

## PERCEPTION OF UNDERGRADUATE DENTAL STUDENTS TO TEAM BASED LEARNING IN ONE OF THE ORAL RADIOLOGY COURSES

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### *ABSTRACT*

**Background:** Team-based learning (TBL) is an interactive teaching and learning strategy which is largely used in medical and dental colleges as it provides effective interactive learning environment, enhances critical thinking and supports students' communication.

**Objectives:** To evaluate the perception of undergraduate dental students about team-based learning in one of the oral radiology courses.

**Materials and methods:** We performed TBL for second year undergraduate dental students on a clinically oriented topic in one of the oral radiology courses. An online anonymous questionnaire was distributed among 35 students after a TBL session. Quantitative and qualitative responses of students were collected and statistically analyzed.

**Results:** Thirty students attended this TBL session. More than half of the participating students found that TBL is more engaging than the traditional lectures and they required more TBL sessions for coverage of clinically oriented topics. Nearly 80% of participants agreed that teamwork in TBL is an effective way to regasp what they had learnt to solve problems and they were actively engaged in discussion and critical thinking.

**Conclusion:** The team-based learning method promoted student self-learning and enhanced their critical thinking with improvement of teamwork behavior and communication skills. The students appreciated the significance of team interaction and discussion to foster students engagement, problem solving skills and critical exploration.

**KEYWORDS:** Perception, students, team-based learning

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## INTRODUCTION

Undergraduate dental and medical education have been extensively dependent on traditional teaching methods to deliver large amount of information which needed to build the knowledge base of the students but unfortunately with less student/educator interaction <sup>(1)</sup>.

However, some courses like oral radiology, the traditional lectures may not be beneficial for development of analytical thinking and problem-solving skills essential for upcoming clinical practice and radiographic interpretation. <sup>(2,3)</sup> So, it is essential to incorporate more student-centered methods to increase student interaction, attention and prepare them for the real clinical practice.

Student centered learning recently becomes the major target of higher educational institutes. The students' engagement and interaction are always a major concern of teachers <sup>(4)</sup>. The integration of active learning methods into the classroom has been exhibited to intensify student concentration, implementation, and elaboration of long-lasting learning skills. <sup>(5-7)</sup> Active learning is a student-centered teaching procedure that utilize interactive, variable approaches to generate a more attractive classroom environment compared with the traditional informative lecture. <sup>(8)</sup>

Team-based learning (TBL) is an interactive educational strategy which is largely used in medical colleges as it provides efficient interactive learning environment, enhances critical thinking and supports students' communication. In TBL single facilitator can accomplish several minor groups at the same time. Thus, TBL has acquired significance due to its capacity to endorse active learning deprived of necessity of great number of instructors. <sup>(9)</sup>

TBL is a dynamic small group teaching and learning methodology that inspires students and offers cooperative efficient learning environment

with appreciation of combined productive outcome. TBL is as an effective instructional strategy which is practicable and efficient in the medical and dental education. <sup>(10)</sup>

This study will explore the perception of undergraduate dental students about about team-based learning versus lectures in one of the oral radiology courses.

### Aim of the study

This study aimed to evaluate the perception of undergraduate dental students about team-based learning versus lectures in one of the oral radiology courses.

## MATERIAL AND METHODS

This cross-sectional study was accomplished in College of Dentistry, Princess Nourah University (PNU) Saudi Arabia. A survey study was conducted, and an online anonymous feedback questionnaire was distributed among 35 of 2nd year undergraduate dental students attending TBL session in the oral radiology class.

There were three stages in the presentation of TBL. At the first phase, before TBL a learning resource about the selected topic "Guidelines for prescription of dental diagnostic radiographs" was uploaded in the blackboard electronic learning website one week before TBL session with the guided instructions from the course co-director. The learning resource included the reading material, and class time was used for TBL activity and discussion.

In the second phase, during the first 10 minutes of TBL session students had to solve online case-based questions about the selected topic in an individual way, then retake the same questions for 20 minutes to be solved by groups, usually including 7 to 8 students.

In the third phase, the questions were answered by instant feedback from instructors. Group

discussion with instructors enabled students to learn new knowledge and to solve the case-based questions with their colleagues then take feedback from instructors.

After the TBL, a feedback questionnaire distributed to the 30 students who attended the class to evaluate their perceptions about TBL. The questionnaire was modified from a previous study, (Table 1) <sup>(11)</sup> with 5-point Likert scale questions, where 1 = strongly agree, 2 = agree, 3 = neutral, 4 = disagree, and 5 = strongly disagree. The questionnaire composed of 14 multiple choice questions, and two open ended questions.

Quantitative and qualitative responses of students were collected and statistically analyzed.

