

# ACTIVE LEARNING SKILLS IN ENGINEERING EDUCATION TO IMPROVE TEACHING LEARNING PROCESS

**Tuti.Sandhya**

*Co-Director CEED, Associate professor, Department of ECE, KGR CET*

## ABSTRACT

*Employers/Industry are demanding graduates with excellent Active learning skills. globalization has brought dramatic changes in engineering workplace and it demands new skills and knowledge of engineering graduates to be fit in this competitive work environment of organization. for engineer, work place communication expectations are multifold as a result of globalization and rapid technology advancement as engineers are expected to communicate “with international partners”. Engineers of 21st century need to possess an adequate knowledge and understanding of professional community perception of effective communicative competence in “Active learning skills”. Thus, a student’s Active learning methods in the class room becomes an important element, in delivering positive learning experiences. The main objective of this paper is, to improve knowledge & skills and to train students to talk to a group of people, and aims at investigating barriers that hinder effective communication skills performance of engineering students. This paper also presents a research study conducted at my own work place K.G.R.C.E.T, Hyderabad, India., to capture the professional views of effective skills and presenter attribute requirements for technical oral presentation. this study is based upon the second year engineering class room activities as its platform to elicit views of academic and business/professional community involved in evaluating the communicative event. The students found enthusiastic in learning interactively by class room activities and result analysis of both the subjects have been made and it was observed that the student’s performance was good compared to last year.*

## I. INTRODUCTION

It is difficult for students to stay focused throughout a lecture. But, a student can only comprehend advanced engineering topics when the attention is glued to the lecture. As per a research [1], students recalled 70% of the information immediately after the lecture and only 20% of that from the last ten minutes.

The Traditional teaching method begins with the instructor passively delivering a lecture with full attention on the quality and quantity of the content being delivered. The students are supposed to focus their attention on listening to the session and pulling their diverging mind to stay focused. The understanding of the student is first limited by the attention, next by visualization or by mere memorization. This would also need students to spend considerable amount of time after the session in revising and memorizing. In this method, the instructor on a podium is in such a dominant position, that he/she remains incognizant of the students’ attention. Sometimes it

makes one wonder if the session is for the instructor or the instructed.

An effectiveness of the teaching can be measured by the degree to which the student has acquired the knowledge that the teacher has intended to impart. This literature presents a practical perspective of techniques which ensure active engagement of students throughout the length of the classroom session.

## **II. ACTIVE LEARNING**

Active learning is a term that refers to several models of instruction, which make learners own responsibility of learning. As per a research [4] , active learning is defined as an instructional method that engages students in meaningful activities during the process of learning. The activities stimulate them to ponder on and react on the presented information. The direct involvement techniques of Active learning can include short writes, brainstorming, quick surveys, think-pair- share, formative quizzes, debate, role playing, cooperative learning, collaborative learning, and student presentations.

The classroom environment is turned around with students contributing the most. This can be applied to any learning environment; be it online or standard lectures or even a blend of these. Active learning provides opportunities for learners to think critically about the classroom content through a wide range of relevant activities. These activities help challenge

learners and prepare them for professional situations they could encounter through evaluative, problem solving or clinical reasoning skills.

In Active learning, students engage in reading, writing, discussing and problem solving. These encourage analysis, synthesis and thorough evaluation of delivered content. Some of the approaches that promote active learning are cooperative learning, problem-based learning, use of cases and simulations based methods

## **III. ACTIVE LEARNING TECHNIQUES**

These techniques involve in engaging discussions, workshops, small group activities in pairs, trios and groups. These strategies ensure individual participation in small groups. Some key activities which are highly applicable in engineering education are listed below.

### **Activity 1: Think-Pair-Share**

1. Pose the problem and have students work individually for a short time
2. Have them form pairs and reconcile/improve solutions
3. Call on several individuals or pairs to share responses

Requires a little more time

Individual thinking leads to greater learning

### **Activity 2: Think aloud pair problem solving (TAPPS)**

1. Have students pair up and designate one “explainer” and one “questioner”



2. Explainers have 1-2 min to explain the problem solution to partner
3. Questioners ask questions when explanations are unclear
4. Stop and call on students for explanations
5. Switch roles and continue with next part of solution

**Activity 3: In-Class Teams**

1. Form teams of 2-4 and choose recorders
2. Give 15 s – 3 min to
3. Summarize prior material
4. Answer a question
5. Start solving the problem
6. Think of an example
7. Explain a concept
8. Think why a result might be wrong
9. Brainstorm a list...

