

RESEARCH ARTICLE

Comparison of powerpoint with animation enhanced traditional demonstration and traditional practical demonstration in physiology among first year undergraduate medical students

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ABSTRACT

Background: Effective teaching learning activity in physiology practical classes increases learning in cognitive and psychomotor domains with an aim to generate a competent medical graduate. Currently, multimedia teaching tools are being widely used and proven to be effective in enhancing the academic performances in theoretical teaching. Our study was aimed to assess the effectiveness of multimedia in practical classes. **Aims and Objectives:** The objective of this study is to compare cognitive scores, psychomotor scores, and student's level of satisfaction and acceptance while undergoing powerpoint (PPT) with animation enhanced traditional demonstration and traditional practical demonstration of hematology practical sessions. **Material and Methods:** A prospective cohort study was conducted in 96 1st year MBBS students, attending physiology practical classes, after obtaining permission from the institutional ethical committee. Traditional demonstration (Group A) and PPT with traditional demonstration (Group B) were given in two practical sessions. Immediate, short-term, and long-term theory retention capacity (cognitive scores) was assessed using pre- and posttest scores. Psychomotor scores were assessed using objective structured practical examination (OSPE) scores. Student's feedback was taken. **Results:** Both groups showed an equal increase in their immediate retention capacity. However, Group B showed an insignificant marginal increase in short- and long-term retention capacity. There was a significant increase in short-term psychomotor scores to that of immediate OSPE scores in both groups. However, Group B showed high significant retention capacity ($P = 0.007$). Student's feedback revealed traditional method promoted better understanding, whereas PPT with animation gave better clarity, evoked interest, and allowed better 3D view and apparatus identification. **Conclusion:** PPT with animation can be used as an adjunct to the traditional hands-on demonstrations to strengthen teaching learning activity in physiology practical classes.

KEY WORDS: PowerPoint with Animations; Traditional Demonstration; Physiology Practical Classes

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INTRODUCTION

The Medical Council of India Regulations on Graduate Medical Education^[1] 2012 was designed with a goal to create an Indian Medical Graduate possessing the requisite knowledge, skill, attitude, values, and responsiveness. Several studies on medical education are targeted toward enhancing

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the process of learning in medical students, with the use of instructional multimedia programs. Multimedia teaching tools consist of computer-assisted tools such as powerpoint (PPT) presentations with animations, graphics, videos, and e-learning modules. Currently, multimedia teaching tools are being widely used and proven to be effective in enhancing the academic performances in theoretical teaching.

Therefore, our study was aimed to enhance the teaching learning process in practical demonstrations by judicious use of multimedia along with traditional hands-on demonstration method and also focuses on the effect on the long-term retention ability of practical knowledge and skills. The objective of this study is to compare cognitive scores, psychomotor scores, and student's level of satisfaction and acceptance while undergoing powerpoint (PPT) with animation enhanced traditional demonstration and traditional practical demonstration of hematology practical sessions.

MATERIALS AND METHODS

A prospective cohort study was conducted in first year MBBS students, attending physiology practical classes in Dr. Somervell Memorial CSI Medical College, Trivandrum ($n = 96$). Ethical approval was provided by the Institutional Ethics Committee. Written informed consent was obtained from the students. Absentees during the interventional classes were excluded from the study.

Two interventional teaching methods were adopted for each practical session. They were (a) traditional method - Hands-on demonstration with oral instructions and teaching using apparatus and laboratory records by the teacher and (b) PPT with animation enhanced traditional method - traditional method with the help of PPT presentations which includes the use of graphics, animations, and text. For the study, two practical sessions (each session lasted for 2 h) were conducted. Each session began with 30 min demonstration on the specific experimental procedure. Two hematology experiments, having similar complexity levels and weightage as assessed by a faculty of five subject experts, were selected for the study purpose. The experiments administered were Exp 1: PCV and ESR estimation and Exp 2: Hemoglobin (Hb) demonstration. Pre-existing groups (50 each) - Group A and Group B received two randomly picked practical (experiment) sessions each. One of the interventional teaching methods was randomly allotted to each practical session. Before each practical session, a pretest was conducted. Group A received practical experiment one with traditional method, whereas Group B received the same experiment with PPT with traditional method. For the next experiment, teaching methods were interchanged between the groups.