Ethical approval request was provided from PNU institutional review board (IRB).

### Statistical analysis

Data were presented as frequency and percentages using SPSS 18.0 (Statistical Package for Scientific Studies, SPSS, Inc., Chicago, IL, USA) for Windows. Microsoft EXCEL was used to generate representative figures.

### RESULTS

Thirty students attended this TBL session. 24 out of 30 students answered an online questionnaire with response rate 80%. Results are summarized in table (1) and Fig. (1)

TABLE (1) Rating the percentage of the different responses to the questionnaire

Question	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1-Are you satisfied with the traditional way of learning (lecture) in Oral Radiology course?	62.5	25.0	8.3	4.2	0
2-Does TBL is more engaging than the traditional classroom?	20.8	29.2	25	12.5	12.5
3-Does TBL promotes greater opportunities to communicate with other students?	41.7	37.5	12.5	8.3	0
4-Are you more motivated to learn with TBL?	16.7	25	16.7	37.5	4.2
5-The group discussions permitted me to improve my learning than individualized learning?	41.7	8.3	16.7	25	8.3
6-I have been able to relate knowledge to solve clinical based problems during TBL?	20.8	45.8	25	4.2	4.2
7-TBL sessions stimulated interaction, discussions, and clearance of doubts?	54.2	16.7	16.7	12.5	0
8-I was actively engrossed in critical thinking during TBL?	29.2	50	8.3	8.3	4.2
9-I understand better in Lecture classes than in TBL sessions?	33.3	16.7	37.5	8.3	4.2
10-I need more TBL sessions for handling of clinically oriented topics?	16.7	25	33.3	16.7	8.3
11-Solving problems in a team is an effectual method to regrasp what I have learnt?	37.5	41.7	20.8	0	0
12-Do you like the idea of team working and discussion in TBL?	37.5	33.3	12.5	12.5	4.2
13-Do you like the use of technology in TBL?	45.8	29.2	12.5	12.5	0
14-TBL format is useful in developing my analytical skills?	37.5	33.3	16.7	12.5	0

### Open ended questions

Results are summarized in table (2) and Fig. (2-3)

**Q15** What you liked the most in TBL? 15% of the students liked the interaction, 10% found TBL fun, Interesting and useful, 10% most liked interchanging experience with peers and instructors, 10% learned new ways of thinking and critical thinking and 10% found the information clearer and more understandable. In addition, students stated that TBL was time efficient, improved their team working and problem-solving skills and helped

engaging with the lecture.

**Q16** What are your suggestions about other ways to improve oral radiology learning?

Students suggested more classes/ more examples for radiographs of anatomy or lesions (21.5%), Extra TBL sessions (14.5%), extra practicing sessions (14.5%) and that the basis of the topic be explained ahead of the TBL (14.5%). Other suggestions included extra activities, revisions, traditional lectures, using PBL and clearer references.

TABLE (2) Rating (in percentage) of different responses to open ended questions

Question	Response	Percentage
15- What you liked the most in TBL?	Fun, Interesting and useful	10
	Learning from mistakes through group discussion	15
	Interactive	15
	Interchanging experience with peers and instructors	10
	Time efficient, simplify information	5
	More Understandable/clear	10
	Learning ways of thinking/critical thinking	10
	Working in groups	5
	New way to learn	5
	Engaging more with the lecture	5
16- What are your suggestions about other ways to improve oral radiology learning?	Solving problems	5
	Use more activities (not blackboard assignment)	7
	Provide clearer references	7
	Extra TBL sessions with approachable instructors	14.5
	More classes/ more practice on radiographs for radiographic anatomy or lesions	21.5
	Learn about the subject or the basis of it before doing TBL	14.5
	Revisions	7
	Traditional lectures	7
Add PBL	7	
More lab/practicing sessions	14.5	

