Peer Education: Reviews of the Literature (PERLs)

Articles selected by: Dental students and advisors at Midwestern University College of Dental Medicine–Illinois

Faculty advisors: Dr. Preetha P. Kanjirath, Associate Dean for Preclinical Education (pkanji@midwestern.edu), and Dr. M.A.J. (Lex) MacNeil, Dean, Midwestern University College of Dental Medicine–Illinois

Theme: Team-Based Learning


Background: This article provides an excellent introduction to team-based learning (TBL) and a useful practical guide to its implementation. TBL was originally developed in business schools in the early 1990s and has been promoted in health professions programs since 2001. It is a learner-centered but instructor-directed approach that ensures active small-group learning in large class settings.

It differs from problem-based learning (PBL) in several ways. For example, in TBL, only one instructor is needed, and this content expert directs the learning; students must come prepared to class and are individually and as a team held accountable for their contributions to the group’s productivity. In short, TBL is designed to engage students in active learning to avoid learner apathy in large lecture classes.

Practical guide: The authors describe the essential components of TBL first from their perspective as learners and then from the instructors’ perspective. For learners, the recurring steps are a) an out-of-class, individual advance assignment and b) individual in-class readiness assurance test followed by c) team readiness assurance test with the same questions; d) the instructor then clarifies and reviews the content in class to ensure students feel well prepared to solve problems; and e) in-class team application of the content to a scenario/.case provided by the instructor then follows. These steps are prepared by an orientation to the process and complemented by peer evaluations of each student in the small group. For the instructors, the recurring steps are to a) identify situational factors (for example, students’ prior knowledge) and learning goals; b) develop an advance assignment; c) design the individual and team readiness assurance test; d) provide a clarification review of the material; and e) create or find an authentic, believable problem case or scenario for the team application. Carefully considering how teams should be formed and oriented to the process is crucial as well. Engaging students in giving constructive peer feedback as well as grading in such a way that all aspects of the process are considered is important.

Significance for dental education: In the future, health care is likely to become more interprofessional and team-based. Research has shown that TBL is an effective approach to prepare students for interprofessional collaboration and teamwork. The use of authentic clinical scenarios will challenge dental students to think critically and analyze problems as a team. The fact that TBL engages students in active learning without an increase in number of faculty members is a benefit that makes it a valuable approach in dental school settings.

Reviewed by Holly Bennett, dental student, Class of 2018, Midwestern University College of Dental Medicine–Illinois.


Background: Research has shown that TBL promotes critical thinking and enhances problem-solving skills and lifelong learning. It provides better utilization of faculty time by facilitating a small-group experience in a large group setting and improves the performance of both academically stronger and weaker students. TBL actively engages students, improves retention of subject matter, and assists with overall development of better learning skills. The objective of this study was to compare pharmacy students’ perceptions of TBL and traditional lecture-based learning as a function of when the different types of learning took place.

Methods: 111 first-year pharmacy students at two schools participated in this study. After responding to a TBL survey at the beginning of the academic year, the students in one school experienced TBL in two courses, and the students in the second school engaged in traditional lecture-based...
didactic learning in one course during the fall term. At the end of the term, both groups responded to the TBL survey. In the spring term, the method of instruction was switched, and students who had previously experienced TBL now were instructed in the traditional lecture-based manner and vice versa for students in the second program. At the end of the spring term, both groups responded to a perception of TBL vs. didactic teaching survey.

Results: The order of experiencing TBL vs. traditional instruction significantly affected students’ survey responses. Students who experienced TBL first had more positive perceptions of teams and teamwork at the end of the fall term than students taught with the traditional approach. At the end of the school year, the students with two TBL courses in the fall term preferred TBL to lecture-based learning, while the students with one TBL course in the spring term preferred traditional learning. Both groups acknowledged the benefits of TBL for developing critical thinking and problem-solving skills and appreciated having teams with diverse personality types and learning styles.

Significance for dental education: Challenges in pharmacy education such as large classes, faculty shortages, and passive learning in lectures are also encountered in dental education. Developing good critical thinking and problem-solving skills along with learning how to function effectively in teams is essential to the future success of both pharmacy and dental professionals. TBL can be useful in addressing these challenges and contributing to preparing competent graduates. However, in addition to thinking how to successfully present material in the TBL format, the results of this study suggest considering when to introduce TBL in the curriculum and how to implement it to optimize its benefits.

Reviewed by Manoush Farzin, dental student, Class of 2017, Midwestern University College of Dental Medicine–Illinois.


Background: In TBL, students work together in small groups to ensure their readiness in a given content area and then apply their knowledge to a case scenario/problem. This approach moves students from individual learning to team-based functioning. The purpose of this study was to explore whether TBL outcomes would be affected by team members’ personalities, attitudes towards team-learning and intelligence, motivation, study skills, and amount of practice and whether these personal characteristics would affect students’ views of team or cooperative learning.

Methods: TBL was introduced into a pharmacokinetics course. The 159 students completed four interim assessments during the course, plus a fifth cumulative exam at the end of the term. A learning curve was generated for each student based on his or her performance on these five exams. Latent curve modeling (LCM) was used to analyze the data. LCM is a statistical technique that assesses inter-individual variability of intra-individual (for each student) change. Variables included were prior academic performance such as Pharmacy College Admission Test scores and grade point average (GPA) on admission; study skills assessments; personality assessment with the Myers-Briggs Type Indicator; students’ self-views of intelligence and attitudes toward team learning survey responses; and scores in the Motivated Strategies of Learning Questionnaire.

