Original Article

A Unique Approach to Learning/Teaching Anatomy

1. Huma Musarrat Khan 2. Rohail M. Mirza 3. Farah Shahid

1. Assoc. Prof. of Anatomy, FUMC, Rawalpindi 2. Student 3. Demonstrator/Lecturer of Anatomy, FUMC, Rawalpindi

ABSTRACT

Context: The present day teaching emphasizes on teaching methodologies that capture the interest of students and increase their satisfaction.

Objective: To assess the effectiveness of nontraditional teaching methodologies such as storytelling for teaching anatomy and to determine whether this method enhances student satisfaction.

Materials and Methods: The study was carried out in Foundation University Medical College, Rawalpindi (Pakistan) on first year MBBS students (n=87). The students were given a story, adapted from: "The case of the dividing cell: mitosis and meiosis in the cellular court" (http://www.sciencecases. org/mitosis _meiosis/mitosis_meiosis.asp) by Clyde Freeman Herreid. Copyright held by National center for case study teaching in science, University at Buffalo, state university of New York. Used with permission. The students were divided into small groups who discussed the learning issues in three interactive sessions, after which, they were given a surprise assessment test and an anonymous questionnaire which was to be answered on an open scale of 1-10 (1 being the minimum score and 10 maximum) regarding the effectiveness of this methodology.

Findings: Students enjoyed the sessions and would like similar sessions in future (mean evaluation score: 5.92/10±3.15). An overall satisfaction score of 6.52±1.75 was obtained. Mean of assessment results was 92.7%±10.4. Some students felt that it was more time consuming as compared to lectures and could not be used to cover all topics.

Conclusion: Teaching anatomy by storytelling captured the interest of majority of the students who found it an effective teaching methodology. However, other traditional tools of teaching should also be an integral part of anatomy curriculum.

Key Words: Teaching methodologies, storytelling, teaching tool, teaching anatomy, student satisfaction, present day teaching.

INTRODUCTION

In the present age, teaching has become a multifaceted process that lays emphasis on teaching/learning methodologies which focus more on active and conceptual learning. This has become a serious challenge for teachers, and an effort is being made at all levels to supplement passive learning methods such as traditional lectures, with other methodologies that captivate students, increase their satisfaction and motivate active learning[1]. One of such methodologies is the use of "case studies" or "stories". Case studies are stories analyzed through discussion, and used to achieve learning objectives in the classroom. Business and law schools have a long history of using real or simulated stories known as "cases" to teach students about their topic of discussion. Harvard University is among the pioneers in developing cases in these subjects[2], and has produced teachers who have carried this methodology to other institutions. However, case studies have rarely been employed in undergraduate science teaching except as stories or experiences told by an instructor as part of introducing or summing up a lecture. James B. Conant of Harvard was probably the first science educationalist to design and implement a complete course around this teaching methodology. However, unlike the practice in other fields, where cases were presented as part of a discussion, Conant presented cases entirely in the form of a lecture. His style did not become popular, and was hardly ever used again in any institute[3].

Teaching of anatomy is generally considered as an integral part of medical education; yet, it is normally taken as a subject full of hard core facts putting a lot of strain on rot memory[4]. This realization has created the need to deliver the subject of Anatomy in a more effective and efficient manner[5]. Moreover, as thinking is a deep desire of the human mind, a need is felt more acutely than ever to rescue anatomy from the mere status of dry, boring description of facts to living factual realities.

> "Tell me a fact and I'll learn. Tell me the truth and I'll believe. But tell me a story and it will live in my heart forever." - Indian Proverb

With the advent of latest changes in the teaching methodology and introduction of modern medical education in Pakistani medical schools, a greater burden has been put on the faculty of anatomy to introduce newer teaching methodologies which are more interesting and captivating. Keeping this in mind a

study was planned in which the first year medical students of Foundation University Medical College, Rawalpindi (batch 2010) were exposed to sessions during which a "story" was used to induce learning. The case chosen was rather atypical as compared to the traditional "cases" in the sense that it was purely a fictitious and imaginary story which had little to do with the real world. It was unlike the cases normally used in business schools which reflect real life situations and was chosen specifically to capture the student interest rather than to recreate a true life scenario.

