

## The effects of team-based learning techniques on nursing students' perception of the psycho-social climate of the classroom

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### Abstract

**Background:** Team-based learning is a structured type of cooperative learning that is becoming increasingly more popular in nursing education. This study compares levels of nursing students' perception of the psycho-social climate of the classroom between conventional lecture group and team-based learning group.

**Methods:** In a quasi-experimental study with pretest-posttest design 38 nursing students of second year participated. One half of the 16 sessions of cardiovascular disease nursing course sessions was taught by lectures and the second half with team-based learning. The modified college and university classroom environment inventory (CUCEI) was used to measure the perception of classroom environment. This was completed after the final lecture and TBL sessions.

**Results:** Results revealed a significant difference in the mean scores of psycho-social climate for the TBL method (Mean (SD): 179.8(8.27)) versus the mean score for the lecture method (Mean (SD): 154.213.44)). Also, the results showed significant differences between the two groups in the innovation ( $p < 0.001$ ), student cohesiveness ( $p = 0.01$ ), cooperation ( $p < 0.001$ ) and equity ( $p = 0.03$ ) sub-scales scores ( $p < 0.05$ ).

**Conclusion:** This study provides evidence that team-based learning does have a positive effect on nursing students' perceptions of their psycho-social climate of the classroom.

**Keywords:** Team-based learning, nursing students, Perception, Psycho-social climate, Classroom.

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### Introduction

Team-based learning is a specific instructional strategy and framework that uses intentionally formed teams of learners to deepen student learning and develop high-performing teams (1). TBL requires that instructors shift their paradigms: 1) the course goal shifts from knowing content to applying concepts, 2) the instructor shifts from delivering information to creating opportunities that will engage students in learning, 3) students shift from passive to active participants, and 4) the responsibility for learning shifts from the instructor to the student (2). TBL "flips the classroom" so that students are responsible for initial exposure to content through guided self-study (3).

TBL consists of three stages. At the first stage, students need to study and make preparations for class discussions. The second stage is to measure students' knowledge of the subjects to be studied in the first phase with individual readiness assessment test (IRAT). This step involves a group readiness assessment test (GRAT) by establishing small groups for discussions between the teacher and classmates. At the third stage, higher-level concepts are discussed in the groups. In fact, effective learning in TBL is conducted through interactive discussions based on key educational principles and evaluations (1) TBL improves student participation and engagement during class (4).

In medicine, team-based learning (TBL)

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is an established active learning strategy that uses patient cases with emphasis on exploring multiple problem solutions, using evidence to support proposed solutions, and reflecting on a solution's strengths and weaknesses to develop problem-solving skills (5). For medical students, TBL has produced equal or superior academic outcomes compared to lecture-based approach (6-12). Overall, the literature in this area is limited, but evidence exists that students in TBL classes score higher on examinations. Further high-quality experimental studies are needed to confirm that TBL positively affects examination scores and other learning outcomes (13)

The quality of the educational environment is also indicative of the effectiveness of an educational program (14). Classroom environment is "the tone, ambience, culture or atmosphere of a classroom or school. It evolves from the relationships between students, and between teacher and students, and the types of activities, actions, and interactions that are rewarded, encouraged and emphasized in the classroom" (15). Developing and implementing a positive psychosocial environment should be one of the main responsibilities of educators. As educators influence the climate, learning is enhanced or hindered (16). Students' perceptions of the educational milieu can be a basis for implementing modifications and thus optimize the educational environment. (17). If the classroom environment is energetic, encouraging, facilitating, it can help students to avoid any kind of frustration, and to understand each other's emotions, feeling and manage their own and other's emotions (18).

Most studies on the effects of active and passive methods of teaching, have considered learning variable as independent variable and the emphasis is on learning and academic achievement of students, however, less attention has been paid to the effects of active techniques on classroom environment.

The aim of this study was to determine the effects of team-based learning tech-

niques on nursing students' perception of psycho-social climate of the classroom.