**Activity 4: Note Check**

1. Students work in pairs
2. Summarize notes and locate misconceptions
3. Fill in gaps in their notes
4. Approx 3 min

**Activity 5: Reciprocal Peer Questioning**

1. Work in groups of 3-4
2. Provide generic question templates
3. How does X relate to prior knowledge?
4. What conclusions can I draw about X?
5. What is the main idea of X?
6. What is a new example of X?
7. Each student prepares 2-3 questions on topic
8. Questions are discussed in small groups, then groups choose especially interesting ones to share

**Activity 6: Concept Tests**

1. Ask a multiple-choice question about a concept, with distractors (wrong answers) that reflect common misconceptions.
2. Have students respond using “clickers” and display a histogram of responses. Or have them hold up cards indicating their chosen responses; scan the room for response distribution
3. Have the students pair up, reconcile responses, vote again.
4. Call on someone to explain their response; discuss the correct answer and why the distractors are incorrect

**Activity 7: Writing Assignments**

1. Write about a topic before the lecture, to make connections with prior knowledge
2. Summarize main idea of the lecture
3. Generate a list of applications or examples
4. Make a list of questions about the new material

#### IV .RESERCH STUDY

##### A. Focus of Study Questions

The questions addressed in this study were inspired by the literature on engineering education from sources like IUCEE PBL, and National Academy of Engineering. We analyzed the study and identified. Common threads then developed a series of questions to gain insights into the perceptions and views of our undergraduate engineering students. For example, the literature on excellence in engineering education stresses the importance of summing the class ,group activity and oral presentation skills. Based on this study we wanted to understand if the students perceived as part of their goal to learn skills. With this goal in mind, we asked our students individually to describe their role in the college of engineering and to discuss as a group the goals of teaching engineering, and the types of skills and attitudes they need to learn.

##### B. Participants

Eighty college of engineering and technology of K.G.R.C.E.T, undergraduate engineering students participated voluntarily in this study. Each participant given at least one hour class presentation. And parcipated in group activity.

##### C. Procedure

I am following 3 active learning methods to improve my students communication skills, presentation skills and their knowledge. The activities are:

1. **Summating the class:** After completion of every class students has to give minimum 2 summative points this takes 10 mins everyday in the class.
2. **Group activity:** I have divided class students into 3 groups, and I asked them to prepare 5 questions per group for the completed chapter. Each group will ask the questions to other 2 groups. And the group which answers effectively and correct answers for that group I have given them the pens and chocolates as gift to improve their confidence level.
3. **In class team(presentations by students):** The participants were greeted individually and asked to give class room presentations. The participants were first asked to give presentation of each single unit which included in their syllabus for each unit of presentation minimum five student participants will be taken, they need to prepare particular unit for the next class. The unit which they are going to give presentation is already completed by their instructor earlier in the class. And also other method for improving the presentation skills and better understanding of students we are practicing peer tutoring method in our college so, Employing students to teach or tutor other students empowers both the student doing the teaching and, by increasing her chances for success, the student being tutored. It can also help bridge the time gap between the students who achieve mastery on the first assessment and those who need more time. Simply telling the peer tutors to go help their fellow classmates is usually not enough. A child may be an excellent student, but not necessarily an excellent teacher.

For this practice in our college we are included a special hour called tutoring hour in their time table for better improvement of students presentation skills. During the tutoring hour everyday students individually takes part of presentations.

## V. CONCLUSION

Although the results vary in strength, this study has found support for all forms of active learning examined. Some of the findings, such as the benefits of student engagement, are unlikely to be controversial although the magnitude of improvements resulting from active-engagement methods may come as a surprise. Other findings challenge traditional assumptions about engineering education and these are most worth highlighting.

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Hyderabad, India, mail id: [gayatri.tangirala@kgr.ac.in](mailto:gayatri.tangirala@kgr.ac.in)

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