

Towson University Interlibrary Loan



ILLiad TN: 179718

Borrower: MUB

Lending String: *TSC,MDU,BCM,MDP,LOY

Patron: DEPT; STATUS; Leupen, Sarah

Journal Title: The Journal of nursing education.

Volume: 50 **Issue:** 12

Month/Year: December 2011 **Pages:** 665-9
COLOR IF POSSIBLE

Article Author:

Article Title: Team-Based Learning; Systematic
Research Review

Imprint: New York, N.Y. ; Blackiston Division, Mc

ILL Number: 101816035



Call #: RT1 .J65

Location:

ARIEL

Charge

Maxcost: 30.00IFM

Shipping Address:

Interlibrary Loans
Albin O. Kuhn Library and Gallery
Univ. of MD Baltimore County
1000 Hilltop Circle
Baltimore, MD 21250

Fax: 410 455-1061

Ariel: ariel.lib.umbc.edu

Team-Based Learning: Systematic Research Review

Rebecca J. Sisk, PhD, RN, CNE

ABSTRACT

Team-based learning (TBL) is an active learning method developed to help students achieve course objectives while learning how to function in teams. Many faculty members have adopted TBL because it is a unique teaching method, but evidence about its effectiveness is unclear. Seventeen original studies on TBL are presented in this systematic review of research. The studies include descriptive, explanatory, and experimental research published from 2003 to 2011 in the nursing, medical, education, and business literature. Generally, students are satisfied with TBL and student engagement is higher in TBL classes. Evidence also exists that students in TBL classes score higher on examinations. However, further high-quality experimental studies are needed to confirm that TBL positively affects examination scores and other learning outcomes and to determine whether TBL produces students who have the ability to function well in groups.

Twenty-first century professional practice models require nurses to participate in organizational efforts as full partners and members of interdisciplinary teams (American Nurses Credentialing Center, 2011). In addition, developing a culture of safety is a crucial goal in the health care organizations in which nurses work (Nadzam, 2009). Teamwork is a large part of developing a culture of safety and learning how to develop team roles (Sammer, Lykens, Singh, Mains, & Lackan, 2010). Learning how to work within teams also provides a framework for handling team members who assume a hierarchical stance or indulge in disruptive behavior (Lamontagne, 2010; Nadzam, 2009; Pfrimmer, 2009). Instructional methods that encourage healthy and accountable interaction in groups provide the hands-on practice of working in teams that is needed by nursing students when they graduate.

Educators have designed a variety of instructional methods to help students work together in groups. An interesting active-learning method developed by Michaelsen, Knight, and Fink (2002) is team-based learning (TBL), which has been used in a variety of fields, such as business, engineering, the natural sciences, mathematics, medicine, nursing, informatics, and the humanities. Although proponents have published narratives and research related to TBL, the state of the science related to TBL is unclear. Therefore, the question posed in this systematic research review is: What is the effect of applying TBL as an active-learning strategy on educational outcomes?

TEAM-BASED LEARNING

Team-based learning is a specialized form of group learning with definitive goals and procedures. Student teams engage in meaningful, problem-focused tasks in TBL. The premise of the method is that team cohesion will lead to learning (Michaelsen & Sweet, 2008b). Researchers compare TBL with group learning and problem-based learning, but the difference is the application of the four principles: forming heterogeneous teams, stressing student accountability, providing meaningful team assignments focusing on solving a real-world problem, and providing feedback to the students. Teams are composed of five to seven members assigned anonymously

Received: March 9, 2011

Accepted: August 23, 2011

Posted Online: October 17, 2011

Dr. Sisk is Associate Professor, Chamberlain College of Nursing, National Management Offices, Lombard, Illinois.

The author has no financial or proprietary interest in the materials presented herein.

Address correspondence to Rebecca J. Sisk, PhD, RN, CNE, Associate Professor, Chamberlain College of Nursing, National Management Offices, 333 E. Butterfield Road, Suite 500 (5th floor), Lombard, IL 60148; e-mail: rsisk@chamberlain.edu.

doi:10.3928/01484834-20111017-01

to avoid cliques and to help students learn to work within a diverse team (Michaelsen & Sweet, 2008a). Students remain in the same group for an entire term because they need time to form and work as a team.

