

# Team based learning in medical education

Albena Gayef<sup>1</sup>

Trakya University Faculty of Medicine, Department of Medical Education, Edirne, TURKEY

**Abstract:** Team based learning is an active, student-centered method applied in a group of 5-7 students with the management of a single trainer who is a specialist. There are three stages in the team based learning method: preparation, display of readiness and implementation. Team based learning is an active learning strategy in medical education. In this study, the structure and basic principles of team based learning, the steps of the method and assessment and evaluation are discussed.

## 1 Introduction

Medical education has evolved from the master apprentice relationship to the well-structured, institutionalized, student-centered and learning-centered educational strategies that implement scientific facts [1]. Team based learning takes place with students groups consisting of 5-7 students in a large group with the management of a single instructor [2].

The first team based learning in Medical Education was initiated in the late 1990s as a pilot study at Baylor Medical School [3,4] and then there are examples of practice in various medical faculties [5,6].

Nowadays, there are many examples of application of team based learning in pre-graduate, post-graduate and continuing medical education periods. In the study carried out by Burgess et al. between 2002 and 2012, the researches on team based learning programs conducted in medical faculties were evaluated systematically. In this study, which examined 20 studies that met the accepted admission criteria, it was stated that team based learning applications provided constructive learning experiences to students. Of the 20 studies included in the study, 14 were pre-clinical and 6 were post-clinical studies. It can be seen that team based learning practices have a wide variety in terms of discipline and content [7].

With team based learning, clinical problem solving, questioning and interpersonal interaction increase. In a study conducted at Baylor Medical Faculty, it was reported that students' participation in courses, taking responsibility and satisfaction were at a high level as observed in many other studies [8]. In another study by Willett et al. published in 2011, students emphasized that it was easier to contact a faculty member in a small group than in a large classroom [9].

Students are responsible for their own performances in team based learning. Because individual performances directly affect team performance, teams encourage members to work. For this reason, team based learning is preferred by educators who plan to include active training methods in educational programs [10].

## 2 The structure and basic principles of team based learning

Team based learning is based on theories of constructivism and social constructivism. Constructivism theory is basically based on the principle that the learner builds knowledge on what they have previously learned, and decides how and when to reconstruct this information. From a constructivist point of view, the teacher is not an informant but a person who facilitates learning and helps learning. Learning is heavily dependent on prior knowledge, so the teacher should create appropriate problems and group interactions that will lead the student to active learning, and to use and prioritize prior knowledge. Sufficient time should be given if new information is to be actively created and information reconstruction is to be performed [11].

Vygotsky (1978) described the theory of social constructivism. According to this, student's understanding and understanding of information is realized through social interactions. It is possible to learn better and higher through social interaction [12].

Describing the general context and scope of the implementation is important because TBL efforts in medical education may range from a single session to an entire course, and these variations influence design choices related to the core elements.

Descriptions of a TBL implementation's context and scope should contain information about the following items: [13]

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<sup>1</sup> Corresponding Author: [albenag77@gmail.com](mailto:albenag77@gmail.com)

- Overall class size and number of learners per team
- Number and background (e.g., prior experience with TBL) of faculty involved
- Subject (either of the overall course or of the sessions that used TBL)
- Context of the implementation (e.g., single session, series of sessions in a course, entire course)
- Estimate of learners' familiarity with TBL prior to the implementation

TBL is a teacher-directed method for incorporating multiple small groups (generally five to seven learners per group) into a single classroom setting, usually with a single instructor (e.g., undergraduate sessions, graduate conferences, continuing education activities). TBL moves beyond basic acquisition of facts to emphasize meaningful application of session or course content in real-world scenarios. This typically involves intra- and intergroup discussions of problems that are specifically prepared to foster complex reasoning, debate, and "constructive controversy". TBL puts into operation instructional principles that maximize student preparation and participation and that foster high levels of team performance. When TBL is used as the organizing structure for an entire course, students master content through repeated iterations of a three-step process that consists of (1) preclass preparation, (2) assurance of readiness to apply learned concepts, and (3) application of content through group problem-solving activities [13].

