

Team-Based Learning in Dentistry teaching: what do students think?

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ABSTRACT

Team-based learning (TBL) is a dynamic method that provides a motivating and cooperative environment, with appreciation of collective production. The aim of this paper was to analyze the perception of undergraduate dentistry students of a Brazilian university on the TBL method. This is a cross-sectional study with convenience sample (n = 83), in which each student answered a self-administered questionnaire - Student's TBL Evaluation Instrument. Data were analyzed based on descriptive statistics. Moderate, acceptable internal consistency (Cronbach's alpha = 0.736) was found. The means of answers obtained indicated that students showed preference and satisfaction regarding the use of the TBL method, being able to arouse greater sense of responsibility. The application of the TBL method was positively perceived by almost all dentistry students.

Descriptors: Team-Based Learning. Active Methodologies. Dentistry.

1 INTRODUCTION

The construction of knowledge has been the main focus of contemporary undergraduate courses due to the continuous changes of the learning process.

Today, students enter university with a expectations and study habits that differ from those of previous generations. Often, classroom moments become a long period of exhaustion, in which teachers and

students end up falling into an academic routine that seems not to be renewed over time¹.

From this perspective, it is essential to overcome the concept of banking education, in which the teacher makes the deposit of contents, while the student is obliged to memorize them, or the licentious practice, of individuals on their own fate, in a void of those who do and undo according to their free will². In contrast to traditional methods, active learning methodologies emerge, which are educational methods that enable learners to engage in the learning process, placing them in the control of their own path of knowledge construction³.

Team-based learning (TBL) represents one of these active methodologies and was originally developed for business courses in the 1970s by Larry Michaelsen aimed at large classes. These methodologies sought to create opportunities and obtain the benefits of working in small learning groups so that teams of 5 to 7 students were formed to work collaboratively in the same physical space. In 2001, the US government decided to fund health science educators to incorporate new teaching strategies, and TBL was chosen to be implemented⁴. This instructional strategy has been shown to be viable and effective in medical education and other health areas^{5,6,7}.

The contemporary world of work demands the formation of professionals with critical-reflexive profile and able to work collectively. In this context, TBL is a dynamic method that provides a motivating and cooperative environment where collective production is valued. Students are motivated to participate, which makes the educational environment more interesting, minimizing the lack of interest

in learning⁸.

Some studies have indicated that students of health education programs often have positive perceptions of the TBL approach^{5,9}. However, these investigations were applied to North American and Asian students, and the application of the perception assessment method to Brazilian dentistry students was not found in literature. This study aimed to analyze the perception of dentistry students of a Brazilian university on the team-based teaching and learning methodology in two curricular components through the Team-Based Learning Student Assessment Instrument / TBL-SAI.

2 METHODOLOGY

This was a cross-sectional study with convenience sample composed of students regularly enrolled (n = 83) in two subjects (Biosafety and Ergonomics 2; Oral Pathology), in the second semester of 2017 of the dentistry course of a Brazilian university. The study was approved by the Institutional Research Ethics Committee under number 81177017.5.0000.5208. Subjects who agreed to participate, by reading and signing the informed consent form, who had completed the respective subjects in classes in which TBL was used were included. Students who failed by attendance were excluded from the study.

The two subjects under study are curricular components of the fourth semester of the undergraduate dentistry course in which TBL was used as teaching-learning methodology. At the beginning of the semester, each subject using its methodology was presented, forming teams with 6 to 8 students with heterogeneous profile, whose composition remained fixed throughout the semester. There are three phases in the TBL method. In phase I,

known as pre-class preparation, the teacher indicated readings and provided a study script with objectives and goals. In phase II, each student answered ten multiple-choice questions (individual knowledge assurance step), and then students were brought together in their respective teams and answered the same test as a team (team knowledge assurance step). After these activities were completed, the teacher would gather the class for content sedimentation (phase III).

