



Peer-assisted Learning Associated with Team-based Learning in Dental Education

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Abstract

Peer-assisted learning is one of many educational strategies that can assist students' learning and their professional development. Its value could be enhanced if combined with a student centered learning strategy such as team-based learning.

Purpose: The aim of this pilot study is to evaluate the impact of peer-assisted learning associated with team-based learning on the learning experience of dental students.

Method: Forty-two dental students participated in peer-assisted learning associated with team-based learning activities and 6 of them took the role of tutors in the team-based learning sessions. A structured on-line questionnaire was sent to 42 students to evaluate their perception regarding the impact of peer-assisted learning associated with team-based learning on their learning experience. Thirty-eight (90.5%) participants out of 42 answered the questionnaire. Sixteen students volunteered to participate in focus-group interviews for verification of the questionnaire responses.

Results: Thirty-two participants (84%) agreed that peer-assisted learning associated with team-based learning improved the way they study and increased their interest in the subject. Thirty-five students (94%) indicated that they enjoyed this learning experience. In addition, they would recommend this program to their colleagues. Thirty-one (82%) agreed that peer-assisted learning associated with team-based learning improved their teaching skills. Furthermore, thirty-one students (82%) indicated that it increased their communication skills. All participants agreed that they were satisfied with the overall program. The results obtained from both students' survey and focus-group interviews were consistent.

Discussion: Our findings suggested that peer-assisted learning associated with team-based learning was a valuable strategy to enhance learning among students. It can also provide these students with teaching experience which could help their professional development.

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1. Introduction

Peer-assisted learning (PAL) is one of many educational strategies that can assist students learning in many higher education institutes. PAL is defined as people from similar social groupings who are not professional teachers helping each other to learn and

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learning themselves by teaching.¹ The important points to note are that those helping their peers to learn have less extensive knowledge of subject matter but they are from similar social groupings to the learners and not necessarily from the same course or year of study. The PAL rationale lies in the fact that students, whether tutors or tutees, share a similar knowledge base and learning experience, which allows the peer tutors to use language that their learners understand and to explain concepts at an appropriate level.^{2,3} Furthermore, student learners feel more comfortable with peer teachers because of their similar social roles. This phenomenon is called “social congruence”.^{4,5} There are many benefits of PAL mentioned in the medical education. These include alleviating the faculty teaching burden, providing role models for junior students, enhancing intrinsic motivation, and preparing physicians for their future role as educators. Evidence suggests that participation in PAL can provide leadership, coaching, learning skills training, enhance confidence and intrinsic motivation, and may also promote an interest in academic careers.^{5,6}

Team-based learning (TBL) is an active learning, student-centered, holds students responsible for their preparation for class engagement, and expects them to apply knowledge to solve real problems.⁷ It is a flexible strategy, well suited for large or small classes, and only requires one instructor. TBL provides frequent opportunities for peers to enhance learning as students discuss together to reach a consensus decisions. Faculty encourage teams to explain and support their choices to other teams, and give justification for the best answer. In addition, application questions require students to employ critical thinking, rather than to retrieve relevant knowledge. Faculty often observe considerable energy and engagement of students during discussions.⁸ Adding TBL as the main approach of teaching, can enhance student-centered education and support cognitive and meta-cognitive students' competencies.⁹ Studies of the impact of peer-teaching on students' academic performance have led to contradictory results.^{10–14} However, researchers agree that peer-teaching does strengthen the student-teacher's own knowledge and skills, so learning is reinforced by teaching the material to others.¹ Research into cooperative learning has shown that such learning processes enhance students' achievement and positively enhance self-esteem and the ability to work cooperatively.¹⁵

PAL can be related to constructivism as learning being an active process and learner take control over the learning process. Adults adopt this process of constructivism as they become self-directed learners,

become aware of context, and appreciate the active process enabled by experiential learning.¹⁶ PAL draws on cooperative learning as small groups of students work together to maximize their own and each other's learning.¹⁷ It is an extension of experiential and self-directed learning.

Team based learning demonstrates the value of the constructivism theory of learning. It incorporates group dynamics and problem solving approaches using real-life problems.¹⁸ Students perform tasks, which health care professionals are facing in real life. To perform the tasks, students employ an active learning process and are responsible for their learning. Learning results from the process of understanding the concepts and mechanisms underlying these tasks.¹⁹ Students in TBL develop interpersonal and team skills through immediate feedback on how well they have used their knowledge in making decisions.²⁰ Hence, TBL is an instructional strategy that is an excellent fit with structured PAL program intended to enhance students' learning. There are many papers about TBL only as well as PAL but we could not identify any research in PAL literature that used TBL as a teaching method for the intervention. Hence, this project is using a novel approach of PAL associated with TBL in high education.

The aim of this study is to evaluate the impact of combining two student-centered educational strategies of PAL associated with TBL on student learning and social development. The objectives of this project are to develop a pilot module of PAL initiative using TBL as the main approach of teaching, and to evaluate students' perceptions of PAL when combined with TBL as an educational strategy to enhance dental students' learning. In order to measure the impact of PAL associated with TBL on students' learning experience, on-line questionnaire and focus group interviews were used.