Students demonstrate accountability through the readiness assurance process (Michaelsen & Sweet, 2008b). They are required to read their assignments and be prepared to contribute to the team. Their preparation is determined through readiness assessment tests, peer review, and team accountability for a team project. When students come to class, they first take an individual readiness assessment test, which is a short quiz about their readings. They then turn in their answer sheets and take the same quiz as a group. Students are held accountable to the team and must reconcile their answers within the team. Students also complete peer assessments by rating each other on elements such as individual preparation, class attendance, attendance at team meetings, contributing to discussion, and respecting others. Faculty members provide feedback on the team process and the outcome of team projects.

SELECTION OF ARTICLES FOR REVIEW

To provide a summary of TBL research, a search of the literature was conducted in the CINAHL, ERIC, Business Source Complete, and Medline databases using the term *team-based learning*, which yielded 60,867 articles. When limited to peer-reviewed research articles published from 2001 to 2011, the yield was 14,383 articles. To gain a more manageable set of articles, the term *team learning* was then used, resulting in 62 articles. Thus, all articles were evaluated to determine whether they met the following inclusion criteria: original research article about unmodified TBL that followed the procedure outlined by Michaelsen and Sweet (2008b). Four articles were found in the nursing literature on TBL. However two were excluded—one (Mennenga & Smyer, 2010) because it was not a report of research, and the other (Sandor, 2008) because it was not clear whether unmodified TBL was used is unclear.

The 17 articles selected for this review were examined to determine how they compared with the levels of evidence described in the Oxford Centre for Evidence-Based Medicine (2009). None met the level of a randomized controlled trial, but two studies used a prospective crossover design. Five studies were descriptive and 10 were comparison/descriptive.

ANALYSIS OF THE LITERATURE

Among the 17 studies selected for review, participants were medical students (10 studies), psychiatric residents (1 study), medical doctors (1 study), medical physiology students (1 study), industrial/organizational psychology students (1 study), economics students (1 study), and undergraduate nursing students (2 studies). Establishing the efficacy of TBL is limited in all of the studies because of the lack of true experimental studies. Random assignment was used only in the studies by Koles, Nelson, Stolfi, Parmelee, and DeStephen (2005) and Thomas and Bowen (2011). Typical outcome variables in studies included in this review were student satisfaction, student engagement, and examination scores.

Student Satisfaction as the Outcome

One of the variables used in TBL research is student satisfaction with working in teams. Abdelkhalik, Hussein, Gibbs, and Hamdy (2010) demonstrated introductory medicine students' high satisfaction with TBL as a teaching method. In a study by Clark, Nguyen, Bray, and Levine (2008), there were no differences from the first to the last day of the course in the "value of teams" score in a nursing case management course. However, the positive attitudes displayed at the beginning of the course did not decrease after exposure to TBL.

Bick et al. (2009) evaluated the use of TBL in a clinical medicine course in a first-year medical curriculum. During the first 3 pilot years, a modified TBL (team projects only) was used. In the fourth year of the course, readiness assessment tests were introduced, resulting in a classic TBL course. Approximately 240 students were enrolled in each year's class. Students rated their individual and team involvement and satisfaction with the team final examination slightly higher in the final year. However, focus groups revealed that many students believed that reading before class is unnecessary and that they preferred lectures to TBL.

In a descriptive study of changes in attitude about TBL from year one to year two of a medical curriculum, Parmelee, DeStephen, and Borges (2009) found an increase in satisfaction with the team experience, its contribution to professional development, and peer evaluation from year one to year two. During year two, students became less enthusiastic about peer evaluation; peer evaluation methods were adjusted to increase student perception of fairness.

Espey (2010) found that attitudes toward teamwork became more positive in 189 economics students after being exposed to TBL. Interestingly, students who are successful academically were more negative about TBL and preferred to learn on their own. Finally, students in a psychotherapy course and their faculty members reported high satisfaction with TBL, although no actual outcomes were reported (Touchet & Coon, 2005).

Although the authors of these studies confirmed that many students are positive about TBL, no measures of student learning were used. Therefore, whether TBL improves student learning is unclear from these studies. Another outcome that has been studied is student engagement in learning, which has been a focus of both medical and nursing studies.