## Methods

### *Research Design*

This quasi-experimental, pretest-posttest study was conducted in the academic year 2013. All nursing students in their 4th semester of the program, studying in a nursing college in Saveh in Iran (n=38) were selected. Half of 16 cardiovascular disease nursing course sessions, was run through lecture and the other half was instructed through TBL method. The first eight sessions were taught by conventional lectures. Explanations were given about the TBL technique during the ninth session that was pertinent to the eight next sessions. Furthermore, in accordance with the provisions of the TBL technique, students were divided into groups of 6 to 7, and for each group, a name was chosen and a manager appointed.

### *TBL method*

Prior to the beginning of the instructional unit, students was given a reading and other assignments that should contain information on the concepts and ideas that must be understood to be able to solve the problem the instructor identified for this unit in the backward design activity.

The first in-class activity was an individual RAT (IRAT) on the preclass assignments. The IRATs typically consist of 8–10 multiple-choice questions with no access to materials or peer discussion that, in combination, to assess whether students have a sound understanding of the key concepts from the readings. The IRAT questions were focused on foundational concepts (and avoid picky details) but were difficult enough to create discussion within the teams. Following the IRAT, students retook the same test, but this time the teams must agree on the answers to each test question (Group Readiness Assurance Test, GRAT), using IF-AT (Immediate Feedback Assessment Technique) scratch cards to gain immediate feedback. With the IF-AT an-

swer sheets, students scratch off the covering of one of four (or five) boxes in search of a mark that indicates they have found the correct answer. If they found the mark on the first try, they received full credit. If not, they continued scratching until they did find the mark, but their score was reduced with each unsuccessful scratch.

At this point readiness assurance process, students proceed to the fourth phase (appeal phase). This phase gives students the opportunity to refer to their assigned reading material and appeal any questions that were missed on the group test. In this phase, students were allowed to do a focused restudy of the assigned readings to challenge the teacher about their responses on specific items on the group test or about the confusion created by either the quality of the questions or inadequacies of the preclass readings. The fifth and final part of the readiness assurance process (RAP) involved oral feedback from the instructor. This feedback came immediately after the appeals process and allowed the instructor to clear up any confusion students may have about any of the concepts presented in the readings. Teams then worked through application activities, reaching consensus on answers through intra-team discussion. The facilitators led inter-team discussions about the applications. At the end of each session, the topic of the next session was introduced, and some related resources were determined for self-study.

### *Instrument*

The modified college and university classroom environment inventory (CUCEI) was used to measure the perception of the classroom environment. This was completed after the final lecture and TBL sessions. This particular inventory was used because of its suitability for use in small higher education classrooms of about 30 students. The CUCEI has been found to be a valid and reliable instrument in assessing the college classroom environment (19,20).

The modified version of the CUCEI contained 49 items with 5-point Likert-type (1

=strongly agree to 5= strongly disagree) separated into the following seven categories: 1. Personalization—the interaction between the students and instructor as well as concern for the welfare of the students. 2. Innovation—the extent to which new and interesting activities are introduced in a lesson. 3. Student cohesiveness—the extent to which students interact with each other and help each other. 4. Task orientation—the extent to which classroom activities is well-organized and clearly explained. 5. Cooperation—the extent to which students cooperate rather than compete with one another on learning tasks; and. 6. Individualization—the extent to which students is able to make decisions and show autonomy in the classroom. 7. Equity—The extent to which students are treated equally by the teacher (20-22)

This questionnaire has already been validated and tested for reliability in Iran by Torabizheh et al, 2010(23). The content validity of the translated questionnaire was evaluated by ten members of the nursing faculty. The reliability of the questionnaire was acceptable (Cronbach's alpha 0.85) as well as the categories. The categories Cronbach's alphas were 0.81 for personalization category, 0.79 for involvement, and 0.78 for student cohesiveness category, 0.91 for satisfaction category, 0.81 for task orientation category, 0.87 for innovation category, 0.83 for Individualization category.

