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Original Article

# Comparison of Innovative Teaching Tools In Embryology In Learning Anatomy Among First Year MBBS Students

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ABSTRACT

The Embryology is the important subdivision of Anatomy. The Embryology is difficult as the students were unable to understand the three-dimensional spatial orientation of subject. There is need to do the innovations in Embryology teaching by using 3D videos, photographs of models, illustrations in lectures so that students will develop interest in Embryology and will attempt to procure the knowledge of Embryology subject. For the present study 250 MBBS students were divided into the three batches A, B and C. Three methods of teaching topic were selected i.e. illustrative explanation, Lecture with explanation of models and Lecture with showing 3D videos taught to all the three batches by same teacher. Method of teaching interchanged with topics and batches were rotated. Assessment was taken for all the batches in succeeding week in the form of MCQ exam after the session. The validated questionnaire was given in the google form to assess the understanding of subject in students with every method Evaluation and Interpretation of responses of MCQS was obtained and analysed statistically By taking innovative teaching methods by using the illustrations, videos and models, students are able to score more than 50% in the exam. There is no statistically significant difference was found between the comparison of the methods.Among all the methods teaching with Videos is the best method recorded in present study

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## Introduction

The fundamental subject to be learned by a health professional is Anatomy, as it is the prime and most important subject in basic medical sciences that forms the foundation stone for other specialties. [1] Unlike gross anatomy, histology or osteology, embryology is a dynamic subject as its sequential changes occurs across a timeline. [2]The Embryology is the important subdivision of Anatomy. The study of human embryology deals with a highly complex process that transforms a single cell into a fetus in nine lunar months. This involves the amazing integration of a multitude of developmental phenomena. In universities in India, embryology as a subject is taught during the first academic year of the undergraduate MBBS curriculum. Understanding the detailed developmental process forms a strong anatomical basis for comprehending the gross structure and related anomalies [3]

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In comparison to other basic medical science subjects, learning Embryology was difficult as the students were unable to understand the three dimensional spatial orientation of subject.

There is need to do the innovations in Embryology teaching by using 3D videos, photographs of models, illustrations in lectures so that students will develop interest in Embryology and will attempt to procure the knowledge of Embryology subject. The present study aimed to assess the effect of various teaching methods on acquiring the level of knowledge among the students, to compare the teaching learning methods with each other and to find out most preferred teaching learning method

## MATERIAL AND METHODS

For the present study 250 MBBS students were divided into the three batches A, B and C. Three methods of teaching topic were selected i.e. illustrative explanation , Lecture with explanation of models and Lecture with showing 3D videos taught to all the three batches by same teacher. Method of teaching interchanged with topics and batches were rotated. The development of urinary system, male reproductive system and female reproductive system, these topics were selected for the present study

Assessment was taken for all the batches in succeeding week in the form of MCQ exam after the session. The questionnaire was given in the google form to assess the understanding of subject in students with every method Evaluation and Interpretation of responses of MCQS was

obtained and analyzed statistically. Statistical z test has been applied to see any statistical difference. P value has been calculated.

| Methods | Topic 1 | Topic 2 | Topic 3 |
|---|---|---|---|
| Lecture with illustrations | A | B | C |
| Lecture with Explanationon Models | C | A | B |
| Lecture with showing 3D videos | B | C | A |
| | Exam | Exam | Exam |

There is no statistical significant difference was found between the comparison of the methods in all the methods with respect to all the topics except models and diagrams in male reproductive system. (P= 0.0235)

## DISCUSSION

Theory hours are preferred for teaching embryology over practical hours, due to limited hours for embryology in the curriculum and large class size. For beginners, visualization of the three-dimensional concept of the developing embryo with its related developmental processes within a short time becomes a tedious and time-consuming experience. [4].

According to the Koscinski, the presentation of videos in embryology courses increases the student's motivation to learn. The video contributes to a better comprehension. Alone, it will not optimize the memorization of embryology because it presents a very high concentration of information in a short time for an optimal teaching which is corelating with the findings of the present study.[1]

According to the study of Choudhari P, most of the students expressed a high degree of satisfaction as they found that combining 3D videos and animations with traditional lecture made the topic more interesting, improved in solving the confusion, and alleviated misconceptions regarding the topic which led to better understanding of the subject. They felt hopeful that this technology-enhanced learning using 3D videos and animations will result in better understanding and better academic performance by them. [5]

Guilherme Guedert results showed that use of different methodologies in favors cognitive development, engagement in classes, motivation, cooperativeness and communication skills of students. [6]

Baxi et al. conducted a study to explore the views of 5th-semester students at Government Medical College, Bhavnagar, on the advantages and disadvantages of different teaching tools. A multimedia approach was appreciated by most of the students and has been shown to be effective for classes with students from different backgrounds because multimedia material was helpful to explain complicated topics with the help of pictures, animations, and simulations. The incorporation of video was also reported to positively influence most of the domains identified in classroom learning.[7]

Teaching embryology has changed considerably in the recent decades. It has become very easy to visualize the complicated Anatomical structures as well as complex developmental aspects with the use of three dimensional videos. Thus use of different teaching learning methods were found to be very effective and useful for teaching embryology ,the most complicated part of Anatomy.

Different methods used for teaching not only made the subject easy but also arose interest amongst students about the subject. It also stimulated them to think ,read and study the subject thoroughly. As all the teaching learning methods used included active participation of students ,these methods were very much helpful for teaching the subject as well as for understanding the subject for students. [3]

## RESULTS

Maximum correct responses have been obtained in the Method of teaching by video. After interpreting the evaluation it has been observed the percentage of correct responses have been calculated .They were 69.3%, 71% and 70.3% for the method of teaching by explanation of models, video and illustrations.

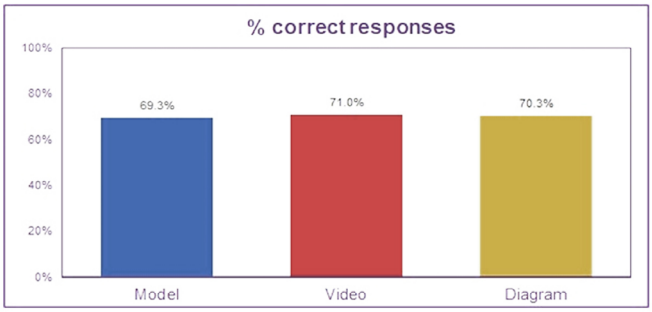



**Table no 2 Quantitative comparison of three methods of assessment**

| Models | | Videos | | Diagrams | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | N | No | % | N | No | % | N | No | % |
| Urinary system | 350 | 210 | 60% | 330 | 185 | 56.1% | 1050 | 603 | 57.4% |
| Male reproductive System | 620 | 410 | 66.1% | 400 | 284 | 71.0% | 1270 | 879 | 69.2% |
| Female reproductive System | 610 | 475 | 77.9% | 740 | 574 | 77.6% | 1900 | 1478 | 77.8% |
| Total | 1580 | 1095 | 69.3% | 1470 | 1043 | 71.0% | 4220 | 2960 | 70.1% |

Quantitative comparison has been done topic wise for all the three methods. Statistical significant difference also have been calculated by applying z test. No statistical significant difference is observed in all the methods except models and diagrams in male reproductive system. (P= 0.0235)

## CONCLUSION

By taking innovative teaching methods by using the illustrations, videos and models, students are able to score more than 50% in the exam. There is no statistical significant difference was found between the comparison of the methods except models and diagrams in male reproductive system. (P= 0.0235)

Among all the methods teaching with Videos is the best preferred method recorded in present study

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