2. Methods

2.1. Participants

All second year students enrolled in the dental college (BDS program) of the University of Sharjah during 2014–2015 were invited to participate in this study on voluntary basis. Forty-two out of 100 students (42%) volunteered to participate in the study. The 58 remaining students followed the regular course activities as lectures, laboratory, and tutorial sessions. The 42 participants were randomly divided into six groups with one student tutor in each group. All participants signed a consent form specifying that their participation

was voluntary and they could withdraw at any time without affecting their relation with their instructor or their grades.

2.2. Preparation

Two hours of PAL sessions per week for 6 weeks were introduced in the time-table of year two dental students during the first semester 2014–2015. An intensive workshop about TBL, and how to write questions appropriate for TBL was offered to all participating students. In TBL, individual learners were usually asked first to complete a multiple-choice exam to assure their readiness to apply their knowledge (IRAT). Then, groups of learners (team) were asked to collectively answer the same questions (GRAT). This small group learning provided students with rich opportunities to explore, explain, and understand course material while learning how to communicate, collaborate and problem-solve.⁷

Learners are motivated to prepare for class to do well on both IRAT and GRAT. Further motivation to actively participate in the team decision-making comes from the grading of GRAT. Immediate feedback on both individual and team performance is essential so that students know their level with respect to understanding the content and its application.²⁰ Finally, the tutor should give the right answers and clarification on concepts that their peer tutees have been struggling with and to wrap up with a summary of important concepts and issues.

The ethical approval was obtained from the University Medical and Health Sciences Institutional Review Board.

2.3. Pre-class phase

The teaching materials (lecture notes, text-book chapters and reference list) were posted for all students on the Black Board at the beginning of each week, and participating students were asked to study the materials and prepare themselves to answer related questions. IRAT and GRAT questions were prepared each session by a different student tutor and were reviewed by the instructor of the course.

2.4. In-class phase

The same student tutor who prepared the questions took the role of instructor in class. Student learners were asked to complete a multiple-choice exam to assure their readiness to apply their knowledge (IRAT). The six

groups of seven student learners in each group were asked to collectively discuss and answer the same questions (GRAT). Subsequently, the student tutor provided immediate feedback on both individual and team performance and the right answers and clarification on concepts that learners had been struggling with and wrap up with a summary of important concepts and issues.

2.5. Evaluation

In order to assess the impact of PAL using TBL on students' learning experience, a structured on-line questionnaire and focus group interviews were used. The on-line questionnaire was prepared and given to student representatives from each group to be tested for clarity and validity. The questionnaire was modified several times in line with students' feedback. The questionnaire was divided into three main categories: the first part was about the PAL/TBL program itself, the second about the peer-tutors' performance, and the third about tutees' performance. Tutor questions focused on the extent to which they prepared themselves, the adequacy of the tutor training, and the benefits they perceived from participation in this educational experience. Tutee questions asked about the appropriateness and timing of PAL/TBL interactions and the extent to which the tutors' contributions were seen as useful. Tutee's were also asked whether they have gained any new insight regarding the course contents. After the six sessions of PAL/TBL, the questionnaire was sent electronically to all 42 participants and they were asked to answer it on-line. At the end of survey students were asked two open-ended questions about the strength of PAL/TBL and their suggestions to improve it in the future.

In order to validate the questionnaire and the collected data, focus group interviews were conducted with 16 out of these 42 students. Two focus groups were held and interviews were recorded after asking the participants' permission. The two interviews lasted about 40 minutes each. Data analysis was conducted using simple descriptive analysis.²¹ The authors, read the transcripts several times to identify recurring words, which then were placed into specific categories, where finally, themes emerged through capturing the experience of participating students.

3. Results

Thirty-eight (90.5%) participants out of 42 answered the questionnaire. All respondents agreed that the aim of PAL/TBL was clearly explained and the questions were related to the course objectives. Thirty-five (92%)

participants agreed that the study materials were posted well enough before the TBL sessions. Thirty-four (89%) students agreed that sessions were organized and well-prepared. Thirty-four students also agreed that timing of the sessions was adequate and convenient. The majority of participants ($n=35$, 94%) indicated that they enjoyed this learning experience. In addition, they ($n=36$, 97%) would recommend this program to their colleagues.

The participants were asked if they think that PAL/TBL improved their teaching skill. Thirty-one (82%) students agreed, whereas seven (18%) were not sure. The majority of the participants ($n=35$, 91%) agreed that peer tutors were able to explain relevant materials. Thirty-one students (82%) agreed that peer tutors were academically prepared for TBL. Thirty-four students (89%) indicated that tutors were helpful and provided support to the tutees. In addition, 32 respondents (84%) agreed that tutors understood tutees' needs. Thirty-four (89%) participants indicated that they felt comfortable working with peer tutors.