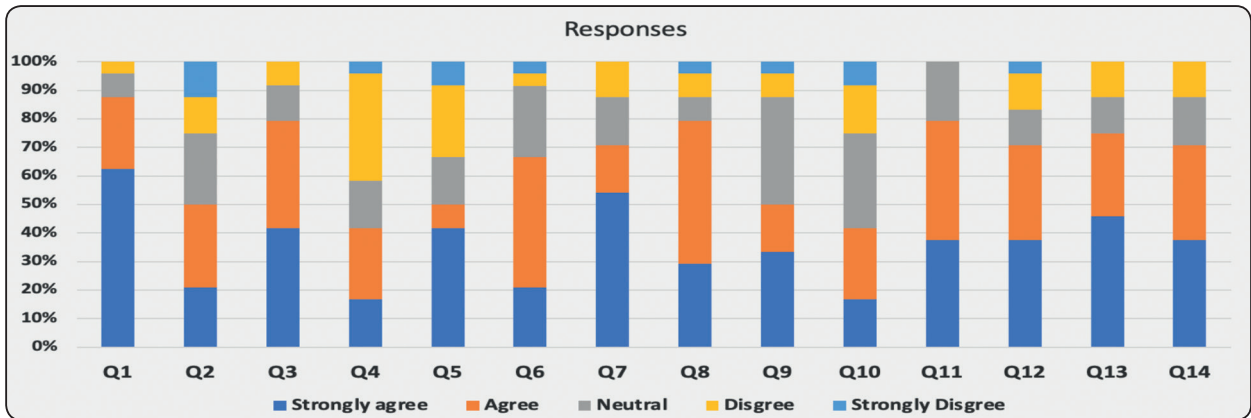


Fig. (1) Bar chart illustrating rating (percentages) of different responses

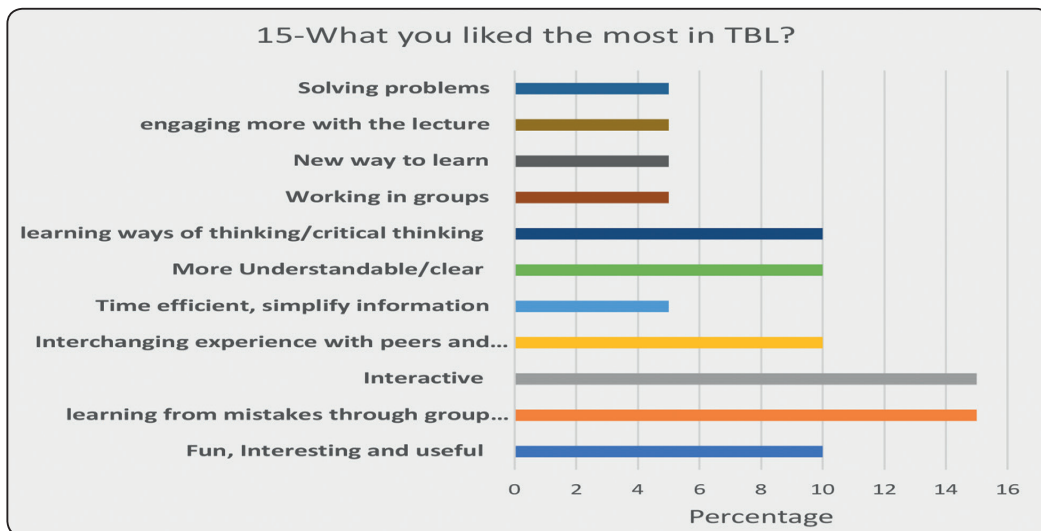


Fig. (2) Bar chart illustrating rating (percentages) of different responses to Q15

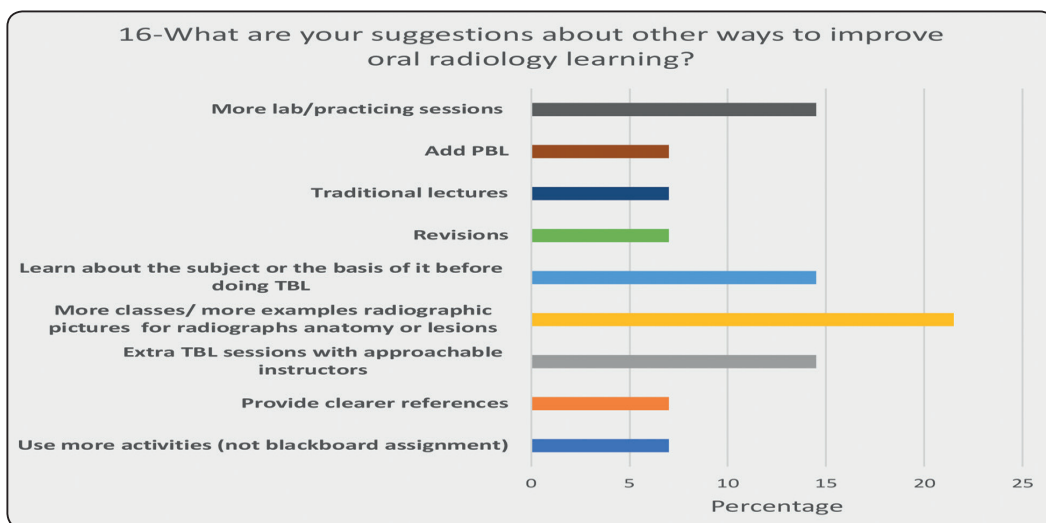


Fig. (3) Bar chart illustrating rating (percentages) of different responses to Q16

