

An Assessment of Usage of Power Point Presentation in Undergraduate Courses in Electrical & Electronics Engineering

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Abstract: Despite the need of the hour, many instructors are reluctant in introducing technology in classroom. The reasons for being reluctant could be lack of confidence, availability of time and lack of skills required for using technology. Power point presentations form the introductory step in incorporating technology in classroom. Power point presentation provides instructors an opportunity to build innovative and dynamic presentations that command students' attention and are fun to use. The cost incurred in preparing a presentation is economically and financially minimal. The advantages of using a power point presentation are; it provides visual appeal, animated graphics, notes in an organized manner, updated information in the slides using the web links, more of the class time can be used for executing activities and interacting with students. This study investigates students' perception on usage of power point presentation in class in comparison with chalk and talk. This activity was implemented in two courses Basic Electrical Engineering and Modern Control Systems.

Keywords: chalk and talk; dynamic classroom; power point presentation; technology

1. Introduction

Basic Electrical Engineering is a course taught at freshman level for both semester one and semester two undergraduates of all the disciplines at KLE Technological University, Karnataka, Hubballi. This course uses insightful engineering mathematics such as equations to be written applying the Kirchoff's Voltage Law (KVL) and Kirchoff's Current Law (KCL), operation of matrices and complex numbers. This course covers different concepts such as

in single phase and three phase ac circuits. This course explains to students the majorly used fundamentally significant concepts in electrical engineering such as calculation of loop currents, determination of node voltages, power dissipated in the resistive elements, power absorbed in single phase and three phase systems. These fundamental concepts are used in many courses like circuit theory, control system, analog electronics and power electronics in the subsequent engineering semesters.

This course is easy to teach, however students find it difficult to understand. Usually handful numbers of students have very good scores in this subject whereas most of the students tend to get confused and perform very poorly in this course. With this strong observation the question that typically arises is 'What is the good practice to teach the course Basic Electrical Engineering such that it enhances student learning and understanding?' This paper aims to address this stated question by recording the changes that were made in the pedagogical approach in teaching this course. The author has taught this course six times, out of which five times (2014-2017) the course was taught using chalk and talk and once (second half of 2017) using power point presentation. A sample slide form the power point presentation is shown in Fig. 1.

Modern Control Systems is a course taught at sixth semester, this course also involves mathematical computations. This course majorly deals with matrix operations. The different core topics are concept of state variable & state model, state space representation using variables, obtaining transfer function from state model, computation of state transition matrix, Lyapunov's stability criteria, pole placement technique, state regulator, state observer and controllers. The author has taught this course only one time (2017), the course was taught using chalk and talk (unit 1) and using power point presentation (unit 2). A sample slide form the power point presentation is shown in Fig. 2.

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Maxwell's Circulating Current method, Node Voltage method, dc motor parameters (speed, back emf, armature current, armature torque) calculations, power consumption

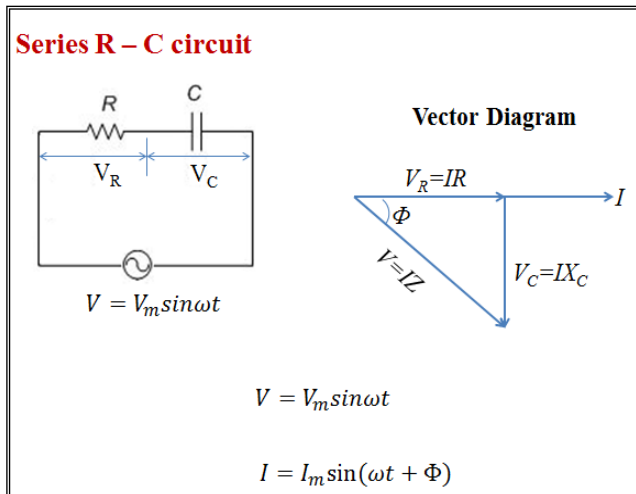


Fig. 1 Sample slide from Basic Electrical Engineering presentation

For, $\lambda_3 = -4$

$$[\lambda_3 I - A] = \begin{bmatrix} -4 & 0 & -1 \\ 2 & -1 & 0 \\ 0 & -2 & -1 \end{bmatrix} \quad M_3 = \begin{bmatrix} 1 \\ 2 \\ -4 \end{bmatrix}$$