Student Engagement as the Outcome

Several researchers have studied student engagement in the classroom as an outcome, although an increase in student engagement in a TBL course should be expected because the method requires students to participate in groups. For example, in a comparative, descriptive study, Kelly et al. (2005) examined student engagement in seven lecture courses in a medical school, four of them in problem-based learning courses and three of them in TBL courses. Researchers used the STROBE classroom evaluation tool to measure student engagement. The STROBE relies on observational data. Initial interrater agreements for the STROBE averaged 84%, and Cohen's kappas averaged 0.79 (O'Malley et al., 2003). Kelly et al. (2005) provided training to observers prior to the study to ensure consistency of observations.

They found that students in the lecture course interacted more with their teachers, and that students in problem-based learning or TBL course interacted significantly more with each other. Some of the classes in the 14 courses were small; students in smaller classes were observed more often than students in larger courses, which may have skewed results. The researchers did not measure educational outcomes, so the effectiveness of TBL as a teaching strategy could not be measured.

Feingold et al. (2008) also used the STROBE classroom evaluation tool (O'Malley et al., 2003) to evaluate the use of TBL. Studying a convenience sample of 48 students in a first-year clinical nursing course, they found that students were actively engaged in the experience, although they expressed discomfort with accepting a team grade rather than an individual grade. No educational outcomes were reported in this article, nor was there a comparison group to confirm whether student engagement is influenced by TBL.

In a study by Clark et al. (2008), student engagement and student attitudes toward TBL were compared between a nursing case management course using TBL and a nursing pharmacology course using traditional lectures. Students took both courses in the same semester. The Classroom Engagement Survey (Fund for the Improvement of Postsecondary Education [FIPSE], 2003) was used to measure student engagement in the class, and the Value of Teams Survey (FIPSE, 2003) was used to measure satisfaction with the team experience. Cronbach alphas were 0.80 and 0.81 for the Classroom Engagement Survey and 0.92 and 0.87 for the Value of Teams Survey. A significant difference was found in student-rated participation in class between the pharmacology course and the case management course, but no differences were found in the value of teams score in the case management course from the beginning to the end of the course.

The study by Clark et al. (2008) had several limitations. Convenience samples were used. Furthermore, differences in student interest in course content may have explained differences in student engagement, rather than the teaching method. The case management course was new, which may have affected the way the course was conducted. Whether the students were enrolled in both courses during the semester in which the study was conducted was unclear. Finally, no educational outcomes were measured, leaving the question of the efficacy of TBL unanswered.

Studies on student engagement are interesting for faculty who are seeking more student involvement during class time. However, increased student engagement should be expected with TBL because students are required to interact and work together. Furthermore, student engagement is part of the process of delivering instruction, rather than an actual learning outcome. Most of the studies focusing on student learning have been conducted in medical schools. Typically, scores on examinations have been used as outcomes.

Examination Scores as Outcomes

Hunt, Haidet, Coverdale, and Richards (2003) provided anecdotal evidence that students met course objectives when TBL was used in an evidence-based practice course in a medical school. The authors of this evaluation stated that students appeared to be engaged in the class throughout the course. How-

ever, when interviewed in a focus group, students were unenthusiastic about the method and preferred lectures. No statistics were reported in this study, and a convenience sample was used. Team-based learning was not compared with any other instructional method, so there was no comparison group.

McInerney and Fink (2003) evaluated the use of TBL in an undergraduate microbial physiology course in a medical school by comparing 3 years of the course using convenience samples composed of students who were enrolled in the course during the 3 years of the study. Readiness assessment tests were used in all 3 years of the course, but team projects were assigned in only years two and three. Scores on the final examination were significantly higher in years two and three. One limitation of this study was that it was unclear whether the same final examination was used in all 3 years. In addition, improvements in final examination scores may have occurred because of the team projects in year two and three, rather than because TBL was used as an instructional method. Finally, no measures of inherent student ability, such as grade point averages or standardized test scores, were reported, although the capabilities of year two and year three students may have been higher than the ability of year one students.

Most of the studies testing knowledge scores as outcomes are single-group, pretest-posttest designs that are limited because no comparison groups were used. Whether the increase in knowledge scores was attributable to the exposure to course content rather than to TBL is unclear. For example, Haberyan (2007) found an increase in knowledge scores from pretest to posttest after introducing TBL in an industrial/organizational psychology course. Similarly, TBL was evaluated in a continuing medical education program in a pretest-posttest design study of 165 continuing medical education program participants in Germany (Kühne-Eversmann, Eversmann, & Fischer, 2008). Knowledge test scores increased significantly from the beginning to the end of the course, and students rated TBL as an effective method of learning. Finally, McInerney and Fink (2003) demonstrated a significant increase in final examination scores in their study of an undergraduate microbial physiology course when the full TBL method was used.