## **2.1 Preclass preparation**

At the preparation stage, the trainer determines the learning outcomes, aims, objectives and the content of the training. Students take advantage of the recommended resources and try to gain knowledge and / or skills related to the predetermined and informed learning objectives. It is a basic rule that students come ready for educational applications. The preparation of the evaluation system in the preparation phase and the evaluation of the performance in this context should be determined. In addition, teams are created in preparation [14]. The number of ideal students in a team is 5-7 people. When creating teams, it is essential that diversity is combined so that different student characteristics are kept together [15, 16].

## **2.2 Assurance of readiness to apply learned concepts**

It is the first stage in which students come together in the classroom following their individual studies. At this stage, it is aimed to evaluate whether the students are at the level of being able to perform the planned training application with the highest efficiency and to determine and complete the deficiencies. An individual readiness test is generally applied, which can be completed within 10-15 minutes, where the main concepts in the learning objectives are tested by the students, and mostly multiple choice questions are used. Following the individual readiness exam, students come together with their predetermined team and discuss the same questions as a team and make a decision and indicate their responses on the team readiness exam answer sheet [14].

After team readiness exam, the instructor provides accurate answers and information about the performance of the teams. There may be claims that the teams have objections to some question structures and correct answers, or that alternative right answers are among the options. In this case, the teams are expected to defend their claims in evidence and in written form. Objections are made at the team level, not individual, and objection forms may be used for this purpose. The trainer may make brief briefings or a pre-prepared summary presentation in the areas where he / she feels deficiencies throughout the classroom or to fix misunderstandings [14].

## **2.3 Application of content through group problem-solving activities**

At this stage, one or more predetermined methods, such as a discussion session, case study, practice or play, in which the subject is generally considered may take place. The most preferred method is problem solving studies [17].

At the implementation stage, the teams work in the same hall, where they can see and hear each other. Team members must be together during studying. In the implementation stage, the tasks expected to be performed by the teams must be the same for each team and must be determined in advance. The tasks assigned should support both the learning level and the development of the teams. For this purpose, tasks that require intra-team interaction should be preferred. An ideal intergroup interaction usually arises when teams need to solve complex problems by using the basic concepts they learn and simply express their decisions. When the tasks that require the decision-making process are given, the students often try to reach a decision by discussing with each other [14].

During application activities, learners have the opportunity to try out their knowledge of course content by working in teams to solve ambiguous or complex problems that simulate realworld conditions. The sequencing of application activities is important because it can affect learner engagement with both course content and their peers. Descriptions of in-class problem-solving activities should include details about the presence and sequence of intrateam and interteam discussions, the relative proportion of time devoted to each type of discussion and the number of application activities performed [13].

### 3 Assessment and Evaluation

The peer evaluation method is used to determine the level of contribution of individuals to their teams. Student performance, team performance, peer assessment results are used as elements of student evaluation in team based learning [18].

### 4 Conclusion and Recommendations

Team based learning is an active method that focuses on implementing the knowledge of the trainer for solving real life problems in independent teams in a large classroom environment. The prevalence of team based learning in medical schools is increasing. Students take advantage of the knowledge they have gained in the discussion of problem solving in teams and get the opportunity to get instant feedback about the solutions they produce as a team. Taking into account the responsibility of learning to the class prepared incomes to apply their individual and team related information will then use this information to solve the problems given in the classroom through inter team discussions. It improves the skills of using learned content in problem solving, critical thinking, effective communication between teams, in teams and working skills [19, 20].

Increasing the number of applications based on teamwork and increasing the number of academic studies on this subject will provide valuable contributions to medical education. It seems possible for well-established team based applications to take place more widely in medical education and it is inevitable that team based learning becomes an effective training method.

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