Each participant individually answered the TBL-SAI, a self-administered questionnaire, characterized by being an assessment tool specifically designed to analyze students' perceptions on TBL with 33 questions, whose answers are on a Likert scale¹⁰. This questionnaire was validated for the Portuguese language in a previous study¹¹. TBL-SAI consists of three subscales: (1) responsibility, consisting of eight items; (2) preference for traditional class or TBL, consisting of 16 items; and (3) student satisfaction, comprising nine items.

Data were entered in an Excel spreadsheet and descriptively analyzed (means, medians, standard deviation). To assess the degree of internal consistency of the questionnaire, Cronbach's alpha was obtained. For inferential statistical analyses, the SPSS software version 23 was used.

3 RESULTS

A total of 82 students answered the electronic forms, with response rate corresponding to 98.79% of the 83 students enrolled in subjects under study. The sample consisted of predominantly female students (78%, $n = 64$) compared to male students (22%, $n = 18$). Reliability assessment (internal consistency) with the

application of the Cronbach's alpha test was 0.736, which indicated moderate acceptable degree of internal consistency.

Results were distributed according to the following subscales: responsibility (table 1), method preference (table 2) and student satisfaction with the TBL method (table 3).

Table 1 shows that all responses positively reaffirm the student's sense of responsibility when using the TBL method, especially when asked about individual contribution to collective learning. Most students also claimed to make better use of time with previous studies to improve their performance during activities. Although most students reported feeling proud of their group contribution, a small part of students do not feel responsible for peer learning.

Regarding the preference for lecture / traditional class or the TBL method, as shown in table 2, the results indicate that there is a tendency towards greater distraction, drowsiness, boredom and presence of parallel conversations during traditional classroom. Only 1.2% of students agreed that they are distracted with TBL activities. Another relevant aspect was the students' agreement to affirm that the TBL method helps them to remember the present subject and past information, helping students to achieve their best performance at the moment of evaluations.

Table 3 provides information related to student satisfaction. All respondents disagreed with the statement that the TBL method would be a waste of time, and none reported they did not like teamwork. Another relevant aspect was the agreement by more than 80% of students regarding issues such as good experiences and the pleasure and effectiveness of team activities and studies, as well as the improvement of school performance with this method.

Table 1. Responses for the TBL-SAI “Responsibility” subscale

| QUESTIONS | ANSWERS | | | | | | | | | |
|---|---------------------|------|----------|------|----------------------------|------|-------|------|------------------|------|
| | Completely disagree | | Disagree | | Neither disagree nor agree | | Agree | | Completely agree | |
| | n | % | n | % | n | % | n | % | n | % |
| Q1. Do you use your time to study before class to be more prepared? | - | - | 3 | 3.7 | 6 | 7.3 | 21 | 25.6 | 52 | 63.4 |
| Q2. Do you feel that you need to prepare for class for better performance? | - | - | 1 | 1.2 | 2 | 2.4 | 12 | 14.6 | 67 | 81.7 |
| Q3. Do you contribute for the learning of your team members? | - | - | - | - | 4 | 4.9 | 28 | 34.1 | 50 | 61.0 |
| Q4. Is your contribution to the team important? | 68 | 82.9 | 11 | 13.4 | 3 | 3.7 | - | - | - | - |
| Q5. Do team members expect you to help them with their learning? | - | - | 1 | 1.2 | 16 | 19.5 | 30 | 36.6 | 35 | 42.7 |
| Q6. Are you responsible for the learning of your group? | 2 | 2.4 | 13 | 15.9 | 18 | 22.0 | 29 | 35.4 | 20 | 24.4 |
| Q7. Are you proud of your ability to help team members with their learning? | 1 | 1.2 | - | - | 19 | 23.2 | 29 | 35.4 | 33 | 40.2 |
| Q8. Do you need to contribute to your team's learning? | - | - | 3 | 3.7 | 10 | 12.2 | 31 | 37.8 | 38 | 46.3 |