In a similar study, Wiener, Plass, and Marz (2009) allowed students to self-select into TBL sections of an elective course during their first year in a medical school in Austria. Students in the TBL sections scored higher on the final examination than did students in the non-TBL sections. Neither a comparison group nor random assignment was used, and the researchers did not control for indicators of student capability at the beginning of the study. Descriptive-only statistics were reported, so it was not possible to determine whether differences in final examination scores were significant.

In a comparison/descriptive study of a convenience sample of 160 students in a medical ethics course in South Korea (Chung, Rhee, Baik, & A, 2009), group readiness assessment test scores were significantly greater than individual readiness assessment test scores. When comparing students with weak and strong grade point averages, TBL benefited weaker students to a greater extent. Koles, Stolfi, Borges, Nelson, and Parmelee (2010) subsequently reported significantly higher scores in second-year medical school examinations in courses in which

TBL was used. These results are limited because other factors influencing test scores, such as difficulty of content, were not considered.

Two prospective crossover design studies have been reported in the literature. First, Koles et al. (2005) conducted a prospective crossover design study in a comparative evaluation of the effectiveness of TBL versus case-based group discussion in a pathology course. The participants were 83 second-year medical students who were randomly assigned into groups that received at least four modules of TBL and four modules of case-based group discussion in a random order. Final examination scores did not differ by teaching method, but the lowest scoring students scored higher in examinations after having been through the TBL class than did those who had been through the case-based group discussion course. A traditional, lecture-only control group was not used in this study. Furthermore, faculty-to-student ratios were higher in TBL (1 faculty:40 students) than in case-based group discussion (1 faculty:20 students), and those ratios may affect learning. The advantage of this study is that students served as their own controls due to the prospective crossover design and that students were randomly assigned to the order in which they would participate in the TBL portion of the course.

Finally, Thomas and Bowen (2011) compared TBL with the small group learning method in an ambulatory medicine course. One hundred twelve students were assigned to either a TBL first/small group learning second group or a small group learning first/TBL second group. Examination scores were significantly higher in the TBL portion of the course than in the small group learning portion, whether TBL was taught first or second. However, the equivalence of the examinations used was unclear in this and other studies using examination scores as an outcome variable.

Despite limitations of the studies focusing on examination scores, results have demonstrated that TBL is a promising instructional method. Further research using consistent measurements of student learning would confirm whether TBL should be more widely used.

REVIEW

The **Table** (available as supplemental material in the PDF version of this article) displays the articles included in this review. Most of the research on TBL has been conducted in medical schools, where the instructional method is frequently used. Three outcomes of TBL are commonly used in the research: student satisfaction with TBL, student engagement, and examination scores. Generally, students are satisfied with TBL as an alternative, active learning method. However, some students prefer the passive learning found in the traditional lecture format. The data show that students are more engaged in TBL courses than they are when other formats are used, which is not surprising because TBL, by definition, involves interaction of students within teams. Finally, although studies have demonstrated that examination scores improve with TBL, researchers are often unclear whether the same examination is used for comparison groups or for pretests versus posttests. Of note, evidence suggests that students who are not academically successful achieve more in TBL courses.

SUGGESTIONS FOR FURTHER RESEARCH

Several issues evolve from this review of the research related to TBL. Suggestions for future research are related to both research design and the types of outcomes used in studies.

Suggestions for Future Research Design

Most of the studies about TBL are descriptive, rather than experimental. When comparisons are used, random assignment is rare. Planning true experiments is difficult in education. However, prospective studies in which students are assigned to TBL and non-TBL sections are needed to demonstrate the efficacy of TBL. Pretests should also be used to assure equivalence of preclass knowledge between groups.

Suggestion for Outcomes

In addition to the need to improve on research design, the outcomes investigated in TBL studies should be improved. First, although student satisfaction is important, it is not a valid way to evaluate whether a teaching method actually works. Second, using student engagement in class activities is an interesting outcome variable, but greater student engagement in TBL courses should be expected because the method forces students to become more engaged in the learning process. Third, the most meaningful outcome for testing a teaching method should be whether the students actually learn. In addition to examination scores, other outcomes, such as NCLEX-RN scores and follow-up studies on graduates, should be considered. Finally, perhaps it is time to consider another outcome, one that will be difficult to define and measure—effectiveness in work teams. Surveys and focus groups are two ways an education program could obtain the data from alumni and employers. So far, the data demonstrate that TBL is a potentially powerful teaching method. Examining a wider variety of learning outcomes of TBL would demonstrate its usefulness.