### *Data analysis*

Data was analyzed using SPSS at an alpha level of 0.05. Descriptive and correlation analyses were conducted. The Kolmogorov-Smirnov test showed normal distribution of data in different variables ( $p>0.22$ ) and the paired-Samples t-test was used to examine differences in each subscale and total scores mean of CUCEI in the lecture and TBL groups. Identities were kept strictly confidential, and all questionnaires were anonymously analyzed.

### *Result*

The mean $\pm$ SD age of the participants was

20.1±3.20 yrs (Age range 19-22 yrs) and 50.87% (n=19) of the participants were female.

Table 1 shows the mean scores and standard deviations for each subscale and the total score of CUCEI in the lecture and TBL methods.

A paired-samples t-test was conducted to compare the mean total scale scores of the inventory between the TBL and the lecture methods. Results of the statistical test revealed a significant difference in the mean scores for the TBL method (Mean (SD): 179.8 (8.27)) versus the mean score for the lecture method (Mean (SD): 154.2 (13.44)).

The results of Table 1 suggest that the use of TBL in the classroom had a significant, positive effect on students' overall perceptions of the psycho-social climate of the classroom.

In addition, paired-sample t test was conducted to compare the mean seven subscales scores of the inventory between the TBL and the lecture methods. The results showed no significant difference between the two methods in the subscales scores of personalization, task orientation and individualization ( $p>0.05$ ), but did show a significant difference between the two methods in the innovation ( $p<0.001$ ), student cohesiveness ( $p=0.01$ ), cooperation ( $p<0.001$ ) and equity ( $p=0.03$ ) sub-scales scores ( $p<0.05$ ).

## Discussion

There has been growing interest and concern about the role of the learning environment in medical education. Educational environment is one of the most important

factors in determining the success of an effective curriculum (17). There are various factors to facilitate learning achievement and learning outcomes. Proper learning environment is one of the possible solutions in order to improve learning outcomes (24). Nair (2002) has also indicated that the learning environments of students have a significant influence on the outcomes of student learning within the classroom (25).

Our study showed that TBL does have a positive effect on students' perceptions of their learning environment. We found that TBL in comparing with traditional lecture method can result in increasing perception of the psycho-social climate of the classroom especially in innovation and cooperation sub-scale domains among nursing students.

Positive learning atmospheres do not happen automatically; they are climates the instructor molds and shapes. Various factors can influence this result, such as the effect of innovation, team cooperation and student cohesiveness in the learning process.

Although there is no report of a similar study in past studies, various studies have been conducted to evaluate the effectiveness of TBL. Most studies on the effects of TBL have considered learning variable as the independent variable and the emphasis is on learning and academic achievement of students.

For example, Hashmi (2014) conducted a study to determine if TBL was more effective than a traditional didactic lecture (TDL) in improving knowledge outcomes about diabetes management in fourth-year

Table 1. Descriptive statistics for each subscale and the total score of CUCEI in the lecture and TBL groups

Method	Lecture		TBL		Mean Difference (SD)	t (P value)
Subscales	Mean	(SD)	Mean	(SD)		
Personalization	27.73	(3.25)	28.36	(3.08)	0.63(4.2)	1.13(0.26)
Innovation	18.01	(4.01)	27.01	(2.33)	9(3.89)	8.23 (<0.001)*
Student cohesiveness	21.12	(2.76)	24.77	(2.10)	3.65(3.01)	3.01 (0.01)*
Task orientation	21.11	(2.24)	20.85	(2.33)	0.26(2.99)	- .85(0.44)
Cooperation	21.32	(6.75)	31.28	(3.78)	9.96(5.74)	8.89 (<0.001)*
Individualization	20.99	(2.41)	20.52	(3.41)	-0.47(3.33)	-1.18(0.38)
Equity	27.92	(3.61)	30.37	(1.34)	2.54(2.78)	2.19 (0.03)*
Total	154.24	(13.44)	179.76	(8.27)	25.52(13.8)	9.32(<0.001)*

\* Statistically significant ( $p<0.05$ )

medical students and to check the students' view of the TBL method in comparison with their earlier experience with TDL. The result showed students included in the study achieved higher mean test scores on test questions that assessed their knowledge of diabetes mellitus content learned using the TBL strategy compared with TDL method ( $p < 0.001$ ). Also, TBL learning method was favored by a majority of medical students compared to the TDL session (26).