Table 2. Responses for the TBL-SAI “Preference for Lecture / Traditional Class or TBL” subscale

| QUESTIONS | ANSWERS | | | | | | | | | |
|--|---------------------|------|----------|------|----------------------------|------|-------|------|------------------|------|
| | Completely disagree | | Disagree | | Neither disagree nor agree | | Agree | | Completely agree | |
| | n | % | n | % | n | % | n | % | n | % |
| Q9. During a traditional class, do you almost always find yourself thinking about things not related to the class? | 7 | 8.5 | 20 | 24.4 | 13 | 15.9 | 23 | 28.0 | 19 | 23.2 |
| Q10. Are you easily distracted during a traditional class? | 5 | 6.1 | 16 | 19.5 | 10 | 12.2 | 28 | 34.1 | 23 | 28.0 |
| Q11. Are you easily distracted during team-based learning activities? | 40 | 48.8 | 35 | 42.7 | 6 | 7.3 | 1 | 1.2 | - | - |
| Q12. Is it easier for you to fall asleep during a lecture class than during classes that use team-based learning activities? | 1 | 1.2 | 4 | 4.9 | 2 | 2.4 | 30 | 36.6 | 45 | 54.9 |
| Q13. Do you get bored during team-based learning activities? | 40 | 48.8 | 33 | 40.2 | 7 | 8.5 | 2 | 2.4 | - | - |
| Q14. Do you talk about unrelated things during team-based learning activities? | 27 | 32.9 | 33 | 40.2 | 11 | 13.4 | 9 | 11.0 | 2 | 2.4 |
| Q15. Do you easily remember what you learn when you work as a team? | - | - | 3 | 3.7 | 9 | 11.0 | 33 | 40.2 | 37 | 45.1 |
| Q16. Do you remember the subject better when the teacher gives a lecture about it? | 6 | 7.3 | 7 | 8.5 | 18 | 22.0 | 29 | 35.4 | 22 | 26.8 |
| Q17. Do team-based learning activities help you remember past information? | - | - | - | - | 5 | 6.1 | 29 | 35.4 | 48 | 58.5 |

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Team-Based Learning in Dentistry teaching: what do students think?

continuation

| | | | | | | | | | | |
|--|----|------|----|------|----|------|----|------|----|------|
| Q18. Is it easier to study for tests when the teacher has given a lecture on the subject? | 1 | 1.2 | 5 | 6.1 | 18 | 22.0 | 27 | 32.9 | 31 | 37.8 |
| Q19. Do you remember information for longer time when performing / participating in activities: individual test + team test + group discussion + appeal + teacher's explanation? | - | - | 1 | 1.2 | 5 | 6.1 | 16 | 19.5 | 60 | 73.2 |
| Q20. Do you remember the subject better after classroom practice in team-based learning? | - | - | - | - | 2 | 2.4 | 27 | 32.9 | 53 | 64.6 |
| Q21. Can you easily remember the subjects taught in lectures? | 1 | 1.2 | 9 | 11.0 | 24 | 29.3 | 37 | 45.1 | 11 | 13.4 |
| Q22. After discussing with your team members, do you have difficulty remembering what was discussed during the class? | 28 | 34.1 | 45 | 54.9 | 8 | 9.8 | 1 | 1.2 | - | - |
| Q23. Do you perform better on exams when using team-based learning of subjects to study? | - | - | 4 | 4.9 | 13 | 15.9 | 33 | 40.2 | 32 | 39.0 |
| Q24. After attending the lecture, do you have difficulty remembering what the teacher said during class? | 15 | 18.3 | 37 | 45.1 | 15 | 18.3 | 13 | 15.9 | 2 | 2.4 |