Immediately after the interventional classes, posttest along with objective structured practical examination (OSPE)

was conducted to assess immediate retention capacity of knowledge as well as skill and thus the effectiveness of the teaching methods. Posttests were conducted at the 3rd-month and 6th-month intervals to assess short- and long-term retention capacities. 3rd-month OSPE was conducted to assess the short-term skill retention capacity.

Cognitive score assessment was done by comparing pre and posttest scores. Three sets of five questions with equal weightage were selected for each experiment. They were randomly selected from a pre-prepared question bank of 30 objective type questions made for each experiment/practical session. Four question banks containing a total of 120 questions were made for the four practical experiment sessions. All questions made were peer-reviewed by five subject experts. Psychomotor score assessment was done by comparing immediate and 3rd-month OSPE scores. OSPE checklist question comprising 10 procedural steps with equal weightage was used for each practical experiment. All OSPE checklists made were peer-reviewed by five subject experts. At the end of the study, to assess student satisfaction and acceptance, a feedback form was given to the students.^[2] It was a four-point Likert scale with 20 questions.

Data entry and analysis were done using SPSS 16.0. The cognitive and psychomotor scores were expressed as mean \pm standard deviation, and $P < 0.05$ was considered to be statistically significant. Unpaired *t*-test was done to compare the scores of both the groups, and paired *t*-test was used to compare the pre- and posttest scores. Student feedback was expressed in percentage.

RESULTS

In our study, undergraduate medical students ($n = 96$) were exposed to traditional and PPT enhanced methods of teaching. Both the groups had similar pretest scores ($P = 0.311$) as shown in Table 1, which proves that both groups had similar previous knowledge about the experiment. Group A and Group B showed a remarkable improvement in immediate posttest scores which were highly statistically significant ($P = 0.0001$ in both the groups). Immediate retention was

Table 1: Cognitive scores of both groups to assess immediate, short-term, and long-term retention capacity of theoretical knowledge

Cognitive scores	Group A traditional method	Group B PPT enhanced method
Pretest	2.58 \pm 1.6	2.54 \pm 1.7
Immediate posttest	7.20 \pm 1.4	6.78 \pm 2.0
3 rd month posttest	5.97 \pm 1.9	6.08 \pm 1.9
6 th month posttest	5.19 \pm 2.0	5.25 \pm 1.8

Pretest comparison, $P=0.311$; Pre-post difference, $P=0.0001$;
Post-tests comparison: $P=0.273$

slightly higher in Group A. Group B had a better short- and long-term retention capacity as observed in 3rd- and 6th-month posttest scores. However, the differences in the posttest scores for immediate, short-term, and long-term retention capacity of both the groups were not statistically significant ($P = 0.273$) as tested with repeated measures ANOVA.

As shown in Table 2, there was a statistically significant increase in short-term skill recall capacity (OSPE scores) of both the groups, when compared to that of immediate scores. However, in Group B, the retention capacity was found to be slightly higher when compared to Group A and was highly significant ($P = 0.007$).

In Figure 1, student's feedback revealed the traditional method of demonstration promoted better understanding, whereas PPT with animation gave better clarity, evoked interest, and allowed better 3D view and apparatus identification.

DISCUSSION

In this study, immediate cognitive and psychomotor scores showed a significant increase in acquisition of knowledge and skill in both groups, respectively ($P < 0.05$). However, Group B had an insignificant increase in short- and long-term retention of theoretical knowledge and a highly significant increase in short-term psychomotor scores ($P = 0.007$) when compared to that of Group A ($P = 0.02$). A larger proportion of students agreed that PPT enhanced method brought about a

positive learning environment. However, the traditional method helped in better understanding of the class. Hence, in the current situation, the introduction of PPT with animation in practical classes with small group discussion may help learner grasp the class better and have a lasting impact.

Our findings are similar to that of earlier studies done in anatomy and physiology, which have clearly shown a statistically significant increase in learner's academic performances due to the effectiveness of visual aided method as well as animations during theoretical teaching.^[3-6] This might be due to multimedia tools generating a higher lasting impact on the learner as these tools have a better visual appreciation.^[7] However, it is in contrary to that of a study done on nursing students which concluded that conventional demonstration was more effective than video-based method in learning practical skills. This could be due to the effect of a real-time experience of a teacher performing the skill in front of the learner, giving a more realistic touch to the knowledge acquired.^[8] There are also studies showing that the medical students preferred blackboard teaching over PPT in lecture classes.^[9] Another study suggested that chalkboard teaching had the advantage of a better recall.

