based techniques*- Based on the student memory of accepting knowledge, resulting the same in examinations and oral performance of the learned concept. To achieve perfection sincerity of learning is the most.

- *Cognitive Process* -The Cognitive process is involved learning process of the humans which invisible, an unobservable mental process and remembering new knowledge. In the cognitive process, the learner knowledge is a changing process.

They are like Learners in theoretical knowledge and functioning with long-term memory to apply in cognitive activity.

iii. TEACHING - LEARNING STRATEGIES:

Individual learners try hard to gain knowledge to make easy of the knowledge, programmatic ideas must be designed to make the learning process more practical and appropriate. Below are the best learning strategies to make millennial students active and successful.

- *Teamwork:* Millennial Students group is led by a leader, who guides them and assigns work to perform.

- *Real-time Applications:* Students should be assigned to Real-time applications as topics in their assignments. While teaching classroom sessions take real-time applications as examples.

- *Internships:* To make students broad-minded various levels of internships are given.

- *Updates:* Continuous updates of the subject topics should be delivered to the students.

- *Interaction:* To motivate millennial students, allow them to interact with every student.

- *Teams:* Observe the personalities of the students and assign them to class work to improve self-confidence among them.

- *Listening skills:* Teacher should be aware of the student that he/she have listening skills up to 15-20 minutes.

- *Classroom environment:* As classrooms are widely sophisticated, make students feel class as live. Students with different learning style, try to understand and learn at different levels. Teachers should create a motivational learning environment in the classroom to encourage students.

- ✓ Basing on the effort and the value of academic measures, where *value* is the measure of work and *effort* is the measure of time that students focus on work.

- ✓ Managing academic tasks basing on the effort and the value of the students can perform greatly in the classroom environment.

- *Classroom activities:* Make time to students, explore themselves instead of continuous lecture like:
- ✓ *Conducting Quick on the current topic or any other topic:* We know that quiz questions come from the master but here in the classroom environment allow students to create questions instantly on the topic and ask the other group to answer.
- ✓ *Conducting Just a minute:* Based on the explained topic or previous session topic, faculty should pose a sentence from which bulk of information will be extracted from the minds of the learners.
- ✓ *Jumbled programs:* Most of the Engineering students are very poor in programming. Faculty must teach students programs in a logical way and allow doing in class. Jumbled order of programs is given on the board and allows students to correct them.
- *Role-play:* Students are not always interested in listening to third parties. A Teacher should play a role of first party and students as the second party. A Teacher should be involved in the role and make students involved in the role.
- *Class work management:* Teachers are habituated to emerge with the educational setting to reach the individual pupil's needs and capabilities. The learning outcomes are referred to the taxonomies of learning. A procedural ways to make students reach their goals.
- *Taxonomy of learning:* The main objectives of this are to target from the lowest level with very simple processes and to progress to the highest level through every stage with ascending complexity. The most used and current popular implementing taxonomy is "Blooms Taxonomy".

ii. **Blooms Taxonomy**

A Mixture of some cognitive psychologists, educational theorists, and Teaching researchers and testing's and evolution's are now using Blooms taxonomy. Blooms Taxonomy has been classified into 7 step procedure.

- Remember - Recognizing, Recalling.
- Understand - Interpreting, Exemplifying, classifying, summarizing, Inferring, comparing, Explaining
- Apply- Executing, Implementing
- Analyze - Differentiating, Organizing, Attributing
- Evaluate- checking, Critiquing
- Create- Generating, planning, producing

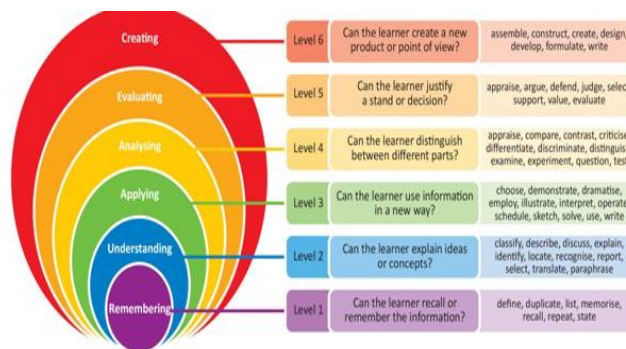


Figure 1: Representation of Bloom's Taxonomy

IV. **PROPOSED TEACHING IDEA "CLASS DIVISION"**

Within 45 to 50 minutes of class work, If the faculty goes on taking Lecture without any gap , students losses interest, some feel drowsy and some talk with each other without listening. The proposed idea is like making classroom environment **"Live Open Source Knowledge Discovery"** through faculty for the students. When Lecturer divides his/her classroom sessions in divisions like:

