

HOW TO APPLY TEAM-BASED LEARNING IN MEDICAL EDUCATION?

ELSHAMA, S. S.

Department of Forensic Medicine and Clinical Toxicology, Suez Canal University, Ismailia City, Egypt.

e-mail: saidelshama[at]yahoo.com

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Abstract. Team-Based Learning (TBL) is one of the new instructional strategies that encourage a higher level of learning and cognitive skills; it is a type of evidence-based collaborative active learning. Team-Based Learning is a form of small-group learning that enables one instructor to manage a number of small groups in a large class at the same time. So, small groups can work independently and effectively in the knowledge application under faculty leadership although the high students to faculty ratio. The four principles of TBL are properly formed and managed groups, student accountability, team assignments that promote learning and group interaction, and frequent and immediate feedback to the students. However, there are some obstacles and challenges that prevent the successful application of Team-Based Learning in medical education such as shortcomings of the content and the lack of qualified and experienced tutors. Thus, it should overcome these barriers during implementation to ensure effective Team-Based Learning. It should establish collaboration among faculty members, administrators, and other stakeholders based on a shared vision. Moreover, organizing regular training sessions which involve faculty members is by providing the required different resources, besides assigning a responsible educational team to implement the Team-Based Learning process with a regular follow-up.

Keywords: *Team-Based Learning, challenges, medical education, collaborative, active learning, implementation*

Introduction

In recent years, there is a growing interest to develop the professional skills of physicians to be suitable for the skills of the 21st-century medical professional as well as develop also students' competencies for self-directed learning. So, there is an urgent necessity to develop medical education by creating new instructional strategies that enable students to practice more and take the initiative and responsibility for their own learning improving the learning outcomes. Moreover, these new strategies will provide the needs of learners and other standard professional skills requirements of the physician of the future such as communication, leadership, and teamwork skills (Compton et al., 2016). Team-Based Learning (TBL) is one of the new instruction strategies that is considered a type of evidence-based collaborative active learning wherein it is a tool for the knowledge application in comparison with the traditional methods such as the lecture that is considered a tool for knowledge transmission. In the Team-Based Learning method, the student can master the course subject matter and utilize the course concepts via promoting critical thinking and problem-solving in contrast to the lecture that is a passive learning method wherein the audience is passive without any active role (Kendal-Wright and Kasuya, 2010).

Team-Based Learning develops interpersonal and group interaction skills preparing the student for life-long learning. It is considered a systematic approach to teaching and learning because it can promote medical educational activities and professional development enhancing key educational concepts in medical curricula. Furthermore, students in the Team-Based Learning method have ownership of their learning because

of their accountability for the learning material presented. Therefore, a number of medical schools in the world especially in the USA started and are still applying Team-Based Learning wherein knowledge acquisition has been noted to be better compared to traditional learning methods such as lectures beside it increases student engagement and improves communication (Thompson et al., 2007a).

However, Team-Based Learning (TBL) is not distinguished from traditional learning methods such as lecture only, but also from other new or innovative learning methods such as Problem-Based Learning (PBL) based on the variable Key points from a learning method to another (Zingone et al., 2010). In the Team-Based Learning method, students prepare content before the class, and then they apply it in the class as teamwork to solve the problem. Moreover, Team-Based Learning can also give students the chance to discuss and analyze the information encouraging peer debate and elaborative interrogation of content followed by testing for the knowledge application. In the Problem-Based Learning (PBL) method, the facilitator gives a case or problem and the students analyze it to solve this case in contrast with the traditional learning method wherein the instructor provides content in a lecture without any discussion or interaction (Inuwa et al., 2012).

In addition, the instructor of Team-Based Learning identifies learning objectives and content, prepares readiness tests, answers student questions, and prepares application assignments for teamwork while the role of the instructor in Problem-Based Learning is facilitating small group discussion and guidance giving the feedback to the students in contrast with the role of the instructor in traditional method who identifies learning objectives, prepares presentations and answers student questions (Falter et al., 2018). On another hand, the role of the student is also different in the three learning methods. In Team-Based Learning, the student is independent out of the class and joins team discussion in the class to defend solutions while the role of student in the traditional learning method is attending the lecture and studying the notes for the exam. In Problem-Based Learning, the student identifies learning issues in the class after group discussion, and then he does independent out of the class to attain the knowledge via searching in the different resources (Chan and Ganguly, 2008).

Discussion

The Team-Based Learning (TBL)

Team-Based Learning (TBL) is a form of small-group learning that enables one instructor to manage a number of small groups in a large class at the same time wherein small groups can work independently and effectively in the application of information under faculty leadership although the high students to faculty ratio. So, it is considered a small group instructional strategy that gives students the chance to apply knowledge via a collection of successive practices including individual work, teamwork, and instantaneous feedback (Cowan et al., 2010). Therefore, Team-based learning has four essential principles; it includes properly formed and managed groups, student accountability for the individual and teamwork, frequent and immediate student feedback (formative feedback), and the team assignments that promote learning, group interaction, and team development. So, the main features of Team-Based Learning are based on diverse student teams and activities (Elshama, 2016). In the related context, Team-Based Learning may be classified into two main phases, the first phase is the student preparation out of the class while the second is an application of knowledge in

the class. After that and for more clarification, the previous phases may be organized into a pre-class preparation as a first stage and another for readiness assurance testing in the class while the third stage is for application-focused exercise in the class too (Michaelsen and Sweet, 2008).

