

PERCEPTION OF DIFFERENT TEACHING AIDS BY THE ENGINEERING STUDENTS IN HIGHER INSTITUTIONS

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Abstract

Traditional didactic lecture is more passive in nature and less effective as a teaching tool compared with active learning methods, such as problem-based learning. However, a well-organized lecture remains one of the most effective ways to integrate and present information from multiple sources on complex topics. This paper examines the various teaching aids used for engineering students which include: Blackboard, Overhead Projector, PowerPoint Presentation and Multimedia. The study examines the preference and perception of engineering students on various teaching aids and the qualities of the teachers influencing them. A cross sectional descriptive questionnaire based study was conducted on 45 final year electrical engineering students of Federal Polytechnic Idah. From the study, it was observed that multimedia is the most satisfied teaching aid because students can follow the teaching and understand the concept effectively.

Keywords: Teaching, Aids, Blackboard, PowerPoint, Multimedia, Overhead Projector.

As we all know that today's age is the age of science and technology. The teaching learning programs have also been affected by it. The process of teaching - learning depends upon the different type of equipment available in the classroom. The Traditional didactic lecture is more passive in nature and less effective as a teaching tool when compared with active learning methods, since what we hear we know, but what we see, we remember (Toscany Academy, 2012). Some individuals are prone to forgetfulness and hold on more to memories of things they have seen than heard. The rapid increase of students with different and diverse educational needs in mainstream schooling is a reality with multiple costs requiring new educational practices (Rampatzi, 2015). In order to meet this need in schools, the process of teaching and learning in institutions today, especially in the fields of science and Engineering, largely depends on the available teaching materials (that is Instructional materials). Instruction is a combination of decisions and activities that are carried out in order to achieve the desired results. The instructional materials therefore refers to the choice of activities, the teaching and learning process and the Visual Teaching Aids. The use of teaching aids in science and engineering technology is swiftly changing from blackboard to virtual simulations, and teaching methods range from lectures to integrated teaching (Emmanuel, 2009).

Science and Engineering lecturers and instructors have been using different teaching aids to impart knowledge on students and the aids are previously dominated by white marker board, overhead projector, and other customized board for practical demonstrations. In the recent times other aids such as the video tapes, audio visual machines have been introduced. Critics of multimedia feel that it is expensive, too time consuming, and it is not worth the time and effort (Perry and Perry, 1998).

Despite various successful attempts made by numerous scholars, the fact remains that many instructors still complain about lack of teaching – learning materials in the science and engineering. Most instructors or authorities claim lack of fund to acquire them. Research has proved beyond all reasonable doubt that the use of instructional material in teaching produces the best results. The need to design and construct a good local instructional material is therefore a necessity to meet the various challenges in various laboratories and workshops. Jun (2015) opines that the construction of teaching resources library should reflect the characteristics of the school and meets the needs of personnel training: It is particularly significant for the development of ethnic minority colleges and universities.

Iwu *et al.* (2011) identified the importance of instructional material as the fact that abstract ideas and information expressed in printed pages become tangible and concrete when they are translated or reflected in forms of instructional materials and resources. The relevance of teaching aid can be outlined as follows:

1. Every individual has the tendency to forget. Proper use of teaching aids help to retain more concepts permanently.
2. Students can learn better when they are motivated through different teaching aids.
3. It provides complete example for conception thinking.
4. It develops the proper image when the students see, hear, taste and smell properly.
5. It helps to arouse the interest of students.
6. It helps to increase the vocabulary of the students
7. It helps the instructors, sometimes, and make learning permanent
8. It provides direct experiences to the students.
9. It facilitates different learning styles
10. It provides development of continuity of reasoning and coherence of thoughts
11. It reduces verbalism or repetition of words
12. It promotes closer and effective communication between teacher and the learner.