- 30 minutes Lecture on the concept, remaining 20-15minutes on activity class work.
- 30 minutes of Lecture also should not be boring for students. 5 minutes video clips on the present situations that are going on day-to-day life industrial sectors, software companies, environmental sectors, so on relating to the concept, which drives student attention towards class.
- Using Chart methods, allowing students to prepare chart model or else faculty can prepare with own interest according to their teaching style.
- Using PowerPoint presentations with collaborative subject concepts by summarizing the topic.
- 20-15 minute's activity class works providing Parallel Learning system like interaction with students and faculty allowing them to open minds in the subject by conducting quiz, just a minute, so on.

V. **PROPOSED LEARNING PROCESS IDEA: "MILLENNIAL LEARNERS AS TEAM LEADERS"**

Generally, classroom consists of Millennial Learners, average Learners, and low Learners. When a teacher teaches Millennial learners automatically grabs the attention of the teacher and grasps knowledge. The Motive of an Educational Institute is to make every child a graduate providing good knowledge. Those who learn automatically learn but those who won't learn will lack behind with low grades. A student may not listen to the teacher but a student will definitely listen to his fellow student. The Proposed idea in this paper is **"Teamwork using Millennial Learners"**. Each Millennial learner is assigned to the remaining students. So that, Millennial Learner shares his knowledge with others and make them develop their knowledge.



Figure 2 describes graph among the Learners in the classroom, and it is demonstrating pass percentage without Classroom with teamwork. We have Millennial Learners obtaining 100% in their academics, Average students obtaining 60% in their academics, Low Learners obtaining 40% or in some cases even below in their academics.

Figure 3 describes the graph between the Learners in the classroom pass percentage, classroom having teamwork considering each Millennial Learner as a leader and other classmates as teammates. Then the pass percentage of the classroom achieved is 100% for Millennial Learners, 90% of Average students and 60% for Low Learners. This graph shows a drastic change in pass percentage when compared to the above graph without teamwork study. The classroom statistics changes dramatically when millennial learners share their knowledge and ideas with the remaining teammates.

The key achievement of this proposed idea is, students, having more attention towards their fellow students when compared to their academic faculty. Even though faculty has more knowledge than the Millennial Learners and even though faculty teaches entire classroom in the same style, the grasping power of the students lies inside their interest they show and concentration they put towards the concept. Likewise, Millennial Learners can put their subject into practice by sharing and making themselves think in new innovative ways.

ii. Result Analysis

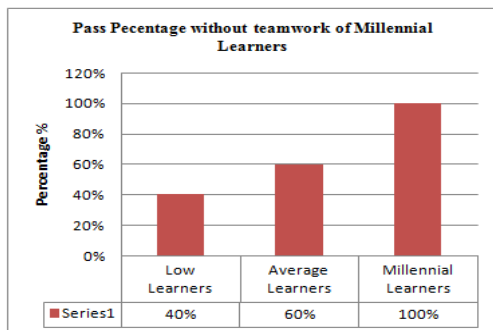


Figure 2: Pass Percentage without teamwork of Millennial Learners

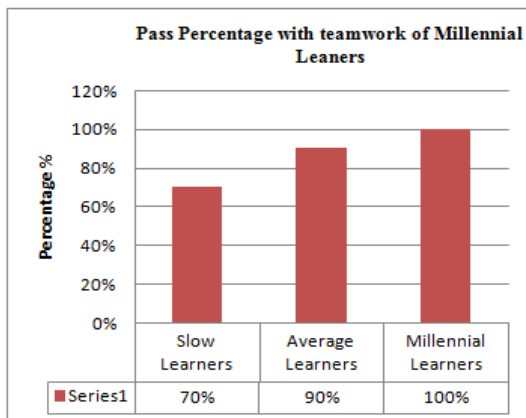


Figure 3: Pass Percentage with teamwork of millennial Learners

VI. CONCLUSION

The class work management by the faculty and the involvement of millennial learners are the most successful lead steps to the achievement of Experimental Engineering Education. As a result, Millennial learners will not be differentiated by others and may become eligible for performing various projects by competing others. Based on the flipped classrooms, the interaction-time among student to student and student to teacher is improved. Students inculcating different usage of tools and techniques will develop their skills practically. Through this paper, we focused on the experimental teaching process which enlightens Millennial Learners and Millennial Learners to their teammates. Finally, we can provide all the students with good knowledge in their engineering process and Millennial Learners will have experimental skills.

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