DISCUSSION

Finding methods to help students work effectively in teams is important for developing a safe environment in health care. The articles described in this review confirm that TBL is a promising method for promoting productive teamwork. However, studies need to be conducted to demonstrate that TBL is effective in improving learning outcomes, as well as the ability to work well in teams. Studying whether student engagement is better in TBL courses is interesting but actually indicates only whether processes are more interactive than traditional methods. It is of greater importance to demonstrate whether course outcomes have improved. The course outcomes examined in the review articles were student satisfaction and examination scores.

TBL is an instructional method, and therefore a form of educational intervention. To definitively demonstrate that TBL is effective, researchers should use established and relevant measurement tools to document student satisfaction, compare student satisfaction between TBL and other instructional methods using inferential statistics, and use experimental designs that truly demonstrate that TBL works. Furthermore, other out-

comes are important in determining whether a teaching intervention works, most notably scores on the same examination from course to course.

Therefore, how will faculty members who are interested in using TBL be assured that TBL produces better learning outcomes? They can begin by ensuring that course objectives and content are appropriate and determining whether course examinations are reliable and valid before instituting TBL in a course. Keeping objectives, content, and examinations consistent while transitioning from traditional methods to TBL ensures that competing variables will not affect results. Students in previous, non-TBL semesters can then serve as control groups. In larger schools, where randomization is possible, randomly assigning students into TBL versus non-TBL groups would strengthen the design of TBL studies.

Using measurements of student satisfaction and examinations that are reliable and valid are vitally important. The scholarship of teaching includes devising methods to test and improve instruction, so TBL research is an opportunity for faculty to work together to demonstrate its effectiveness. Using TBL, particularly during initial preparation and execution while there is a learning curve for faculty members and students, is time consuming and requires thoughtful planning. Stronger research designs would test whether TBL is as effective as its proponents advise.

