International Journal of Medical Science and Education

www.ijmse.com

Original Research Article

pISSN- 2348 4438 | eISSN-2349- 3208

TECHNOLOGICAL STRATEGIES IN TEACHING AND LEARNING ANATOMY - BOON OR BANE?!

Naveena Swargam

1. Associate Professor, Department of Anatomy, ESIC Medical College, Sanathnagar, Hyderabad, Telangana State, India

*Corresponding author – **Naveena Swargam**
Email id – naveena.swargam@yahoo.com

Received: 26/03/2019 ***Revised:03/05/2019*** ***Accepted: 14/05/2019***

ABSTRACT

Background: The paradigm of teaching and learning has been changed from traditional transfer of knowledge by the teacher to constructing knowledge through experiences using technology by the student. Changes in the teaching of anatomy from didactic lectures & cadaveric dissection to newly adopted teaching and learning strategies are expected to bridge the gap between teachers and students. **Materials and Methods:** The first MBBS students of 2016 - 2017 academic year with a strength of 100, were selected at ESIC Medical College, Sanathnagar, Hyderabad, Telangana State, India. The students were taught few chosen topics in anatomy by using different teaching methodologies like PowerPoint presentation, digital visualizer, smart board, virtual dissection table, cadaver, chalk & board, slide projection system. A written feedback was taken from the respective group of students after every session of pedagogy. **Results:** The results of present study were found to be encouragingly adaptable, providing conceptual framework of utilising clusters of teaching methodologies in teaching and learning anatomy. **Conclusion:** Successful medical teaching requires the ability of teacher to address the learner needs and understand the variations in learner approaches. To accomplish these requirements an optimal teaching-learning environment should be created by utilizing a variety of teaching methodologies.

Key Words: Digital visualizer, PowerPoint presentation (Ppt), Liquid Crystal Display (LCD) projector, Smart board, Virtual dissection table, Slide projection system.

INTRODUCTION

Effective teaching in medicine requires not only commitment but flexibility too. Reviewing and modifying the teaching and learning methodologies is a must for the improvement of undergraduate teaching specially in the subject of anatomy. It is important for the teachers to obtain feedback from the students to identify the strengths and weaknesses of their teaching styles thereby help in modifying their teaching methods to meet the learners need. Recent technologies like 3-dimensional audio visuals, digital radiological imaging, virtual reality, simulation models and web based study materials etc. have been introduced to make anatomy more interesting and easier. The technology has been proved to be a boon for anatomists as it invokes the audience interest and aids the explanation of complex illustrations, thus playing a remarkable role in education of gross anatomy. Present study deals with the implementation of a cluster of teaching and learning techniques in an organized way, followed by obtaining feedback from

the students to estimate the impact of newly adapted technical strategies on conceptual understanding of the subject.

MATERIALS AND METHODS

The study was conducted on students from first MBBS of 2016 - 2017 academic year, with a strength of 100, at ESIC Medical College, Sanathnagar, Hyderabad, Telangana State, India. All the 100 students were divided into 3 groups. Each group of students were taught few chosen topics in anatomy by using different teaching methodologies for each topic, during their academic year. The topics belonged to osteology, gross anatomy & histology. The techniques used for teaching osteology were smart board, digital visualizer which require LCD projector. For gross anatomy, PowerPoint presentation which require computer and LCD projector, virtual dissection table, cadaveric dissection were applied. To methodologies used to teach the histology were, chalk & board, slide projection system which require a projection camera, computer and multimedia device. A written feedback was taken from the respective group of students after every session of pedagogy, to assess and relate the efficiencies of different methodologies applied in a combination, with a routine didactic lecture.

RESULTS

Present study results completely rely on the analysis of feedback, given by 100 students, for each topic taught with a strategy of amalgamation of different teaching methodologies. Each strategy applied in this study has been discussed separately with its overall effect on conceptual learning of the subject.

Combination of smart board and digital visualizer

There was 100% positive feedback, for the topics taught under osteology by using the combination of smart board and digital visualizer, mentioning the clarity in understanding and remembering every feature and attachment on a bone. They also specified that, no one had to wait for the demonstrator, to approach them personally during the class, to show all the markings on a bone. The strategy was time saving for the teacher in a given period of time, as both the methods were used simultaneously by demonstrating the bony features under digital visualizer and explaining the attachments on the bone by using figures displayed in smart board.

Combination of powerpoint presentation, virtual dissection table and cadaver

Analysis of feedback, given for the gross anatomy teaching with PowerPoint presentation, virtual dissection table and cadaveric dissection, showed mixed results. However, the respective group of students expressed in their feedback that, their formative knowledge was strengthened by the use of virtual dissection table, as the 3D images were effortlessly self-explanatory. In the present study students also mentioned in their feedback that the simultaneous use of PowerPoint presentation showing a clear, colourful and magnified pictures with a brief description of anatomical relations helped enhancing their orientation on theoretical knowledge.

Combination of chalk & board and slide projection system

For teaching the histology, chalk & board, slide projection system were selected and the feedback from students was grossly positive. Every student mentioned that the simultaneous explanation of histological features of each cell and tissue with projection system along with a typical chalk & board diagram was theoretically and practically much more clear, before they go directly for identification of a histology slide under microscope.

DISCUSSION

The results of previous studies **(1)** done on the effectiveness of lecture delivery modes suggest that the lecture could best be a combination of two or more teaching-learning methods. The efficiency of using a combination of creative, non-traditional teaching techniques and strategies plays a major role in reaching as many different types of learners as possible. The present study has proven that if teachers use a variety of teaching methods and styles learners are exposed to both familiar and unfamiliar ways of learning and ultimately giving learners multiple ways to excel, which supports a previous study done by Lisa **(2)**. Vishram Singh **(3)** has mentioned in his study that, in teaching gross anatomy, the challenge is not to determine the superiority of one methodology over

another but to capitalize on the learning benefits offered by the different methods.

It is evident by the literature reviewed **(4)** that there is no compensatory technique to cadaveric dissection in learning gross anatomy as it is not only help in learning the anatomical details but also familiarise the students with anatomical variations. H Brenton **(5)**, in his study on using multimedia to enhance anatomy teaching, has mentioned that medical virtual environments offer opportunities for collaborative learning which may be usefully applied to web3D anatomy resources as they have the ability to simulate spatial relationships between anatomical structures. Previous authors **(6)** in their study mentioned that they have used demonstrations in teaching gross anatomy as a supplement to lecturing. According to a previous study **(7)**, Virtual microscopy, a newer approach in teaching anatomy, should be used to teach histology beyond laboratories.

CONCLUSION

A comprehensive knowledge of anatomy plays a vital role in medical education, ensuring safe medical practices. Technical strategies using amalgamation of different methodologies in teaching and learning anatomy will certainly modify the mode of imparting knowledge according to the students perceived learning needs which will improve the quality of teaching and learning thereby increase the productivity eventually. Frequent feedback from the students may help the teachers to plan the curriculum and improve upon the teaching methodologies adopted. The present study has proven that, strategically using the technology in teaching and learning anatomy would be beneficial to students as well as teachers.

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How to cite this article: Swargam N., Technological Strategies In Teaching And Learning Anatomy - Boon Or Bane?!. Int.J.Med.Sci.Educ 2019; 6(2): 24-26