Quizzing as an innovative Teaching-Learning technique for undergraduate dental students

Saba Khan[1],*, Sandhya Maheshwari[2], Sadaf Ghani[3], Seema Hakim[4], Aditi Gaur[5]

[1,3]Assiatant Professor, [2,4]Profsssor, [5]Senior resident, [1,2,5]Dept. of Orthodontics, [4]Dept. of Obstetrics & Gynecology, [3]Dept. of Paediatric & Preventive Dentistry, Dr. Ziauddin Ahmed Dental College & Hospital, AMU, Aligarh, [4]Coordinator, Medical Education Unit

***Corresponding Author:**
Email: sabakhan.ortho@gmail.com

Abstract

Quiz is a modality, which requires analytical skills to assess and apply information to crack the code of questions. The topic chosen for the Quiz was Cephalometrics, which is a clinical topic. It answers the diagnostic dilemma and is a must in 'know-how' syllabus of BDS final year students. For a better understanding of the topic, we need an interactive teaching session. It was observed that this Teaching-Learning (T-L) session assisted our students in remembering important concepts that are targeted by the quiz.

Keywords: Quiz, Cephalometrics, Teaching-Learning techniques, Curriculum.

Introduction

Teaching and learning are two sides of a coin. Innovation in Teaching-Learning (T-L) methods has gained popularity in recent times. Educators are adopting newer methods, as the teaching tools to deliver information have been found to be strongly correlated with grasping and processing of knowledge among students.(1) Conventional didactic lectures focus on "Surface learning", where the main focus is on comprehension and reproducing information. However, now there has been a paradigm shift, where the primary goal is to emphasize on "Deep learning" which relies on acquiring cognitive skills, balancing analysis and synthesis to form strong reasoning.(2)

It has been well demonstrated that quizzing assists in "Deep learning", and can be a robust T-L tool for small group teaching.(3,4) Quizzing on clinical topics help students widen their horizon to clinical interface from purely pedantic information as is delivered routine-lecture format. Quizzing promotes and encourages students to use the facts flexibly, and amalgamate concepts and findings. Research on psychological aspect of quizzing have also concluded that "questioning" reduces the forgetting curve by retrieval practice and helps assimilate information in an effective way.

Cephalometrics is an important diagnostic tool in orthodontics. Dental Council of India (DCI) has included cephalometrics in the proposed curriculum for BDS students.(5) Cephalometrics is taught in a series of lectures and practical classes. Clinical application of cephalometrics can be taught through interactive teaching-learning (T-L) methods only. To understand cephalometrics, students need to acquire critical thinking in terms of correlation of dental and skeletal components, and to hone problem-solving skills to glean a diagnosis and probable prognosis. We hypothesized that quizzing will provide us as an innovative T-L method to infuse thorough understanding of cephalometrics in BDS students, to enhance their knowledge and help them develop relevant skills at diagnosing and assessing orthodontic problems.

Interactive techniques, which can be derived at, through quizzing include: breaking the class in to small groups, questioning the audience, using audience responses and use of clinical cases.

Aims of the study were:

- To evaluate quizzing as a T-L technique
- To assist students in understanding the clinical applicability of the topic

Material and Methods

This was a cross sectional, comparative and interventional study. The quiz was designed to be used as an instrument to enhance participation and interest for students studying in BDS final year in Dr. Z. A. Dental College, A. M. U. We have 24 students in BDS final year, out of which 20 students attended the quiz. The BDS final year batch was informed that, a Lecture-Quiz session would be undertaken on cephalometrics, two weeks in advance, so that the students came prepared for both lecture and the quiz.

- Didactic lecture was taken on the topic in a two hour session divided into two- one hour session/ week
- A pre-test questionnaire in the form of MCQ test was taken prior to the quiz
- Quiz was conducted after dividing the batch into four teams.
- Post-test questionnaire was taken in the form of MCQ test

- Feedback was taken from faculty and students, a five point Likert's scale was used, where (5) was strongly agreed, and (1) represented strongly disagreed (Table 1).

The quiz was conducted in the following four rounds (Table 2):

a) Knowledge about cephalostat, x-ray films
b) Identification of landmarks
c) Identification of angles/planes
d) Clinical inference to a particular angle/ linear measurement

The cumulative scores were calculated for each team, and the highest scorers were adjudged the winners. Each question had 5 marks while each passed question carried 2.5 marks. The winners scored 35 points, while two teams with 30 points each were declared runners up.

6.

Result

1. 83% students were present throughout the study.
2. Average pretest scores of 40±25/100 were improved to post-test scores of 82±7/100 (Table 3)
3. Student paired t test showed a significant correlation between pre test and post test which indicate a significant improvement.
4. Students' feedbacks indicated that interest of the students increased and they liked the way of teaching and use of interactive technique. (Figure 1)
5. Students were interested that more innovative way of teaching learning methodology should be used to make classroom teaching interesting.