REFERENCES

- Abdelkhalik, N., Hussein, A., Gibbs, T., & Hamdy, H. (2010). Using team-based learning to prepare medical students for future problem-based learning. *Medical Teacher, 32*, 123-129.
- American Nurses Credentialing Center. (2011). *Program overview*. Retrieved from <http://www.nursecredentialing.org/Magnet/ProgramOverview.aspx>
- Bick, R.J., Oakes, J.L., Actor, J.K., Cleary, L.J., Felleman, D.J., Ownby, A.R., et al. (2009). Integrative teaching: Problem solving and integration of basic science concepts into clinical scenarios using team-based learning. *Journal of the International Association of Medical Science Educators, 19*, 26-34.
- Chung, E.K., Rhee, J.A., Baik, Y.H., & A, O.S. (2009). The effect of team-based learning in medical ethics education. *Medical Teacher, 31*, 1013-1017.
- Clark, M., Nguyen, H., Bray, C., & Levine, R. (2008). Team-based learning in an undergraduate nursing course. *Journal of Nursing Education, 47*, 111-117.
- Espes, M. (2010). Valuing teams: What influences student attitudes? *North American College and Teachers Association Journal, 54*, 31-40.
- Feingold, C., Cobb, M., Givens, R., Arnold, J., Joslin, S., & Keller, J. (2008). Student perceptions of team learning in nursing education. *Journal of Nursing Education, 47*, 214-222.
- Fund for the Improvement of Postsecondary Education. (2003). *Evaluation of team learning in health-sciences education*. Retrieved from <http://fipdatabase.ed.gov/grantshow.cfm?grantNumber=P116B000884>
- Haberyan, A. (2007). Team-based learning in an industrial/organizational psychology course. *North American Journal of Psychology, 9*, 143-152.
- Hunt, D., Haidet, P., Coverdale, J., & Richards, B. (2003). The effect of using team learning in an evidence-based medicine course for medical students. *Teaching and Learning in Medicine, 15*, 131-139.
- Kelly, P., Haidet, P., Schneider, V., Searle, N., Seidel, C., & Richards, B. (2005). A comparison of in-class learner engagement across lecture, problem-based learning, and team learning using the STROBE classroom observation tool. *Teaching and Learning in Medicine, 17*, 112-118.
- Koles, P., Nelson, S., Stolfi, A., Parmelee, D., & DeStephen, D. (2005). Active learning in a year 2 pathology curriculum. *Medical Education, 39*, 1045-1055.
- Koles, P., Stolfi, A., Borges, N.J., Nelson, S., & Parmelee, D.X. (2010). The impact of team-based learning on medical students' academic performance. *Academic Medicine, 85*, 1739-1745.
- Kühne-Eversmann, L., Eversmann, T., & Fischer, M. (2008). Team- and case-based learning to activate participants and enhance knowledge: An evaluation of seminars in Germany. *Journal of Continuing Education in the Health Professions, 28*, 165-171.
- Lamontagne, C. (2010). Intimidation: A concept analysis. *Nursing Forum, 45*(1), 54-65. doi:10.1111/j.1744-6198.2009.00162.x
- McInerney, M.J., & Fink, L.D. (2003). Team-based learning enhances long-term retention and critical thinking in an undergraduate microbial physiology course. *Journal of Microbiology and Biology Education, 4*, M3-12. doi:10.1128/jmbe.v4.68
- Mennenga, H.A. & Smyer, T. (2010). A model for easily incorporating team-based learning into nursing education. *International Journal of Nursing Education Scholarship, 7*(1), Article 4.
- Michaelson, L.K., Knight, A.B., & Fink, L.D. (2002). *Team-based learning: A transformative use of small groups*. Westport, CT: Greenwood Publishing Group.
- Michaelson, L.K., & Sweet, M. (2008a). Creating effective team assignments. In L.K. Michaelson, D.X. Parmelee, K.K. McMahon, & R.E. Levine (Eds.), *Team-based learning for health professions education: A guide to using small groups for improving learning* (pp. 35-36). Sterling, VA: Stylus.
- Michaelson, L.K., & Sweet, M. (2008b). Fundamental principles and practices of team-based learning. In L.K. Michaelson, D.X. Parmelee, K.K. McMahon, & R.E. Levine (Eds.), *Team-based learning for health professions education: A guide to using small groups for improving learning* (pp. 9-34). Sterling, VA: Stylus.
- Nadzam, D.M. (2009). Nurses' role in communication and patient safety. *Journal of Nursing Care Quality, 24*, 184-188.
- O'Malley, K.J., Moran, B.J., Haidet, P., Seidel, C.L., Schneider, V., Morgan, R.O., et al. (2003). Validation of an observation instrument for measuring student engagement in health professions settings. *Evaluation and the Health Professions, 26*, 86-103.
- Oxford Centre for Evidence-Based Medicine. (2009). *Oxford Centre for Evidence-Based Medicine: Levels of evidence*. Retrieved from <http://www.cebm.net/index.aspx?o=1025>
- Parmelee, D.X., DeStephen, D., & Borges, N.J. (2009). Medical students' attitudes about team-based learning in a pre-clinical curriculum. *Medical Education Online, 14*(1), 1-7. doi:10.3885/meo.2009.Res00280
- Pfritimmer, D. (2009). Teamwork and communication. *Journal of Continuing Education in Nursing, 40*, 294-295.
- Sammer, C., Lykens, K., Singh, K., Mains, D., & Lackan, N. (2010). What is patient safety culture? A review of the literature. *Journal of Nursing Scholarship, 42*, 156-165. doi:10.1111/j.1547-5069.2009.01330.x
- Sandor, M.K. (2008). Spirituality and clinical care: Comparing team-based learning strategies with lecture and standardized patient scenarios in an interdisciplinary course. *Southern Online Journal of Nursing Research, 8*(2), 2p.
- Thomas, P.A., & Bowen, C.W. (2011). A controlled trial of team-based learning in an ambulatory medicine clerkship for medical students. *Teaching and Learning in Medicine, 23*(1), 31-36.
- Touchet, B.K., & Coon, K.A. (2005). A pilot use of team-2 learning in psychiatry resident psychodynamic psychotherapy education. *Academic Psychiatry, 29*, 293-296.
- Wiener, H., Plass, H., & Marz, R. (2009). Team-based learning in intensive course format for first-year medical students. *Croatian Medical Journal, 50*(1), 69-76.