Results: Higher GPA at admission was associated with a faster rate of learning and understanding of the information. A higher level of metacognitive self-regulation was associated with a slower rate of learning. This finding might be due to the fact that higher levels of metacognitive self-regulation were associated with higher levels of critical thinking and deeper processing of the material. None of the other person-related factors impacted the overall rate of learning in a significant way. Specifically, it is interesting that introversion/extroversion did not affect student learning in this team-based environment. However, introverts had a more negative view of team learning than extroverts.

Significance for dental education: When dental educators decide whether they want to engage students in TBL, they might reflect on whether this approach may be advantageous to some but challenging to other students and, specifically, whether introvert vs. extrovert students would perform differently in a TBL course. The results of this study showed that students with different personality types and attitudes towards TBL-related concepts performed equally but did not perceive this environment equally positively.

Reviewed by Caitlin Wehrle, dental student, Class of 2017, Class of 2017 representative to CDS Academic Chapter; and Class of 2017 representative to ISDS Student Chapter, Midwestern University College of Dental Medicine–Illinois.

Epstein B. Five heads are better than one: preliminary results of team-based learning in a communication disorders graduate course. Int J Lang Commun Disord 2015;51(1):44-60.

Background: Clinical problem-solving is a crucial part of health care providers’ professional lives. Successful communication with patients and collaboration with colleagues from different disciplines is required for determining correct diagnoses and developing optimal treatment plans. TBL has been shown to have a positive effect on undergraduate students’ evaluations of teams and teamwork. However, research on graduate students’ responses to TBL is rather rare. The purpose of this study was to examine graduate students’ educational outcomes and perceptions in a communication disorders graduate course on speech and language-based learning disabilities that was conducted as a TBL course.

Methods: TBL was implemented by the author in a course with 19 graduate students who were assigned to four
groups. The students received the necessary material before each class. The class then followed the typical TBL design. In each session, the students first took an individual readiness assurance test, followed by a team readiness assurance test. After the instructor clarified material the students did not seem to understand, the teams received a case or similar activity that required them to apply their knowledge to the clinical problem. At the end of the course, the students responded to a survey about TBL.

Results: The test results showed that, in every session, the score on the lowest team exam was higher than the highest individual exam score. In addition, the students’ survey responses were slightly positive in favor of TBL as a method of learning. A significant number of students also reported that they valued the opportunity to apply course material to real problems.

Significance for dental education: While this study can only be considered a pilot study due to the small number of students involved and the lack of control group in the form of a course taught in the traditional manner, the findings are encouraging for instructors in dental residency programs or in dental hygiene programs with smaller class sizes. They showed that, even in smaller classrooms, the benefits of TBL may justify using this approach. Preparing students to take a team approach to applying their knowledge to solve clinical problems can contribute to clinicians’ future professional success. The implementation of TBL facilitates the transition from passive to active learning and from a knowledge-focused model to a model of collaborative learning with an emphasis on critical thinking and problem-solving that will enhance patient care.

Methods: The authors conducted a literature search using the OVID and PubMed databases from their beginning through August 2012 using the terms “team learning” and “team-based learning.” They based their description on published articles that explicitly addressed the TBL method.

Results and discussion: The authors did an excellent job of providing the reader with an introduction to TBL and then describing the individual preparation phase, the readiness assurance phase, and the application of key concepts phase as reported in the articles they examined. For each phase, they pointed out challenges students may face and instructors should be attentive to. Their pragmatic description will be helpful for instructors who use TBL for a first-time. The authors also provided examples of how TBL was applied in medical, nursing, and pharmacy education. These descriptions give an overview of which goals instructors pursued when engaging their students in TBL. One oft-cited reason was the desire to prepare students better for patient care. Integrating the foundational sciences with the clinical sciences in TBL and challenging students to apply their knowledge to patient scenarios/problems was seen as a constructive way to prepare students for their future interactions with patients. The authors also pointed out that TBL can be successfully used outside of classroom settings, for example, in clinical clerkships. While some studies did not find significant increases in overall performance, they often showed that TBL was beneficial for the lowest performing students. Additional benefits of TBL include increased comprehension and retention, increased student attendance due to a greater sense of accountability, and improved interpersonal communication skills and attitudes about team-building. Reported challenges to TBL were students’ resistance to a new method of learning and faculty members’ difficulties with adjusting to a changed role in the classroom.

Significance to dental education: This article, while not specifically addressing dentistry, illustrates how TBL can be implemented in health professions education settings and describes the advantages and challenges of doing so. Utilizing TBL in dental education can not only increase retention of information that is vital to the development of competent practitioners, but also teaches teamwork skills that will be of great benefit for future dental care providers whose professional lives will center around teamwork and interprofessional care.

Reviewed by Matthew Strumpf, dental student, Class of 2017, and Treasurer of Pediatric Dentistry Club, Midwestern University College of Dental Medicine–Illinois.


Background: Active learning methods such as TBL are becoming increasingly common in health professions education. They provide students with excellent opportunities to develop problem-solving and critical thinking skills, as well as communication and teamwork skills that are vital to becoming competent practitioners. The objectives of this review article were to describe the fundamental principles of TBL; describe the use of TBL in medicine, nursing, and pharmacy; and discuss the benefits and challenges of TBL as reported in the published literature.

Reviewed by Kristal Lundy, dental student, Class of 2018, Midwestern University College of Dental Medicine–Illinois.