Table 3. Responses for the TBL-SAI “Student satisfaction” subscale

| QUESTIONS | ANSWERS | | | | | | | | | |
|--|---------------------|------|----------|------|----------------------------|------|-------|------|------------------|------|
| | Completely disagree | | Disagree | | Neither disagree nor agree | | Agree | | Completely agree | |
| | n | % | n | % | n | % | n | % | n | % |
| Q25. Do you enjoy team-based learning activities? | 1 | 1.2 | - | - | 1 | 1.2 | 31 | 37.8 | 49 | 59.8 |
| Q26. Do you learn better when in a group? | 1 | 1.2 | 2 | 2.4 | 11 | 13.4 | 28 | 34.1 | 40 | 48.8 |
| Q27. Do you think team-based learning is an effective approach to learning? | - | - | 1 | 1.2 | 4 | 4.9 | 20 | 24.4 | 57 | 69.5 |
| Q28. Do you like working in teams? | 38 | 46.3 | 38 | 46.3 | 6 | 7.3 | - | - | - | - |
| Q29. Are team-based class activities fun? | - | - | 1 | 1.2 | 3 | 3.7 | 34 | 41.5 | 44 | 53.7 |
| Q30. Are activities of a team-based class a waste of time? | 64 | 78.0 | 18 | 22.0 | - | - | - | - | - | - |
| Q31. Do you think team-based learning has helped you to improve your school performance? | 1 | 1.2 | 2 | 2.4 | 13 | 15.9 | 31 | 37.8 | 35 | 42.7 |
| Q32. Do you have a positive attitude towards team-based learning activities? | - | - | 1 | 1.2 | 2 | 2.4 | 30 | 36.6 | 49 | 59.8 |
| Q33. Did you have a good experience with team-based learning activities? | - | - | 1 | 1.2 | 5 | 6.1 | 28 | 34.1 | 48 | 58.5 |

4 DISCUSSION

The high adherence of students to the questionnaire (98.79%) showed, according to the analysis of results, the positive impact of the TBL method on respondents, which can be observed by the positive scores obtained in the 3 subscales in which results were presented: sense of responsibility; method preference and satisfaction.

Another important aspect in this study is the majority of female students. In federal, state, and private universities, the number of female students is still lower than that of male students, although the presence of females in higher education is gradually increasing and more equal quantitative data between sexes are being observed. In the present study, the number of women was much higher when compared to men, 78% and 22% respectively, indicating that the increasing presence of women in higher education may contribute to a broader review of gender roles in society. Similar results were also found in a study involving the TBL methodology with medical students¹³.

During academic education, it is desirable for students to experience collective activities that exercise collaboration and cooperation. Especially in the health area, interprofessional perspective has been requested for professionals seeking insertion in the professional world¹⁴, who need to demonstrate teamwork skills, which is one of the pillars of the TBL method. According to the national curriculum guidelines of undergraduate dentistry courses, “graduates must be able to work in interprofessional, interdisciplinary and transdisciplinary teams¹⁵”.

In this research, students highlighted the benefits of teamwork and the importance of their individual contribution

to positive group outcomes. Similar experiences can also be found in other studies^{8,16}. In the particular case of future health professionals, interprofessional work based on teamwork is premise of the Unified Health System (SUS), which shows that the TBL method has great potential to prepare students for professional challenges of the 21st century when compared to the traditional teaching model, where there is unidirectional knowledge distribution from teacher to student².

Studies have shown that active teaching-learning methodologies not only encourage teamwork but also provide students with a positive response about this experience. A study using active methodologies with the elective discipline of Public Policy in Mental Health at the Federal University of Rio de Janeiro (UFRJ) with Medicine and Psychology students obtained 60% satisfaction in small group work, mainly with this tool as an aid for better learning¹⁷. In the present study, using TBL as active methodology, students reported being proud of their ability to help their group in learning (75.6%). They also reported that they need to contribute to their team (84.1%), showing that teamwork is well accepted by most students.