## DISCUSSION

For many years, lecture-based learning is the conventional teaching method in higher education which is a teacher centered pedagogy. Frequently, most of the courses in medical and dental colleges depend frequently on traditional lectures where the students are passive listeners without interactions.<sup>(12)</sup> These traditional lectures are not applicable to achieve the learning outcomes of some clinical courses like oral radiology course which incorporate providing the students with variable practical skills like, interpretation of images and analytical thinking.<sup>(11,12)</sup>

There are many recent interactive teaching and learning approaches like case-based learning, problem-based learning (PBL), and team-based learning (TBL) which are very effective in dental and medical colleges. TBL was started as a small group learning approach in business courses which proved to improve student learning through motivation, group work and application of knowledge to analyze the data and solve problems.<sup>(11)</sup>

TBL is very beneficial pedagogical approach as it enhances students' ability of group work, collaborative learning, discussion, and analytical thinking.<sup>(14)</sup> As well as TBL requires small teacher-student ratio as one teacher can manipulate and mentor large number of students in comparison to PBL.<sup>(15)</sup>

Oral radiology course composed of theoretical and practical parts which are essential to build students' knowledge base, correlate theory with practice and improve practical skills accordingly. Oral radiology course always integrates two- and three-dimensional radiographs which require time and investigative skills to be analyzed and this need more practice from students to identify oral diseases and reach provisional diagnosis. The image examination and interpretation using analytical skills couldn't be obtained from lecture-based learning approach alone and oblige the application of other interactive learning methods like PBL and TBL. Also, students' feedback is the basis for

assessment of any learning methodology to achieve the active learning and to be sure that the required standards are accomplished. Up to our knowledge, there is few research discussing the significance of TBL in oral radiology and student perception. So, the current study aimed to assess the perception of dental undergraduates for TBL versus lecture in topic of guidelines for radiographic prescription in oral radiology course.

The current study reported that more than 50% of the participating students found that TBL is more engaging than the traditional classroom and 41.7% students required extra TBL assemblies for handling of clinically oriented topics, while more than 87% satisfied with the traditional lecture as a way of learning. This was in harmony with Vasudha Kulkarni et al. 2014 study<sup>(11)</sup> who reported that more than half of the students in this study have valued TBL promisingly in terms of critical thinking, understanding, motivation to study and applied learning. And, in Vasudha Kulkarni et al. 2014 study<sup>(11)</sup> most of the students preferred TBL to be better than traditional lecture approach.

In the present study 50% of the students approved that the group discussion permitted them to develop their learning than personal learning. Nearly 80 % of participants agreed that teamwork in TBL is an effective way to regasp what they had learnt, to solve problems and to actively engaged in discussion and critical thinking. This was in accordance with Vasudha Kulkarni et al. 2014 study<sup>(11)</sup> who found that more than 70% of students strongly agreed that teamwork is an efficient and highly engaging way to solve problems, to promote higher level of interaction between students and to enhance motivation.<sup>(16)</sup>

In the present study 80% of students agreed that TBL promoted more chances to communicate between students and more than 70% of the students liked the idea of team working, discussion and the use of technology in TBL. While in Vasudha Kulkarni et al. 2014 study<sup>(11)</sup> 16.28% of the students



reported that TBL allowed cooperative learning with teamwork behavior and better communication.

Regarding the last two open ended questions, the first one about what the students liked the most in TBL, 35% of the students liked the interaction, found TBL fun, Interesting and useful, 10% most liked interchanging experience with peers and instructors, 10% learned new ways of thinking and critical thinking and 10% found the information clearer and more understandable. In addition, students stated that TBL was time efficient, improved their team working, problem-solving skills and helped them engaged with the lecture. This agreed with Gary L. Neider, Dean X. study 2004<sup>(17)</sup> who stated that TBL developed special skills needed for collaborative learning like communication skills, groupwork, active interaction and leadership.

Concerning the second question about students' suggestion for other ways to improve oral radiology learning. 34% of students suggested more classes/more practice on radiographic pictures for radiographs anatomy or lesions. Extra TBL sessions were recommended by 14.5% of students, and 14.5% suggested explaining the topic ahead of the TBL. Other suggestions included extra activities, revisions, traditional lectures, using PBL and clearer references.

The analysis of the student's responses for feedback online questionnaire on TBL revealed that most of the students strongly agreed or agreed that TBL session helped them cooperate to solve case-based questions, increased their motivation, and support their learning with the help of the immediate feedback from instructors.

## CONCLUSION

The team-based learning pedagogy promoted student self-learning and enhanced their critical thinking with improvement of teamwork behavior and communication skills. The students appreciated the significance of team interaction and discussion to foster student engagement, problem solving skills, analytical skills.

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