In another study Currey J (2015) evaluated postgraduate critical care nursing students' attitudes to, and engagement with, TBL. The result showed that postgraduate critical care nursing students responded positively to the introduction of TBL and showed increased engagement with learning. In turn, these factors enhanced nurses' professional skills in teamwork, communication, problem-solving and higher order critical thinking (11).

The result of Jafari (2014) study in Iran revealed more success and satisfaction from team-based learning compared to conventional lectures in teaching neurology to undergraduate students (27). Team-based learning (TBL) is becoming increasingly more popular in nursing education (10). Result of Currey et al., (2015) study showed that postgraduate critical care nursing students responded positively to the introduction of TBL and showed increased engagement with learning. In turn, these factors enhanced nurses' professional skills in teamwork, communication, problem solving and higher order critical thinking. Developing professional skills and advancing knowledge should be core to all critical care nursing education programs to improve the quality and safety of patient care (11).

The present study support the work of Dart et al. (2000), who found that courses that had deep or meaningful approaches to the learning within the classroom were characterized by relationships in the classroom, student participation in the structure of the learning environment, and investiga-

tive skills inherent to the teaching of the class (28).

The psychosocial environment is as important as the physical environment for the learning environment. That is, the recent educational setting is inclined to the use of the modern technology as the physical environment. However, the effect of the using technology has not positively affected both the improvement of learning the environment and learning outcomes all the time. When properly using both the physical and psychosocial environment on balance (Improving the psychosocial environment as well as the physical environment in learning, learning environment effectively improve to enhance learning outcomes (increase the learning outcomes) (29).

Though a learning environment may possess intangible elements, the concept of a learning environment is a necessary aspect of managing a classroom that "emphasizes the importance of meaningful, authentic activities that help the learner to construct understandings and develop skills relevant to solving problems" (30).

Well-developed instructional strategies such as TBL offer many potential benefits to learners. Cooperation enhances student satisfaction with the learning experience by actively involving students in designing and completing class procedures and course content. In the typical educational framework, competition is valued over cooperation. However, a major component of TBL includes training students in the social skills needed to work cooperatively.

General guidelines for classroom motivation suggest an emphasis on challenging, engaging, informative activities and the building of enthusiasm and a sense of responsibility in learners (31). Team-based learning is a highly interactive method that responsibility for learning shifts from instructor to student and teacher shifts from "sage on stage" to "guide at side" and provides opportunities to practice and improve communication, interpersonal, and collaboration skills as part of preparing student pharmacists for interprofessional practice.



All these factors can create a motivational framework and improve the psycho-social environment of the class.

The findings of this study may prove helpful to change the opinion of students, lecturers, and educational managers about the effects of choosing appropriate training methods for knowledge transfer and achieving educational objectives.

Nurse educators must continually improve their teaching skills through innovation. Nurse educators need to shift the paradigm toward a more learner-centered environment. Again, TBL could help educators move away from competitive or individualistic teaching methods and assessment. The author hopes this research study will help nursing science educators introduce this paradigm into the nursing curriculum.

While these study results provided support for the use of TBL in the classroom, additional research may be needed to generalize results to other population groups.

### Conclusion

This study provides evidence that TBL is an effective method for improving nursing students' perceptions of their learning environment especially in innovation and cooperation sub-scale; thereby it is recommended to increase nursing students' participation in argument by applying active teaching methods which can provide the opportunity for increase nursing students' perception of the psycho-social climate of the classroom. The TBL is recommended as a highly interactive method for nursing curricula.

### Limitations

Because a convenience sample was used for this study, external validity or generalizations are limited outside of the target program and should be approached with caution. A larger sample size, with perhaps a longer duration, could allow more general conclusions about the effects of TBL on nursing students' perception of the psycho-social climate of the classroom. However this is a pilot study, the results provide di-

rection to continuing nursing education program planners regarding appropriate content and methodology for programs.

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