OBJECTIVE

The objective of the study was to assess the effectiveness of nontraditional teaching methodologies such as storytelling for teaching anatomy and to determine whether this particular teaching method might succeed in capturing the interest of students and enhance their satisfaction with the learning process.

MATERIALS AND METHODS

The study was carried out in Foundation University Medical College, Rawalpindi (Pakistan) on first year medical students of the year 2010 (n= 87). Institutional review waved off the requirement of ethical approval.

The students were given handouts of the case study/Story adapted from: "The case of the dividing cell: mitosis and meiosis in the cellular court" (http://www.sciencecases.org/mitosis_meiosis/mitosis_meiosis.asp) by Clyde Freeman Herreid. Copyright held by National center for case study teaching in science, University at Buffalo, state university of New York. Used with permission [6,7]. The students were advised to read the story before hand, so that they could do some pre-session preparation. During the learning sessions the students were divided into small groups of 25, each headed by a junior faculty member. They read out part of the story and sorted out what they already knew at this point and what were the learning issues which they needed to find out. Points of confusions were cleared by discussions among the students and the faculty members. The case was discussed in three interactive sessions, each lasting two and a half hours. The students were exposed to two triggers during the first two sessions followed by a wrap up session in which the faculty summarized the learning issues.

This case focused on the process of cell division (mitosis, meiosis) and gametogenesis, along with a little introduction of mutations. The case had an unusual format, with the cell organelles talking to each other and arguing in a clear voice. The setting of this case was in an imaginary court room in which the jury was made of Eukaryotic cells and the defendant was an oocyte who was charged of a mutation. The prosecution and the defense called witnesses which included Mr. Spermatocyte and Mr. Nuclear membrane and so the testimony continued revealing the secrets of cell division (mitosis, meiosis) gametogenesis and mutations:

> "……The judge adjusted his plasma membrane over his shoulders and began speaking with a voice that seemed to resonate from the bowels of his endoplasmic reticulum. Let us see now. This is the case of the State vs. Egg Cell Number 6624223. This presents an unusual situation involving an alleged capital offence. The defendant is charged with being an undesirable mutant in the body politic. The penalty is death!....." [6,7]

At the end of the last session, the students were made to attempt a surprise assessment test which comprised of six multiple choice questions (one best type) and fill in the blanks type of statements. Moreover, they were given a feedback questionnaire consisting of 12 questions that students had to answer on an open scale of 1-10 (1 being the minimum score and 10 maximum) regarding the effectiveness of the case method as a tool for teaching anatomy. Open ended comments were also invited, in which the students were asked to reflect upon the learning experience. Both, the assessment test and questionnaire were anonymous. The data collected from the questionnaire and the results of the assessment was analyzed by SPSS.

RESULTS

The analysis of the evaluation form reflected the students opinion that the story induced critical thinking and reasoning (mean evaluation score of 6.19/10±2.63). Most of the students felt that they enjoyed the sessions and would like similar sessions in future (mean evaluation score: 5.92/10±3.15). Moreover, 83.8% of the students thought that the objectives of the session were amicably achieved (that is, their evaluation score was greater than 5/10). An overall satisfaction score of 6.52±1.75 was obtained.

The mean of the result of the assessment test was 92.7±10.4 % (Table 1).

The open ended comments generally confirmed that the students enjoyed the sessions, however, they felt that this methodology was more time consuming and less effective as compared to other modes of teaching. Some of the interesting comments are being quoted:

> "The session was captivating, less tiresome and it was fun to learn" Student

> "The case was fascinating and evoked active learning, but at the same time it conveyed less information as compared to traditional lectures by senior faculty members." Student

"The story captured more interest as compared to standard teaching methods and helped to facilitate the leaning of Anatomy, yet it was more time consuming and probably this method cannot be used for teaching all aspects of anatomy" Student

"I feel that although the case was creative, but it was probably more suitable for high school students rather than professional students of the medical school. The cases or stories used for medical students should have a clinical setting." Student

Open ended comments were also invited from the faculty members involved in the session. They all unanimously gave approximately the same comments, and according to one of them:

"The case method captivated the student interest, encouraged critical thinking and group activity. However, longer sessions were required and some of the objectives were not achieved naturally. The methodology should only contribute to a part of the anatomy curriculum and more traditional methods of teaching anatomy should be continued."