Material and Methods

This study was a cross sectional descriptive questionnaire based. It was prepared using thirteen (13) items covering the different aspects of teaching aid in the form of opinion by the engineering students. The questionnaire was a closed ended one with a few open ended options. The same was validated, the ethical principles were adhered to. The questionnaire was administered to 145 final year engineering students of 2016/2017 academic session of Federal Polytechnic Idah, Kogi State. The students were asked to grade the teaching aids that were used to teach them by the various lecturers, technologists and Instructors. Informed consent was taken by the participants and confidentiality was maintained. The questionnaire was analyzed to derive the results.

The Teaching-aids used in this study were (1) Black board (BB), (2) Power Point presentation (PPT), (3) Over Head Projector (OHP), (4) Multimedia. Questions asked based on the above teaching aids were:

- ❖ reliable in teaching visual aid
- ❖ develops ability to think and understand topic better
- ❖ provides good learning experience
- ❖ interesting and interactive teaching aid
- ❖ allows better inclusion of context
- ❖ enhances visual quality of text and figure
- ❖ help students to cope with teaching speed of lecturers
- ❖ helps to grasp the content,
- ❖ stresses upon the relevant and important information.
- ❖ is revision allowed at the end of the lecture,
- ❖ is more useful in small group (10-20),
- ❖ is more useful in large group (50-100),
- ❖ is most preferred teaching aid.

After obtaining informed consent, the students were encouraged to furnish their unbiased independent opinion regarding the above study.

Statistical Analysis

The response obtained from the students was statistically treated to calculate the high Satisfaction Index (SI) for teaching aids. Observational study was done and percentage was calculated.

Results

The Table below shows the various percentage of the level of student’s perception and preference using any of the Teaching Aids.

Table 1: Result of the Research

S/No		BB (%)	PPT (%)	OHP (%)	MM (%)
1.	Reliable in teaching visual aid	10	15	15	60
2.	Develops ability to think and understand topic better	70	20	3	7
3.	Provide good learning experience	14	30	6	50
4.	Interesting and interactive teaching aid	25	11	4	60
5.	Allowed better inclusion of context	10	30	15	45
6.	Enhanced visual quality of text and figure	15	50	5	30
7.	Better able to cope with teaching speed of teacher	5	60	10	25
8.	Helps to grasp the content	5	30	15	50
9.	Stresses upon the relevant & important information	7	25	3	65
10.	Revision allowed at the end of the lecture	20	35	15	30
11.	More useful in small group (10-20)		18		70
12.	More useful in large group (50-100)	6	20	4	70
13.	Most preferred teaching aid	5	15	5	75

Source: Researchers Field Survey, 2017

Keywords:

BB = Blackboard

PPT = PowerPoint Presentation

OHP = Overhead Projector

MM = Multimedia

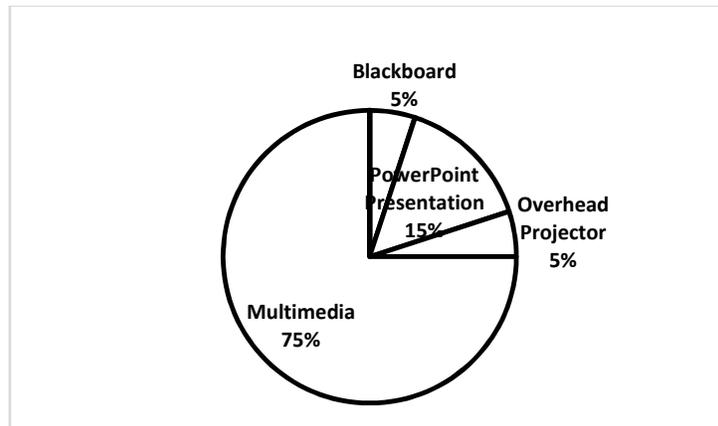


Chart 1: Most Preferred Teaching Aid

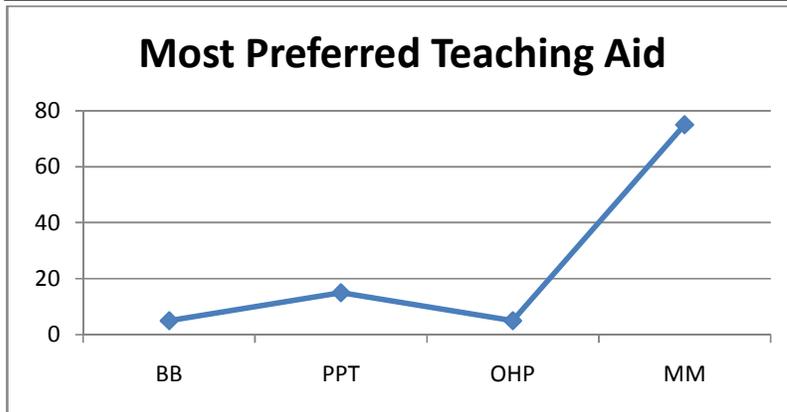


Chart 2: Graph of Most Preferred Teaching Aid

From the results obtained in this study as shown in the Table 1, students preferred Multimedia (75%) as their first choice, followed by PowerPoint Presentation (15%), Blackboard teaching aid (5%) and Overhead Projector (5%).

Multimedia preferred by 75% of students - reliable (60%), Stresses upon the relevant and important information(65%), Helps to grasp the content (50%), Enhanced visual quality of text and figure (30%), Allowed better inclusion of context (45%), Interesting & interactive teaching aid (60%), Provide good learning experience (especially applied aspects) (50%),

PowerPoint Presentation preferred by 15% of students - More useful in large groups (20%). PowerPoint Presentation used with other teaching aids was preferred by 53% of students.

Blackboard teaching aid preferred 5% of students - Develops ability to think and understand topic better (70%), Better able to cope with teaching speed of teacher (5%). More useful in small group (10-20) (66%) revision allowed at the end of lecture (20%)

Overhead Projector preferred in 5% of students-More useful in large group(50-100)(4%), Allowed better inclusion of context(15%), Develops ability to think & understand topic better(3%), Helps to grasp the content(15%), The reliable teaching visual aid(15%),

Discussions

In the present study, multimedia teaching aids was preferred, compared to other teaching aids and it agrees with the study done by Roopakulkarni *et al.* (2012), Garg *et al.* (2014) and Baxi *et al.* (2009). Explanations for the preference of teaching aid was given by different authors were:

A multimedia has been shown to be effective for classes with students from different backgrounds; it explains complicated topics with the aid of pictures, graphs, animations and simulations. It also increases the memory of the student with respect to the topic taught. Multimedia lectures can present complex concepts in small, chronological steps that aid student's ability to comprehend information in a meaningful way. The inability to move away from the computer desk inhibits a teacher walking freely across the room. Hence, when the faculty tends to focus on the technology the students feel ignored (Garg *et al.*, 2009).

This paper examines the preference as contained in the table above: of Multimedia by 75% of students – Most reliable(60%), Stresses upon the relevant & important information(65%), Helps to grasp the content(50%), Enhanced visual quality of text & figure(30%), Allowed better inclusion of context (45%), Interesting and interactive teaching aid (60%), Provide good learning experience (50%).

In case of PowerPoint Presentation presentations the main reason for liking was that they avoided the issue of poor handwriting and dirty blackboard. It is more interesting and engaging. A study has pointed out that in power- point the ability to integrate the text and the pictures and images is a great advantage and improves the educative value of the subject (Mayer and Anderson, 1992). It is suggested that although PowerPoint Presentation has some positive effects, but it reduces the

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interactive discussion between teacher and students (Garg *et al.*, 2014). PowerPoint Presentation preferred by 38% of students in our study because – More useful in large groups (44%).

While preferred blackboard teaching because, the rooms will be well illuminated, Teacher can hold the attention & aroused interest in students and can cope with the speed of the teacher, It increases the ability of the students to think and understand the contents and simultaneously take down the notes and write the diagrams, No interruption because of power failure & more useful in small group (10 - 20) & is deficient in showing three dimensional diagrams, animated videos and sounds. Chalk board may be said to be more student centered (Priyadarshini *et al.*, 2012)

In this paper BB was preferred by 5% of students – because it Develops ability to think & understand topic better (70%), Better able to cope with teaching speed of teacher (5%). More useful in small group (10-20) (66%), revision allowed at the end of lecture (20%).