Modal Matrix,

$$M = \begin{bmatrix} 4 & 4 & 1 \\ -4 & -2 & 2 \\ -4 & 0 & -4 \end{bmatrix} \quad M^{-1} = \begin{bmatrix} -0.11 & -0.22 & -0.138 \\ 0.33 & 0.16 & 0.16 \\ 0.11 & 0.22 & -0.11 \end{bmatrix}$$

Fig. 2 Sample slide from Modern Control Systems presentation

The paper is structured as follows. The section II presents the literature survey which essentially focuses on the advantages and disadvantages of the chalk and talk versus the power point presentation. The section III discusses the methodology used in implementing this activity. The next section will present the students perception of the usage of power point presentation and is validated by the feedback questionnaires and students results.

2. Literature Review

Ever since Microsoft Power Point was introduced there has been comparisons made over conventional chalk-and-talk and power point presentation usage for teaching. On an average more than 30 million power point presentations are being prepared & used and the number of users in the world are more than 400 million [1]. Lectures dealt with power point presentation increase the student interest level and also the likeability toward the teacher [2]. Many engineering academics and universities have incorporated the power point presentation as it offers the faculty with an option of presenting their ideas in different formats such as

graphical, visual and written formats [2]. In the past many studies have been made to correlate the student performance with the usage of power point presentation. In [3], the author says that using power point presentation has no effect on student performance in comparison with the conventional methods in the introductory classes of psychology. Power point based lectures did not improve the students' final grades [2].

On the contrary, in [4] the author reports that when taught using traditional lecture method the student performance grades were greater even though students showed a greater liking towards power point presentation based lectures. Usage of power point does not essentially mean improved active participation of students or creation of more excitement about the subject for the undergraduate courses of Pharmacy colleges [5]. The information presented on the board using chalk is persistent and is visible to students for a long time, even after starting a new topic [6]. Going back to one of the previous slides after having discussed the topic disturbs the flow of the class and harms the student learning experience as the connectivity of the class would be disturbed [6]. The author in [6] also debates that conventional teaching methods are self – paced as these methods allow students to write down the notes and author also says that this will stimulate the student learning.

3. Method

A. Participants

The number of participants who supported in collecting the data for this activity is ninety three which had both male and female participants in almost equal proportion. Out of these ninety three participants, fifty five participants are from second semester that underwent the course Basic Electrical Engineering and thirty eight participants are from sixth semester who studied the course Modern Control Systems.

B. Materials

Student responses to the feedback questionnaire on usage of power point presentation were obtained. The questionnaire had ten questions out of which seven questions were objective type wherein the student had to select only one option as an answer for these seven questions. These questions were focusing on understanding the students' perception on using chalk-and-talk and power point presentation. These questions check the students understanding levels, student-teacher engagement /interaction and usage of class time. The last three questions are subjective type and they focus on the students' perception of advantages & disadvantages of using power point presentation and suggestions regarding the two courses under this study.

C. Procedures

Students from both second and sixth semester completed this feedback questionnaire during the year 2017. The feedback was collected through Google forms and the students of both the semesters gave the feedback online. The questionnaire for second and sixth semester was same; however the focus was on their respective courses. Students are familiar with the usage of power point presentation as both these semester students have been taught using power point presentation before.