Faculty member

Table 1: Evaluation of the Storytelling Method as a Teaching Tool

Evaluation score: 1 to 10 (minimum score is 01 & maximum score is 10)

S#	Criteria for Evaluation	Score Mean ± SD
1	Were the objectives of the session clear?	7.05±2.29
2	Were the objectives met after the session?	6.71±2.47
3	Did the session facilitate active learning?	6.89±2.52
4	Was the problem structured in a way that naturally leads to the learning objectives?	5.89±2.74
5	Did the session improve critical thinking and reasoning?	6.19±2.63
6	Would you like similar sessions in future?	5.93±3.15
7	How do you compare such sessions with PBL sessions as regards to learning?	6.29±2.34
8	How do you compare such sessions with large group interactive sessions?	6.63±2.60
9	Was the physical environment (seating arrangement, noise and room temperature etc.)?	6.46±2.69
10	Was the working atmosphere (attitude and behavior of faculty inductive for learning process?	7.57±2.28

DISCUSSION

Anatomy is one of the most important subjects taught in the pre clinical medical years[8], and the importance of teaching this subject beyond the initial years of medical school all the way upto postgraduate medical training is gaining importance[9]. At the same time, the faculty of Pakistani medical schools is showing an increasing concern regarding stress in their students. According to a study, 50% of medical students complain of stress due to increased cognitive load [10]. Therefore, efforts are being made to decrease the stress on the students and to make the curriculum more palatable for them by introducing different more interesting teaching methodologies. In the present study, storytelling has been used as a teaching tool. The story used has a message and is not simply a narrative for entertainment; its purpose is to achieve the learning objectives in an interesting manner. The present study showed an overall increase in student satisfaction and interest on using story as a means of learning. Similar results were obtained in another study where teaching of dental anatomy to dental school students was positively affected by storytelling and their satisfaction was compared with a control group which was exposed to traditional teaching methods [11].

According to a study, when "cases" were used for teaching the students of nursing, it improved their learning and engaged them in critical thinking and active learning[12]. Another benefit of using storytelling highlighted by the present study was that this methodology encouraged positive group dynamics and facilitated learning through active help and support from their own class fellows. Previous studies have proved that active learning in groups has well established benefits with positive effects on assessment scores, skill development and student satisfaction[13].

At the same time, medical educators are facing the difficult dilemma of decreased time available for teaching as a result of increased demands for clinical time [14]. The results of the present study indicate that both the students and the involved faculty felt that although the storytelling method of teaching encouraged critical thinking it consumed more time to achieve the same objectives as compared to traditional lectures, and that not all aspects of anatomy could be taught through this method. This is in accordance with studies which declare that that most of the aspects of basic sciences (especially anatomy) are not covered adequately by using cases [8].

Moreover, results of surveys reveal that 75 % of the students are interested in short, specialized dissection sessions even during the clinical part of their training[15]. Therefore, cadaver dissection sessions should be considered as an integral part of anatomy curriculum in preclinical and clinical studies.

Keeping the above discussion in mind, it is recommended that a hybridized approach should be used for teaching anatomy. The important topics which are not covered through stories can be taught in lectures, dissection sessions or tutorials. It is also felt that the implementation of storytelling as a tool for teaching anatomy should be associated by a close follow-up of each student with regular feedbacks on his work, and integration of different teaching methodologies as and when required.

Further studies are however, necessary to compare the long term knowledge level of medical students who learned anatomy through newer modes of teaching versus traditional methodologies[16]. Presently, the evidence regarding the learning of Anatomy by storytelling is scant, but it is hoped that with this initiative, further opportunities will arise to gather such evidence. It is also anticipated that this paper will contribute to an ongoing debate, regarding the newly introduced teaching methodologies for anatomy on long term basis.

CONCLUSION

Results of the present study indicate that learning anatomy by storytelling captures the interest of majority of the students who find it an effective and captivating teaching methodology. However, other traditional tools of teaching should also be an integral part of the learning/ teaching of anatomy.

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Address for Corresponding Author:
Dr Huma Musarrat Khan
House No. 172, Street 61, Sector I-8/3,
Islamabad - Pakistan.
Postal Code: 44000
Phone: 051-4444232. Cell: 0333-5115551
Email: huma.anat@gmail.com