By using overhead projections (OHP) presentations it is easy to put much information on one slide. When a large volume of information is presented in this manner, working memory capacity can be overloaded and useful note taking becomes difficult. This could be the main reason why the students did not prefer OHP although both these aids share a few of the advantages of computer presentations such as proper illumination and better display of figures and graphics (Stone, 1999).

In this paper OHP preferred in 5% of students-it was more useful in large group (50 – 100) (4%), Allowed better inclusion of context (15%), Develops ability to think and understand topic better(3%), Helps to grasp the content (15%), The reliable teaching visual aid (15%).

Priyadarshini, *et al.* (2012) conducted the study in the Department of Biochemistry, of a Medical college with study comprising of 117, 1st MBBS students who have completed their 2nd semester. Results showed PowerPoint Presentation in combination with Blackboard (66%) was the most helpful teaching aid to understand, remember and reproduce; followed by combination of Overhead Projector and Blackboard (46%). Teaching using Overhead Projector alone and PowerPoint Presentation alone was opined not effective at all.

In a study conducted by Thirunavukkarasu *et al.* (2011), it was observed that the marks scored by 60 students taught using two different teaching aids for medical under graduates in pathology subject differs. Students had a more favourable response towards PowerPoint presentation than Blackboard for better inclusion of content and understanding figures.

Roopakulkarni *et al.* (2011) study observed where, questionnaire was given to 475 medical students of first, second and final year students in the year 2009, have also concluded that audio-visual aids enhance the effectiveness of the blackboard teaching. 42.1% of students prefer blackboard teaching, whereas 57.9% of students are for multimedia presentations. Garg *et al.* (2014) have taken the students opinions of 63 on the prevailing teaching methods in Pharmacology and showed that 81% of the students wanted the teacher to make use of audio visual aids during the lectures.

Baxi *et al.* (2009) in their study, questionnaire was given to 93, 5th semester students at Government Medical College, Bhavnagar regarding preference for teaching aid. The study showed that an equal number of students preferred blackboard based or multimedia-based lectures. In few studies like Vikas Seth *et al.* (2010) who have compared the preference for teaching aid between medical students versus dental students. The medical students have preferred PowerPoint Presentation whereas the dental students preferred the Chalkboard.

Sujata *et al.* (2013) study showed that student's opinion about both lecture delivery methods, majority students feel that both power point and chalk and board should be used simultaneously in all the classes.

Bartsch and Cobern (2013) noted that students preferred lectures with PowerPoint Presentation over the use of Overhead Projector, but that in some instances study done by Szabo and Hastings (2000), the content of the PowerPoint Presentation distracted students and they performed less well on tests compared with another group given lectures using chalkboard. One extensive study comparing PowerPoint Presentation and Overhead Projector observed no difference in student performance in tests while in another study Lowry *et al.*, (1999) there was marked improvement in examination results when PowerPoint Presentation replaced the use of Overhead Projector.

Conclusions

The students have opined that lectures are essential. In today's world of engineering curriculum and short duration of time frame given to students, student perception forms an essential component for process evaluation of the engineering curriculum which has a profound effect. Ideally combination of teaching aid will be most satisfied teaching aid because the inherent deficiency of one aid is compensated by the other. If individual teaching aids are considered, multimedia teaching aid is most acceptable, because students can follow the teaching and understand the concept effectively.

Recommendations

In view of the above facts, the following recommendations are suggested to improve the teaching and learning in the field of science and engineering. That the use of multimedia along with other teaching aids will improve students in better understanding of subject which will have an impact on final outcome on the stakeholders i.e. the lecturers/instructors or technologist in terms of scope for improvisation in engineering education and students for becoming effective engineers or technologist. We as lecturers/instructors or technologist need to judiciously use different visual aids and methods to increase the understanding, remembrance and reproducibility and thus the academic performance of the students.

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