

# Worksheet Implementation for Engaging Students in Learning

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**Abstract:** MEAs (Model-Eliciting Activities) are open-ended modelling problems that challenge students to solve complex derivations with realistic applications (Miss Kelsey Joy Rodgers, et al, 2012). . One of the tough challenges, instructor is facing now a days is creating interest among engineering students to solve a derivation, who generally feel it difficult. It is also difficult to engage students in class immediately after lunch. The main aim of this activity is to engage students and create interest among them to derive an equation. In this paper we discussed on how to overcome those problems by using a simple in-classroom activity. The method used to carry out this activity is worksheet implementation. Here, the students after participating are expected to show more interest in such regular activities as they found it helpful and also interesting. Positive result is expected at the end.

**Keywords:** challenge, derivation, engineering students, interest, in-classroom, worksheet.

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## 1. Introduction

Students are encouraged to memorize or mimic a derivation from the literature. In engineering colleges, course assignments typically include a variety of library research papers, lab reports and homework. Rarely do these assignments call for deriving original mathematical equations. Yet such derivations are a critical component of creating new systems and concepts (Murray Teitell, et al, 2011). few other researchers tried whether a student shows more interest in class if designed as a game that they usually play or not. Our work is based on students' concentration levels and their interest towards activities rather than regular class room teaching. Instructor has observed more difference in students' interest immediately after lunch when compared to normal hours like morning. Students' feel sleepy and doesn't show any interest in listening to a lecture. Moreover if a derivation is being taught then it is waste of time teaching them in after lunch hour. So in this paper we have discussed on how make students' active in class with an activity along with useful learnings. This is one of way which helps students' come out of the fear that large derivations are not their cup of tea.

## 2. Background

Research done so far mainly focused on the concentration levels of students in class. Previous research says that Use of active learning techniques such as in class activities, problem solving exercises,

discussions, and questioning draw students' and help keep them engaged. Effective use of humour and fun are few of the important tools in this endeavour. One of the Survey has shown the results whether the engineering students will find the use of candy childish and/or distracting, or if candy increases their motivation to actively participate (Dr. Tonya Lynn NilssonP.E., et al, 2017).

One of the other paper presents research on the effectiveness of the use of lecture worksheets and 3D computer models to assist students in understanding concepts taught in the undergraduate Statics course. In that survey results drawn showed that approximately 50% of students who's GPAs were very good felt that the lecture worksheets were helpful. Thirty-three percent of the students who's GPAs were better compared to others given their feedback either neutral or felt it was not helpful (Eunice E. Yang, Beverly W. Withiam Engineering Technology Division, 2010)

The probable reasons for the low interest could be due to lack of concentration, fearfulness, interference of personal life with class, mindset, overload, over eating of food , friend circle etc. The lack of interest mainly affects marks in the main examination. They are even unable to implement that skills for solving a problem.

The research questions and the related hypotheses in this study were as follows:

Research Question 1: How are students' engaged in class so that they can listen to the lecture with concentration?

Hypothesis 1: It was expected that there would be a positive result if any in-class activity being conducted rather than traditional class room teaching<sup>3</sup>. Method

### A. Participants

This activity was conducted on students completing emtl (electromagnetic and transmission lines) course. N=40 students of second year Electronics and Communication Engineering (ECE) at Hyderabad Institute of Technology and Management (HITAM) who has actively participated (N=40, males=17, females=23). Table 1.1 gives the details about where and when the activity is conducted.

**Table1.1 In-class activity details**

Date	Nov- 21, 2016
No of participants	40
Instructor	Azeem Unnisa
Venue	S06 classroom, HITAM

### B. Procedure

Instructor first carefully study the derivation which is to be taught in class and then prepare a worksheet which contains some of the steps of the derivations and some of them missing. Then those worksheets are distributed in class, one for each student. Student will be given 20 minutes of time. In the given time limit students have to use simple mathematics to complete the steps moving from one known step to reach another known step given in the sheet. In this way student should complete whole derivation as early as possible. If anyone of them is stuck in between then they can take the help of instructor and clear their doubts. Let us see few of the samples using pictures of them



**Fig. 1 Worksheet with few missing steps**

As seen in the figure a worksheet prepared with few of them missing after studying the derivation keenly by the respective instructor is given to the students'. In the given time students' should try to fill those missing steps. Few steps require the knowledge of previous concepts but few of them are just

simplification of earlier step. Fig 1 shows how we prepared a worksheet containing half solved steps and half missing steps

