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The effects of Team-Based Learning on learning behaviors in the maternal-child nursing course

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SUMMARY

Background: The Team-Based Learning (TBL) method has been used as a teaching strategy in many disciplines. It is instructor-led, learner-centered learning with functions similar to those of problem-based learning, but it is more cost-effective. However, little is known about the application of TBL to nursing education.
Objectives: The objectives of the study are to employ the TBL approach in a Maternal-Child Nursing course and to evaluate its effects on learning outcomes.
Design: We present one-group pretest–posttest research design with the intervention of the TBL teaching strategy.
Settings: The study was conducted in one of the nursing universities in Taiwan.
Participants: One-hundred-four students in 2011 and 103 students in 2012 in an RN-to-BSN program who enrolled in the Maternal-Child Nursing course participated in this study. These students had graduated from a five-year nursing diploma program before enrolling in the RN-BSN program.
Methods: Data were collected before and after the implementation of the TBL, which included active learning, in-class activities, and application exercises. The Class Engagement Survey (CES), Value of Teams (VTs), Self-Directed Learning Instrument (SDLI), and exam scores were used to measure students' learning outcomes.
Results: TBL significantly influenced the students' learning outcomes. Students who expressed that TBL increased their learning interests had a higher score on VT; and students who had high achievement from the current TBL course had higher scores on the CES, VT, and SDLI. The means of the group test scores and the final examination score were significantly higher than the individual scores from the in-class tests in both 2011, 2012, and the combination of 2011 and 2012.
Conclusion: The TBL design requires out-of-class preparation before all classes, which requires active and self-directed learning. TBL provides opportunities to foster learner-to-learner interactions, which lead to more active engagement and teamwork among learners. It also promotes the students' class engagement and teamwork values, and it increases academic performance. The TBL is suggested to have a greater effect on academically weaker students.

Introduction

Healthcare professional education has sought to develop teaching strategies that could cultivate students' abilities to meet the characteristics and expectations of their intended profession. Active learning and collaborative learning (Clark et al., 2009; Pugsley and Clayton, 2003), therefore, have become increasingly important and popular concepts that have been applied to the curricula in these fields to aid in the students' future professional development. Three modes of pedagogies have commonly been applied in healthcare professional education: lecture-based, problem-based, and a combination of lecture-based with small group teaching (Parmelee et al., 2009). The lecture-based method, which is regarded as a passive learning style without interaction between the instructors and the students or between the students themselves, was the most common but a difficult teaching strategy.

Problem-based learning (PBL), which emphasizes small group and interactive learning and provides students with opportunities to develop critical thinking, group cooperation, and communication skills (Kelly et al., 2005), was then introduced and implemented. Although PBL was promoted as having many advantages, it was not a cost-effective method given the current educational environment, which is influenced by the world economy recession and a shortage of faculty (Searle et al., 2003). Because of the current world economy recession, the government and the schools managed to contain the budgets for the education costs, which would threaten to hire enough trained faculty simultaneously involved with a single class of

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students. An alternative teaching approach, Team-Based Learning (TBL), was proposed and successfully used in the field of business and other disciplines for many years (Searle et al., 2003). TBL possesses functions similar to PBL, but it is more cost-effective with regard to a school's budget due to its high student-to-faculty ratio (e.g., up to 200:1), which is in contrast to the high faculty-to-student ratio of PBL (e.g., 1:6) (Hunt et al., 2003; Sibley and Parmelee, 2008).

No studies have been conducted regarding TBL in the nursing field. The purposes of this study are to employ the TBL approach in a Maternal-Child Nursing course in Taiwan and to evaluate TBL's effect on students' learning outcomes in two cohorts of students in 2011 and 2012. The research questions are as follows:

- Does TBL influence students' in-class engagement, the value placed on teams, and self-directed learning ability?
- Is there a difference in the students' in-class engagement, the value placed on teams, and the self-directed learning ability associated with different demographic variables (e.g., expected final educational degree, willingness to be a clinical nurse after graduation, different cohort of students)?
- Does TBL affect students' academic performance?

Literature Review

TBL was developed by Larry Michaelsen in 1970 and was first introduced in business education (Haidet et al., 2002) and first implemented in medical education by the Baylor Medical College with a grant support from the U.S. Department of Education in 2001. The TBL has been applied to 11 different institutions in 40 courses in medical education including medical pharmacology, physiology, and anatomy programs in the U.S. with significantly effective outcomes (Vasan and DeFouw, 2005; Searle et al., 2003). It also has been studied in a controlled trial and qualitative design with positive agreement from faculty and students' perspectives about the effects of the TBL on students' learning (Hunt et al., 2003; Haidet et al., 2004; Levine et al., 2004).