PPT enhanced demonstration had a higher impact on the learner retention capacity in the acquisition of knowledge and skills. This finding shows that employing PPT with animation along with traditional hands-on demonstration in practical classes will help to enhance and reinforce teaching learning activity in physiology. Thus, multimedia enhanced teaching activity can be an effective tool in bringing a remarkable change in the learner's behavior both in cognitive and psychomotor domains. The use of PPT also ensures uniform delivery of learning objectives irrespective of teacher bias and saves preparation time for the teacher. In addition, it also serves as a permanent teaching learning resource which can be used by the learners to sharpen their skills. Our study has focused on both cognitive and psychomotor domains of learning in practical classes and OSPE, an objective tool of assessment was employed to reduce subjective errors. This study failed to address teacher bias and student receptiveness which might have influenced the scores.

Table 2: Psychomotor scores of both groups to assess immediate and short-term skill recall

Psychomotor scores	Group A traditional method	Group B PPT enhanced method
Immediate OSPE	7.30±2.2	7.23±1.8
3 rd month OSPE	7.90±1.3	7.84±1.3
<i>P</i> value	0.0213	0.0075

OSPE: Objective structured practical examination, PPT: Powerpoint

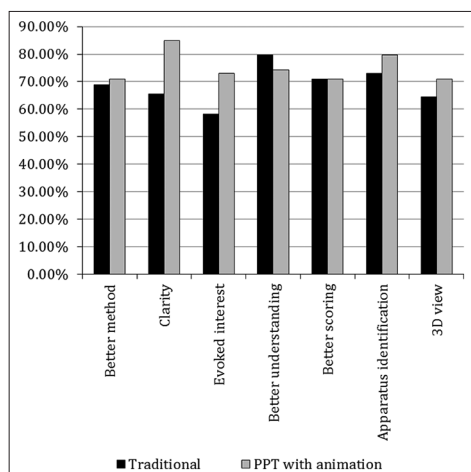


Figure 1: Students' feedback on teaching learning methods

CONCLUSION

Our study on PPT enhanced demonstration of physiology practical classes has shown a positive impact on learner understanding and perception of cognitive and psychomotor abilities. Hence, it can be used to strengthen traditional method and to bring about better long-term retention capacity of knowledge and skill.

REFERENCES

1. Medical Council of India. India: The Rules and Regulations; c1997. Available from: <https://www.mciindia.org/CMS/rules-regulations/>

- graduate-medical-education-regulations-1997. [Last cited on 2018 Jul 19].
2. Bukowski EL. Assessment outcomes: Computerized instruction in a human gross anatomy course. *J Allied Health* 2002;31:153-8.
 3. Chopra J, Rani A, Rani A, Verma RK. Traditional versus computer assisted teaching of human osteology: A randomized control trial study. *Indian J Basic Appl Med Res* 2012;5:370-4.
 4. Seth V, Upadhyaya P, Ahmad M, Moghe V. Powerpoint or chalk and talk: Perceptions of medical students versus dental students in a medical college in India. *Adv Med Educ Pract* 2010;1:11-6.
 5. Baruah M, Patel L. Evaluation of different teaching methods used in physiology lectures. *Indian J Basic Appl Med Res* 2014;4:271-6.
 6. Hassan AA, Usman IA, Awwalu S, Dogara LG, Okpetu L, Yahaya G, *et al.* Impact of powerpoint presentation on the academic performance of medical students of Ahmadu Bello University Zaria. *Sub Saharan Afr J Med* 2014;1:91-4.
 7. Mouneghi HK, Derakhshan A, Valai N, Mortazavi F. The effectiveness of video-based education on gaining practical learning skills in comparison with demonstrating method's effectiveness among university students. *J Med Educ* 2003;4:27-30.
 8. Sunita Kalyanshetti. Perception of medical students toward teaching aids during physiology lectures: 0A cross-sectional study. *Int J Med Sci Public Health* 2016;5:1387-90.
 9. Bamne SN, Bamne AS. Comparative study of chalkboard teaching over powerpoint teaching as a teaching tool in undergraduate medical teaching. *Int J Med Sci Public Health* 2016;5:2585-7.

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