#### □ Topics:

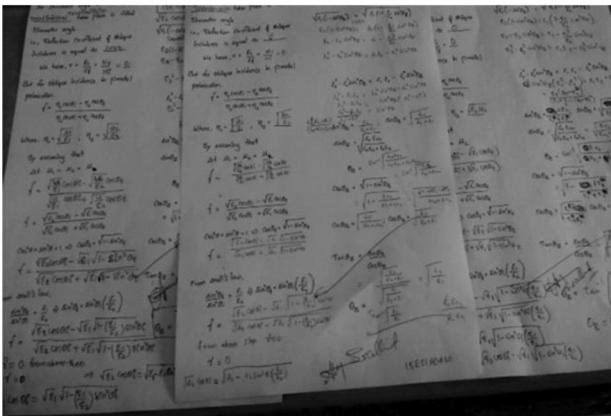
Electric field intensity derivations, polarization (Brewster angle) and transmission line parameters derivations

The above topics are selected because they contain more derivations



**Fig. 2 Student working on the worksheets during the activity**

Students should work on them without discussing with their class mates and friends. Every individual must do on their own as shown in the fig 2.



**Fig. 3 Few of the evaluated sheets**

Fig 3 shows few of those sheets which are evaluated by the instructor and comments were given. According to their performance marks are also awarded.

## 4. Results

Based on the student's performance they were evaluated and given marks and comments by the respective faculty. Results observed are positive. It proved how students' without fear have attempted a derivation in examination rather than choosing a theoretical question. Table 1.2 gives us a brief description about how the evaluation took place and how the marks are awarded. Comments increased students confidence and most of them tried their best to score 5 marks and excellent in their paper. They have shown much interest in this activity and also gave a positive feedback when the session ended.

**Table 1.2 Marks allotted with comments**

No of Student	Comments	Marks
38	Excellent	5
8	Very good	4
2	good	3

To motivate and encourage students we have come up with an idea called wall of fame. As seen in the fig 4, top 3 student's names will be written on that for doing a great job as an encouragement. This helps other students also to participate actively and try to have their names on that wall of fame.

## 5. Discussion

Present generation students cannot concentrate on a particular topic for a longer period of time. So to overcome this problem, a new pedagogy was introduced by us to engage students in active learning. According to research done, students show more interest towards in-class activity learning rather than traditional class room teaching. Emtl (electromagnetic and transmission lines) subject requires more time to finish complete syllabus. Moreover if the lecture is immediately after lunch then it is very difficult for a faculty to handle students. Routine class room teaching makes students feel boring and sleepy. So this in-class activity helps lecturer grab student's attention and also help them in solving a derivation easily. Reason behind selecting this particular topic is, it includes crucial derivations which are not easy to remember all at once and also

requires more practise. The use of worksheets will decrease the time spent by students for better understanding of concepts and provides additional time for higher level of student learning. Student concentration and interest appears to play a significant role of in motivating students' in the engineering course

## 6. Limitation

The findings of this activity are to be viewed to be with some limitations. This activity is based on a single branch sample. A sample drawn from a other branches, perhaps, would show whether the same would be same or not as the length and complexity of derivations differ for different engineering course. Students' personal factors related to their lack of interest are not considered in the study. . The current study shows how students' mindset differs from time to time and how accordingly instructor should act. One of the major limitation is, a single instructor cannot evaluate more sheets at a time which keeps the students waiting for few extra minutes. And it is also hard to cover each and every student in the class during that short period of time. Future research could also focus on how students will listen to lectures even without having any in-class activity.

## References

- [1]Ann F. McKenna, Arizona State University, Polytechnic campus
- [2]Ac 2011-599: “Approaches to engaging students in engineering design and problem solving“, (2011)
- [3]Eunice E. Yang, Beverly W. Withiam Engineering Technology Division,” Efficient Statics Lecture Through the Use of Worksheets”, (2010)
- [4]Jay McCormack, University of Idaho, “Classroom learning activities to support capstone project assessment instruments”, (2011), (1,5)
- [5] Joseph J. Rencis/Hartley T. Grandin, Jr. University of Arkansas/Worcester Polytechnic Institute, “Solving Beam Deflection Problems using a Tradition Approach”
- [6] Kelsey Joy Rodgers, Purdue University ac 2012-3820:
- [7] “The nature of peer feedback from first-year engineering students on open-ended mathematical modeling problems”|
- [8] Murray Teitell, DeVry University, Long Beach, CA, William S. Sullivan, DeVry University, Long Beach AC 2011-1472: “Deriving original systems of equations as an assignment in engineering and technology courses”,