Effects of Team-Based Learning

Team-Based Learning (TBL) emphasizes a teaching style that is learner-centered but instructor-led group-learning. It uses a very structured individual and group out-of-class, automatic, independent learning process, and it requires in-class engagement with a team to solve problems through communication and teamwork skills (Searle et al., 2003; O'Malley et al., 2003). TBL has been used in education for many disciplines, including medicine, veterinary science, physician's assistantship, and business (Parmelee, 2010), but it is relatively new in nursing. Researchers (Chung et al., 2009) have evaluated the effect of TBL in medical ethics education and found that students demonstrated more engagement and enjoyment in the course than was true with traditional didactics. In Chung et al.'s study, the students' significantly higher group test scores than the individual test scores demonstrated the positive effect of collaborative learning. More importantly, TBL improved the performance of academically weaker students. Nieder et al. (2005) used TBL in a medical gross anatomy and embryology course and reported that the individual performance was a good predictor of examining the effect of TBL on learning outcomes. Nieder et al. pointed out that TBL was a superior method for small group learning since students did small group discussions on test questions and did teacher-led patient scenario group discussions after individual tests in the class. Each group was given patient situations or challenging problems and had to present discussion results in the class (Kelly et al., 2005; Clark et al., 2008). TBL also benefited academically at-risk students the most because these students were forced to study more consistently and were given opportunities to develop higher reasoning skills. Parmelee et al. (2009) studied medical students' attitudes towards TBL in a pre-clinical curriculum and found that significant changes in attitudes occurred with regard to professional development and satisfaction with team experience and peer evaluation but no significant changes in team impact on the quality of learning or clinical reasoning ability. Tan et al. (2011) applied TBL in undergraduate clinical neurology education and indicated that measures of engagement were higher in the TBL group than in the traditional teaching group. Tan et al. also suggested that TBL might promote students' self-directed learning. Therefore, conclusions can be made based on the literature reviews that the TBL approach increases students' class engagement, teamwork learning, and self-directed learning and can also promote the academic performance of weaker students through teamwork and structured study learning.

Description of Team-Based Learning

To apply the TBL approach, students are first randomly assigned into groups of five to seven people. The approach contains three phases (Haidet et al., 2002):

- Phase one is an active learning stage involving learners studying out-of-class by completing reading assignments before class. These reading assignments are chapters in textbooks or journal articles related to the class topic.
- Phase two involves in-class activities with the completion of an Individual Readiness Assurance Test (IRAT) and a Group Readiness Assurance Test (GRAT). These tests are designed to determine the students' readiness to apply knowledge obtained from the phase one reading assignments. Each class begins with the IRAT, which is an individual test about the topic covered that week. The GRAT, which uses the same test questions, is given after the IRAT is completed. During the GRAT, intrateam debates occur.
- Phase three involves application exercises in which the groups are given challenging problems or cases with a corresponding set of questions, which help the students to simultaneously apply the knowledge obtained in phases one and two to answer each question. During this third phase, interteam debates occur.

In the authors' serving university, the Maternal-Child Nursing course was a two-credit-hour (two lecture hours per week for 18 weeks) required course that was offered for an 18-week period. All students needed to take and pass the course to graduate. The TBL approach was applied in this course for the first time in 2011 and for the second time in 2012. In the first class period, the students were randomly assigned to small groups with seven to eight people in each group so that the students' achievement abilities were equally distributed across the teams. In addition to the IRAT and GRAT, the students were also given a final examination as one of the learning outcome evaluations.

Methods

Design and Sample

This study employed a one-group pretest–posttest research design with the intervention of the TBL teaching strategy. All the students who enrolled in the Maternal-Child Nursing course that was taught by the instructor who is familiar with the TBL teaching in year 2011 and 2012 were contacted and invited to participate in this study in the first class day of the course. These students had previously graduated from a five-year nursing diploma program and had entered directly into the two-year registered nurse to Bachelor of Science in nursing (RN-to-BSN) program as full-time students. In Taiwan, students can commence the five-year nursing diploma program at about the age of 15–16 and earned a nursing diploma at