Table 1: Student's feedback on conduction of quiz

		Likert scale				
		Strongly Disagree	**Disagree**	**Neither Agree nor Disagree**	**Agree**	**Strongly Agree**
Effective group activity						
1.	We worked as a group and exchanged ideas	1	2	3	4	5
2.	Most students of my group participated in the discussions					
Efficient learning source						
3.	I was able to identify questions to be investigated further					
4.	The faculty guided us about the various learning resources					
5.	I was able to locate the learning resources					
6.	I was able to find answers to questions raised during the discussion					
7.	I was able to clarify my doubts					
8.	I had a better understanding of the subject by this method					
9.	Method helped in developing Problem Based Learning (PBL) ability					
Overall satisfaction						
10.	The sessions stimulated interest and motivated me					
11.	I would like to learn other topics too by this method					

Table 2: Details of quiz rounds

Round	Time	Marks
Knowledge about Cephalostat/ X-ray films	1 minute/question	5 marks/ question 2 rounds were conducted
Identify the landmark	1 minute/question	5 marks/ question 3 rounds were conducted
Identify the planes/angles	1 minute/question	5 marks/ question 2 rounds were conducted
Infer from cephalometric findings	2 minute/question	5 marks/ question 2 rounds were conducted

Table 3: Pretest and post-test comparison by t test

	Pre test Mean ±SD	Post test Mean ±SD	p value
Students n=24	40±25	82±7	<0.001

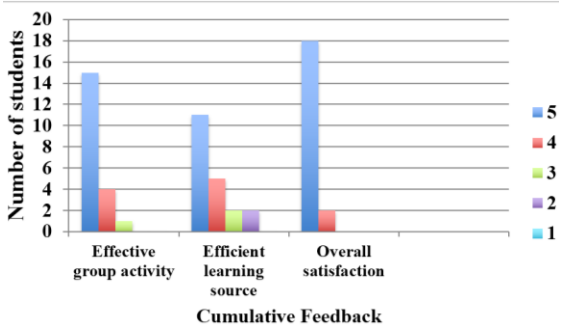

Fig. 1

Discussion

Cephalometrics is a very important diagnostic tool for an orthodontist. Many of our students start practicing as general dentists after completion of their BDS course. Therefore, it is of paramount importance that all our students are well versed with basic application of cephalometrics. The current modes of teaching medical students (lecture-based curricula) neither encourage the right qualities in students nor impart a life-long respect for learning.[5] Advancement in the pedagogical rigor of medical education has led to innovations in existing model of education. This quizzing session helped us outline what is expected of learners and what learners should be able to attain upon completion of a teaching module on cephalometrics. Clinical images and case-based material provide an effective tool for topic like these, they aid in clinical reasoning and are a potent aid for memorizing facts.[6]

Students felt that the method helped them develop problem-based learning, which helped them understand orthodontic diagnosis. The feedback revealed that the students had some difficulty in clarifying their doubts, this can attributed to the fact the lecture allotted are in one hour sessions, thus we had limited time to conduct the quiz and clarify the doubts. The concepts were clarified in the subsequent lecture. The students found that quiz was an interesting tool, and a platform to share their knowledge with their peers. The students were happy that this method incorporated their active participation in designing of the lecture in a way that was best suited to their needs. The pretest scores were significantly less than the posttest scores demonstrating better understanding of the topic. The standard deviation was much wider in pretest, while it was significantly narrow in posttest, signifying equitable knowledge distribution amongst all students, which is difficult to achieve in routine lectures as students have varying attention span.

Quiz can act as an assessment method as well. Assessment is an important for both the educator and the learner, it helps in providing feedback to our teaching method as well as showcase the areas of strength and weakness among the students, thus providing an insight to the teacher to work on certain areas for betterment of subsequent teaching sessions.[7, 8]

MCQ test was a learning aid for students in their preparation for Post-Graduate entrance test, which follows a similar pattern.

The faculty managing and conducting the quiz strongly felt that this session stretched the level and extent of their information on the topic. Subsequently, the knowledge was presented in a well-planned, better-integrated and logically sequenced manner by putting it in a quiz format.

Conclusion

Students found that the quiz helped them learn the basic concepts about cephalometrics in a more friendly and interactive way. They were able to understand the role of cephalometrics in orthodontic diagnosis. The students were more attentive and interested in the Quiz/T-L session than in regular lecture. Quizzing helped us promote flexible use of information as the quiz was designed to make the students appropriately apply-logically evaluate-synthesize concepts and findings, in an effective way.

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