4. Results and Discussions

Performance Scores of Exam 1 (related syllabus taught using Chalk – and – talk) and Exam 2 (related syllabus taught using power point presentation) are represented in Table 1 below. Consider the course Basic Electrical Engineering, the average marks of exam 2 (10.43) is slightly higher than the average marks of exam 1 (10.25). For the course Modern Control Systems, the average marks of exam 2 (13) is slightly higher than the average marks of exam 1 (13.72).

Table 1. Performance Scores of Two Courses

Course	Basic Electrical Engineering		Modern Control Systems	
	Exam 1	Exam 2	Exam 1	Exam 2
Number of Students	70	70	61	61
Average Marks	10.25	10.43	13	13.72
Standard Deviation	3.6	4.15	3.71	4.27
Coefficient of Variation	0.35	0.4	0.29	0.31

For the course Basic Electrical Engineering, students said they better understood the concepts when taught using power point presentation. Most of the students were comfortable with this power point based teaching method. The students also said that the student – teacher engagement and interaction was improved when power point based teaching method was used. As per the students' feedback, the class time was effectively used with power point based teaching method. Overall, the students are happy with the usage of power point based teaching method. The questionnaire and the answers to these questions have been presented in Appendix A.

For the course Modern Control Systems, students said that they have equal liking for both chalk & talk and power point based teaching method. The students said that the student – teacher engagement and interaction was same for both the teaching methods. The students also said that the class time was used effectively more with power point based teaching method in comparison with chalk and talk method of teaching. Students are comfortable with both the teaching methods and they do not prefer one over the other. The questionnaire and the answers to these questions have been presented in Appendix B.

5. Conclusions

This paper presents the observations of teaching the undergraduate students using chalk-and-talk and power point based lectures. This study concluded that the differences in the student performance scores are not much when compared chalk-and-talk and power point based teaching method. Even though there isn't any significant difference in the student performance scores, the students prefer power point based teaching method as they believed that the class is organized and more attention by the faculty is given to students thereby clearing their doubts.

Acknowledgement

The author would like to thank the Head of department, Electrical & Electronics Engineering and all the faculty members for their support in carrying out this work.

References

- [1] Stephen So, "Refined 'Chalk-and-Talk' of Lecture Content: Teaching Signals and Systems at the Griffith School of Engineering", Australasian Association for Engineering Education Conference, Melbourne, Australia, 2012.
- [2] Grainger. S, Kestell. C, Willis. C, "Staff and student perceptions of the effective use of contemporary lecture theatre technology", Australasian Association for Engineering Education Annual Conference, Freemantle, WA, 2011.
- [3] DeBord, K.A, Aruguete, M.S, Muhlig. J, "Are computer-assisted teaching methods effective?" Teaching of Psychology. 31(1), 65-68, 2004
- [4] Amare, N. (2006), "To slideware or not to slideware: Students' experiences with PowerPoint vs. lecture" Journal Technical Writing and Communication, 36(3), 297-308.
- [5] Vamshi Krishna T, et al, "Comparative Study on the Teaching Effectiveness of Chalk & Talk and Microsoft PowerPoint Presentation from the Student Perspective", International Journal of Pharmacy and Pharmaceutical Sciences, volume 4, 2012
- [6] Ressler, S.J, "Whither the chalkboard? Case for a low-tech tool in a high-tech world", Journal of Professional Issues in Engineering Education and Practice, 71-73, 2004.

Appendix

Feedback analysis for Basic Electrical Engineering course

1. In the course Basic Electrical Engineering, which unit did you better understand in class? 63.03% students said unit 2 was taught better and 36.97% students said unit 1 was taught better