Another relevant aspect of the TBL method refers to the student's role in the pursuit of knowledge, playing an increasingly active role, no longer being a mere content receiver, effectively seeking knowledge relevant to learning problems and goals². In this study, students reported feeling more responsible with the TBL method, seeking the previous study to perform evaluative activities in order to improve results (89%). Other authors also found that the TBL method stimulates students to present a more active posture in the pursuit of knowledge, obtaining greater

involvement with this methodology, corroborating our results ^{6,18,19}.

A study at a Brazilian medical school concluded that students demonstrated their preference for TBL compared to the traditional classroom model, reporting that this teaching-learning methodology makes classes more dynamic, participatory and productive, stimulating greater study frequency and group interaction to perform the proposed activities ⁸. Similarly, in the results of the questionnaire applied in this research, students reported that in the TBL method, they feel less distraction, drowsiness or boredom in classroom; in addition, teamwork facilitates the memory of the content taught, consequently leading to better results in tests.

Traditional educational proposals based on teacher-centered transmission have been constantly challenged by innovative pedagogical proposals. This need for transformation in teaching-learning methods can be observed in this research, since 97.6% of students answered that they agree and totally agree with TBL activities, and 92.6% of them reported having a good experience with the TBL method. Data demonstrate the easy adherence of students to the TBL method, which is also found in other studies ^{6,16,19,20}. These results confirm the need for a progressive replacement of conservative teaching-learning methodologies by active methodologies, placing students as protagonists of the construction of their knowledge and the teacher as the bridge for this knowledge, but not an end in its midst ^{2,8}.

Students reported that the effectiveness of activities performed in classroom plus the teamwork of the TBL method helped to improve their school performance. Other studies using the TBL method with physiotherapy, medicine and

dentistry students showed higher grades obtained by student when compared to the traditional classroom model. In this investigation, 79.2% of students reported performing better on tests when using TBL in subjects and 93.4% of them reported that TBL activities help them remember information obtained in classroom. The better school performance of students using the TBL method points out that active methodologies are more effective for learning and fixing the approached knowledge. When used in a fixed denture module for dentistry students at a university in Japan, the TBL method was more effective when compared to traditional conservative methods ⁷.

The present study showed that the vast majority of students, over 80%, recognized the importance of TBL through extremely positive responses about their own improvement in group learning, its effectiveness and improvement in school performance, in addition to the fact that no student reported that this methodology is a waste of time. Similar results were also found in other studies ^{6,7,13,16,18-22}.

It was evident that the TBL method is a promising alternative for changing the conservative education model in force in the health area. However, it is necessary to highlight the need to expand the sample size, which was not possible in this research because the referred dentistry course has only two subjects that use this methodology. In addition, there is need to develop comparative studies on student performance with the TBL method in relation to the traditional learning model.

5 CONCLUSION

The TBL method was positively perceived by almost all students, being configured as a teaching-learning strategy to

be considered in the pedagogical planning of the curriculum components of dentistry courses.

RESUMO

Aprendizagem Baseada em Equipes no Ensino odontológico: o que pensam os estudantes?

A aprendizagem baseada em equipes (ABE) é um método dinâmico que proporciona um ambiente motivador e cooperativo, com valorização da produção coletiva. O objetivo do presente estudo foi analisar a percepção de estudantes do curso de odontologia de uma universidade brasileira sobre o método ABE. Tratou-se de estudo transversal com amostra de conveniência (n=83), no qual cada aluno respondeu questionário autoaplicável - Instrumento de Avaliação de ABE pelo Estudante. Os dados foram analisados a partir de uma estatística descritiva. Verificou-se uma consistência interna moderada, aceitável (Alfa de Cronbach = 0,736). As médias das respostas obtidas indicaram que os estudantes demonstraram preferência e satisfação quanto ao uso do método ABE, sendo este capaz de despertar maior sentimento de responsabilidade. A aplicação do método ABE em disciplinas do curso de Odontologia foi percebido de forma positiva pela quase totalidade dos estudantes.

Descritores: Aprendizagem Baseada em Equipes. Metodologias Ativas. Odontologia.

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