

Quiz as an Academic Tool for Teaching Learning Physiology in Indian Medical Students: A Cross-sectional Study

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ABSTRACT

Background: In a changing world, education has become a priority. It has become a need of the hour to explore more innovative teaching methods effectively. Active teaching in small group discussions and interactive activities like quiz have been explored to ensure healthy and competitive learning. Not many studies have been done in India and thus, we undertook to assess the effectiveness of quiz as an academic tool.

Methods: 96 First-year medical undergraduates participated in quizzes on various topics of Physiology that were organized every 3 to 4 weeks. At the end of the year, they were asked to give their feedback anonymously in a Likert scale that was duly analyzed. **Results:** 49% of students strongly liked the quiz, 40% liked it, and only 1% did not like it. The majority of the students liked various contents and organization of the quiz. Most of the students liked the quiz procedure, e.g., pattern of team formation, weightage of topics, frequency, duration, pattern of scoring, time for answering questions, contents, rounds, difficulty level, and usefulness in the study.

Conclusion: Activities like quizzes are beneficial to the students and must be encouraged as a part of the curriculum.

Keywords: First year medical students, Physiology curriculum, Quiz.

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INTRODUCTION

As times are changing, the need to reinvent and renew the education system to maximize its effectiveness is increasingly felt. The medical curriculum is no exception to it! The success of education lies in imparting knowledge and the application of that knowledge in day-to-day life. Thus, the way of teaching has changed considerably over the years: from didactic lectures in large groups using blackboard teaching, overhead projectors and power-point presentations to small group teaching in the form of group discussions, demonstrations, tutorials and seminars (Sprujit *et al.*, 2013). Poor results in traditional methods for promoting students' creativity have become the stimulus to finding out newer modalities of teaching (Ruben, 1999).

Conventional didactic lectures tend to be very monotonous and make students more oriented towards passing exams by memorizing isolated facts without understanding (Mehta *et al.*, 2016). It has been found that small group interaction enables the student to practice communication and interpersonal skills, which are useful in their professional life later (Gleeson *et al.*, 2007; Marangos, 2000). Also, the concept of passive teaching is increasingly becoming redundant. The active participation of the students is considered valuable for the learning process. In the active learning, the teacher/ professor plays the role of a guide to the students and students are involved in the knowledge construction process instead of sharing a narrator-receptor relationship (Yeo, 2005). Various teaching styles have been experimented upon to involve students more and refine their critical thinking and attitude (Steinert, 1996). It has also become imperative to invoke keen interest and enthusiasm in students in passing the knowledge. Thus, the usual protocol of lectures that are fixed for one hour and the need for

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recreational breaks is being deliberated upon (Mohit *et al.*, 2016). Moreover, holistic learning in the form of vertical and horizontal integrated teaching with the help of innovative technologies, e.g., audio visual aids, patient simulations (Khoa *et al.*, 2017), clay modeling (Akle *et al.*, 2018), etc. explored like never before. However, the impact and implementation of these methods are yet to be analyzed and discussed.

As teaching is meant to benefit the students, students' perspective must also be considered by the regulatory bodies to form undergraduate training guidelines (Mohit *et al.*, 2016). Very few studies have been done in India in this regard. Hence, this study was undertaken to assess the effectiveness of quiz as an academic tool. A quiz was chosen to involve students actively through team participation, develop their

interest in Physiology, and improve their existing knowledge on the subject.

METHODS

i) Subjects

96 First year medical undergraduates (MBBS students, batch 2016-17) participated in the quiz. The quiz was organized in the lecture theatre of institute.

ii) Instruments

The quiz covered many systems and had questions that tested concepts, applied aspects, recent advances, Nobel Prizes etc. The following rounds were conducted:

- General physiology round
- Systemic and applied physiology round
- Visual round
- Rapid fire round

Later on, an anonymous feedback was taken from the students under the following headings:

- Pattern of team formation
- Weightage of topics
- Frequency of quizzes
- Duration of each quiz
- Pattern of scoring
- Time for answering questions
- Contents of the quiz
- Different rounds of the quiz
- Difficulty level
- Usefulness in study

iii) Methodology

96 students belonging to various parts of the country voluntarily enrolled for the quiz and were divided into three major groups. Three students from each group were selected in a randomized manner using the lottery system to represent their group for each system. The range of topics consisted of many systems and had questions that tested concepts, applied aspects, latest advances, Nobel Prizes etc. The quiz had four rounds: the general physiology round, the systemic and applied physiology round, the visual round and the rapid-fire round. Such quizzes were conducted once every 3-4 weeks for spacing and reinforcement and were of 100 marks each. The winning teams were awarded suitable prizes as an incentive. The duration of each quiz lasted for around an hour and the pattern of scoring consisted of no negative marking. Students were given approximately 1 minute time to answer each question. The difficulty level was moderate-hard and the questions were framed from standard textbooks of Physiology. The incorrectly answered questions were passed on to the audience, and scores were given to correct answers in the audience as an incentive to facilitate cooperative and competitive learning. Teams entering Final rounds were decided based on their total scores (score of team during the participation in respective quiz round and scores attained as audience during quiz of other teams). At the end of the

year, they were given a feedback form that had to be filled out anonymously. It had a Likert scale (strongly disagree to agree strongly) that was further analyzed.

Statistical Analysis

The data was compiled and analyzed in Microsoft Excel 2016 and is expressed as percentages/number.

RESULTS

i) Feedback on overall usefulness of the quiz in studies

Inference: 49% students strongly liked the quiz, 40% liked it and only 1% of the students did not like it.

ii) Feedback on structure (contents and organization) of the quiz.

Inference: Majority of the students liked various contents and organization of the quiz.

iii) Feedback on overall procedure of the quiz

Inference: Most of the students liked the procedure of the quiz.

DISCUSSION

More and more creative approaches are being used to improve medical education like quizzing in the current context. Our study found that the maximum number of participants liked/strongly liked the inclusion of quiz as an academic tool and found it useful in studies. Furthermore, most of the students liked the content, procedure, and manner of the quiz.

Most previous studies have supported the idea of small group teaching and active learning. In a study done by Mohit M in 2016, 57.14% of students were of the opinion that didactic lectures should be supplemented with small group discussions. Also, 46.81% of students felt that the optimum duration of a lecture should be between 30 to 45 minutes. Other aspects like proper breaks between lectures, the respite in the form of a small quiz/ relevant videos, easy-to-understand enjoyable lectures, and interaction were also relevant. Marden NY in 2013 found that the majority of the students perceived online quizzes as a valuable learning tool. Also, performance in quizzes was significantly linked to end-of-course examination scores. It was also realized as an identification tool for students who need assistance, as those who could not perform well in quizzes also were more likely to fail the examination. Of the four quiz models, the quiz model that allowed multiple unsupervised and untimed attempts were associated with a significant increase in mean examination performance, suggesting higher effectiveness if the stakes are low.

Mehta B and Bhandari B, 2016 explored another approach of quizzing that involved teams asking questions to each other. Student feedback revealed that they were satisfied, motivated, and confident of applying these learning and communication skills in future clinical practice. They also

supported this activity being implemented as a regular curriculum feature. It led to an increase in student perceptions of their knowledge on the topic and improved their communication, analytical skills and learning. Abdul Rahim Ali Bakhsh *et al.* in 2014 found that approximately 53.5% of the participants were multi-modal learners. However, two-thirds of the participants preferred studying alone, citing that they could maintain focus and operate at a preferred pace when they studied alone.

Factors that accounted for nonparticipation in quizzes were identified in yet another study and were inadequate feedback, curriculum organization and student mistrust, time constraints and fear of judgment (Abney *et al.*, 2017). Also, Brown GA *et al.* in 2015 found that an online review quiz taken the day before an in-class test increases performance on some in-class tests but does not consistently enhance performance on comprehensive examinations, suggesting a short-term impact and need for reinforcement. The spacing effect can overcome this, which refers to repeated exposure to medical knowledge over a given period. Reinforcement and consolidation of retention improve a learner's performance. This model is successful with medical students, pediatric residents and surgical trainees (Kerfoot *et al.*, 2009; Kerfoot *et al.*, 2012; Gyorki *et al.*, 2013; Mathes *et al.*, 2014).

Ensuring self-study on the part of learner is a challenging task. It is a time-consuming approach (Somannavar *et al.*, 2011) and Quiz-based reinforcement systems show promise in fostering active engagement, collaboration, healthy competition and real-time formative feedback, although further research on their effectiveness is required (Shaikh *et al.*, 2017).

The limitations of this study were our inability to objectively assess the level of questions and improvement in students' concepts after that. Also, only the teams that were chosen for the quiz were assessed for a particular organ system although the questions that were incorrect/passed were open to score for the audience later on. Future directions would be to follow up with the study population and analyze the improvement in their academic scores and incorporate other modalities of teaching in the curriculum.

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