2. Were you comfortable with the teacher using the presentation instead of chalk and talk? 67.3% students said 80-100%, 27.3% students said 60-80% and 5.4% students said 40-60%
3. When did you understand the concepts better, when taught using chalk and talk or power point presentation? 53.6% students said using power point presentation and 46.4% students said using chalk and talk
4. The student-teacher engagement / interaction were more when taught using chalk and talk or power point presentation? 61.85% students said using power point presentation and 38.15% students said using chalk and talk
5. Is there an increase teacher-student engagement by using power point presentation? 36.4% students said 80-100%, 49.1% students said 60-80%, 12.7% students said 40-60% and 1.8% students said 0-20%
6. When was the class time used more effectively? 56.4% students said using power point presentation, 12.7% students said using chalk and talk and 30.9% students said both
7. Your juniors should be taught the same course, 41.8% students said using power point presentation, 10.9% students said using chalk and talk and 47.3% students said both
8. What was the advantage of using power point presentation in teaching Unit-2?
 - k. Problems (numericals) were understood in a better way
9. What was the disadvantage of using power point presentation in teaching Unit-2?
 - a. Not much explanation was there in the presentation
 - b. Small mistakes in ppts (presentation)
 - c. Portion was covered a little too fast.
10. Any suggestions regarding the course (or anything you like or did not like)?
 - a. We got variety of problems but theory should go a bit deep
 - b. All over was so interesting to me. Because many more new outcomes I have learnt from teacher.
 - c. It would be better, if both the methodologies are implemented whenever in it is required, rather than sticking to one particular thing.
 - d. A bit tough course so make it more simple for students

The following are the answers given by the students (randomly chosen, the students responses are not edited)

- a. Through PPT it was helpful especially for Star delta connection circuits easily understood.
- b. It saves time and brings in interest
- c. It was helpful
- d. It was very effective and concepts were clear
- e. We were able to understand the circuit arrangement clearly and also it helped the lecturer to concentrate more on our doubt and clear them out.
- f. We could solve more numericals
- g. Student got more individual attention from teacher hence helping in getting the doubts cleared
- h. Interaction between teacher and students was more.
- i. Time was effectively managed
- j. Concepts were clearly understood; especially graphs were more convincing, than those of conventional teaching.

Feedback analysis for Modern Control Systems course

1. In the course Modern Control Systems, which unit did you better understand in class? 47.4% students said unit 2 was taught better and 52.6% students said unit 1 was taught better
2. Were you comfortable with the teacher using the presentation instead of chalk and talk? 42.1% students said 80-100%, 50% students said 60-80% and 7.9% students said 40-60%
3. When did you understand the concepts better, when taught using chalk and talk or power point presentation? 31.6% students said using power point presentation and 68.4% students said using chalk and talk
4. The student-teacher engagement / interaction were more when taught using chalk and talk or power point presentation? 50% students said using power point presentation and 50% students said using chalk and talk
5. Is there an increase teacher – student engagement by using power point presentation? 28.9% students said 80-100%, 50% students said 60-80%, 18.4% students said 40-60% and 2.6% students said 0-20%
6. When was the class time used more effectively? 28.9% students said using power point presentation, 15.8% students said using chalk and talk and 55.3% students said both

7. Your juniors should be taught the same course, 18.4% students said using power point presentation, 26.3% students said using chalk and talk and 55.3% students said both

8. What was the advantage of using power point presentation in teaching Unit-2?

The following are the answers given by the students (few are randomly chosen and presented here)

- a. Easily understandable
 - b. Portion completes much faster
 - c. Less time consuming and more efficient
 - d. Was able to practice more problems
 - e. Time is used properly and understanding is more rather writing.
 - f. No advantage. Chalk talk was best!
 - g. The advantage was that we studied the unit 2 with more concentration
9. What was the disadvantage of using power point presentation in teaching Unit-2?
- a. It was bit fast
 - b. Couldn't able to caught or grasp that fast as the chalk talk explanation can do in classroom, but yeah of course understand the concepts when we gone through.
 - c. While using the ppt, we just listened to whatever was taught and did not write anything.
 - d. We start reading ppt and not concentrate on what teacher was saying.
10. Any suggestions regarding the course (or anything you like or did not like)?
- a. Subject was very easy! And this is my favorite subject.
 - b. More examples can be taught
 - c. Addition of non linearities was not comfortable