Thirty-two participants (84%) agreed that PAL/TBL improved the way they study and increased their interest in the subject. The participants were asked if the tutees were prepared for TBL sessions. Thirty-five (92%) agreed whereas only two students (5%)

disagreed. Thirty-four participants (89%) indicated that PAL/TBL made them study on regular basis.

Regarding social interaction with their classmates, almost all participants ($n=36$, 94%) agreed that PAL/TBL improved their social interaction. Thirty-one participants (82%) indicated that PAL/TBL increased their communication skills. All participants agreed that they were satisfied with the overall program.

Fourteen out of 38 responded participants (37%) provided 21 responses for the first question about the strengths of PAL associated with TBL. Most of the students found PAL/TBL interesting. They also found that PAL/TBL helped them in their study. Participants also mentioned that PAL/TBL helped them understand the subject covered better and allowed them to test their understanding of the subjects covered. It was also mentioned that PAL/TBL organized students' time and obliged them to study on regular basis. Participants indicated that they were comfortable working with their peers and the environment was relaxed which made them perform better.

Six out of 38 participants (16%) provided suggestions for improvement such as; adding games or flashcards to be used with other subjects “if we could add more subjects such as biochemistry”, “peer tutor can summarize the study materials that will be included in TBL session and share it with the students”. Only

Table 1
Thematic analysis of focus group interviews.

Themes	Sub-themes	Quotations
1. The effect of PAL/TBL on learning	PAL/TBL was effective	<i>“I personally found it extremely effective, since I discovered in a competitive environment you tend to do better”</i>
	PAL/TBL was interesting	<i>“It is very interesting.... we had a lot of fun”</i>
	PAL/TBL modified the way of studying	<i>“it makes you critically think about the subject. ... and think more out of the box.”</i>
	PAL/TBL was stress free	<i>“It took out the pressure of time, pressure of marks, pressure of being judged for your mistakes, and also took away the element of stress that you feel”.</i>
2. The effect of PAL/TBL on teaching	PAL/TBL improved tutors teaching skills	<i>“ It also makes you more responsible to have a broader knowledge to teach others”</i>
	Tutors felt comfortable, not threatened	<i>“The environment was supportive as I would be teaching my friends and colleagues, not threatening.”</i>
	PAL/TBL motivated tutors to work harder	<i>“I should understand what the subject in order to be able to test the group about.”</i>
3. The effect of PAL/TBL on communication and social skills	PAL/TBL helped in communication	<i>“I think it helped me in my communication skills...because I can persuade them which is part of the communication”</i>
	PAL/TBL encouraged students to ask questions	<i>“I feel embarrassed to ask in the lecture, but in PAL I feel free to ask because they are my colleagues.”</i>
	Increased participants' self confidence	<i>“It increased his confidence and that he learnt to better communicate his arguments.”</i>

one student suggested that TBL questions should be written by the course instructor not by peer tutors “*I think questions should have been put by doctor herself because student's knowledge is not enough for others to increase their studying skills!*”. The results obtained from the thematic analysis of focus group interviews were summarized in [Table 1](#).

4. Discussion

This study indicated that PAL/TBL can improve students' learning experience, teaching skills, develop their social skills and team work. These results have emerged as a feedback received from the students' feedback and focus group interviews, which were congruent and matching the literature regarding the value of PAL and TBL.^{5–7} It was difficult to measure whether participation in PAL/TBL activity increased academic achievement of students because PAL/TBL outcomes are multi-factorial as most of educational interventions.

Students were comfortable working with peer tutors. This is in concurrent with constructivism and ‘zone of proximal development’.²² Peer tutors are able to understand, and to express themselves at students' level of knowledge.²³ Most participants also indicated that PAL/TBL improved the way they study and increased their interest in the subject. PAL/TBL leads to the development of critical thinking and can help students develop life-long learning through gaining competence in reflecting and expanding on their own knowledge.²⁴

Regarding social interaction with their classmates, and communication skills almost all participants agreed that PAL/TBL increased their communication skills, which support the evidence that PAL can enhance confidence and intrinsic motivation, and promote an interest in academic careers.²⁵ Furthermore, students during TBL develop interpersonal and team skills through immediate feedback on how well they have used their knowledge in making decisions.²³

Participants valued working in a stress-free environment where they can ask questions without feeling judged. PAL has the advantage of increased opportunities for expression and questioning, increased chances to make errors in a supported setting and reduced anxiety.¹ In general students perceived PAL/TBL as a positive experience and they would recommend it to their colleagues. They strongly felt that PAL/TBL helped them improving their teaching, communication and social skills.

The increasing numbers of students created pressure on teaching faculty to provide enough feedback on

learning and assessments. Peer tutors can provide immediate feedback¹, and therefore activities undertaken in PAL/TBL can be an important formative assessment component. In addition, it allows more individualized attention and time without the pressure of summative assessment. It can be cost-effective if generalized to other courses as it frees academic staff from the time consuming tutorials. This pilot study has encouraged the college to generalize it in other courses.

In conclusion, PAL associated with TBL was a valuable strategy to enhance learning among students. It also provided these students with teaching experience and social skills, which could help their professional development.

Disclosure

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