Adoption of Team-Based Learning in Medical Education

The adopters of Team-Based Learning enumerated a number of advantages in their defense about the application of this method in medical education. At first, Team-based learning motivates the students to learn in a team via the creation of students' enthusiasm to interact with each other and promote tutor-to-students interaction. Moreover, Team-Based Learning enhances also the staff's enthusiasm for teaching because the tutor works with a large class in teams, but in a low faculty to student ratio (Hawi, 2017). In addition, Team-Based Learning provides social support for at-risk students wherein the responsibility of the student attendance is related to the team and then it is not considered an issue. However, Team-Based Learning may be used in a large group in pre-clinical classes and clinical classes because the special required facilities (small group classrooms) are not needed (Michaelsen and Sweet, 2008). One of the important advantages of Team-Based Learning is encouraging a higher level of learning and developing higher-level cognitive skills. The discussion and interaction between the team members give students the chance to apply their understanding of knowledge and mastering of basic science concepts via answering a set of clinical based questions to resolve the problem given promoting their accountability. Furthermore, the performance of the team is better than the individual performance wherein the lowest group scores among the different groups tested have grades better than the highest individual marks (Koles et al., 2010).

Team-Based Learning encourages the students to construct interpersonal relationships among group members via creating the students' interactions that are based on discovering the different ways for teaching and communication among the members. In addition, Team-Based Learning as cooperative learning can lessen the possibility for interpersonal conflicts within the team members and acknowledge also the strength and weaknesses of individuals in the team. On another hand, Team-Based Learning requires the usage of large classrooms. Thereby, it is a cost-effective process during the implementation (Zgheib et al., 2016). Finally, the staff members play an active role via providing feedback to the students, introducing new material, and motivating the students via new open questions. This leads to a strong relationship between students and tutors because both become partners in the education process (Whitley et al., 2015).

The implementation of Team-Based Learning in Medical Education

At first, it should make a plan for the course before the beginning of the class wherein the course is divided into units with identification of the learning objectives and design of a grading system. It should explain how to conduct the Team-Based Learning course via demonstrating the readiness assurance test through reading a portion of the syllabus as a first step by the students, and then an individual test and a group test are performed (Haque and Majumder, 2017). To get the starting point, it should form groups "teams" (5-7 students per team) in one big classroom depending on specific students' characters such as the grading (individual test) and the positive group norms

(pre-class preparation and class attendance). Members of the team should be included high and low-level students to maintain equity among the different teams' participants and to encourage the poor-level students to learn from the high-level students (Burgess et al., 2018).

Noteworthy, the properly formed and managed groups lead to easy communication that helps the learning and then the success of the team. So, it should consist of enough members (5-7 members) to maximize the resources and allow full participation of the members. Furthermore, it should avoid previously established groups to minimize the barriers and mix the students to establish new groups from the ground up with permanency to develop more group cohesiveness while the group resources should distribute evenly for the learning team to work effectively (Khansari and Coyne, 2018). Activities of Team-Based Learning include preparation outside of the class, and in-class individual, group readiness assurance tests, and application exercises wherein problem and potential solution are discussed in teams and then as a class with the facilitator. The tutor identifies the content for the students as assignments in the pre-class preparation stage whereas the student studies the content for the test (individual study). In more detail, it should give reading assignments to students at home prior to the Team-Based Learning session as preparation for the Readiness Assurance Test and covering the contents that are going to be in the class (Parmelee et al., 2012).

In the class, the student is tested on the previous content individually (Individual Readiness Assurance Test) at the beginning of the Team-Based Learning session. It is a Multiple-Choice Questions (MCQ) and selection of one best answer to assess pre-class preparation and the student's readiness to apply the knowledge in the class (Tweddell et al., 2016). And then, the student joins with the team to solve simple and complex concepts as a team at the same test (Group Readiness Assurance Test) wherein the team interacts on a common activity (discussion) with an individual commitment to the usefulness of the group with development of the high level of the trust among the members of the team. Written team appeals are performed to show the evidence from the reading and then the clarifying lecture is instructed by the instructor to clarify the issues. After that, the student performs application-oriented activities such as problem-solving. The final phase is the assessment of student learning (Obad et al., 2016).

The student accountability for the individual and teamwork depends on the pre-class preparation phase wherein individual preparation is important for teamwork and the group test. And then, the readiness assurance test can evaluate the pre-class preparation phase; it also depends on contribution to the team via the performance and peer assessment of each member of the team (Wu et al., 2018). Readiness assurance is a four-step process that launches at the starting of the course; it consists of pre-reading by the students outside the lecture hall, individual readiness assessment test (MCQ), team readiness assessment test (the team takes the same test but the answers are consensus from the team with immediate feedback on their performance) and appeals that are written argument from the team based on the evidence from the course content to justify the incorrect answers (Oldland et al., 2017). Therefore, readiness Assurance Tests (RATS) and application-focused team assignments can give frequent and immediate student feedback on the group performance wherein the appropriate team assignments require group interaction for making the decisions by the members, and then present a simple report. Finally, near the end of class, it should revise the learning objectives and recognize the effective team interaction (Burgess et al., 2014).

Obstacles and challenges facing Team-Based Learning implementation

There are some obstacles and challenges that prevent the successful application of Team-Based Learning in medical education. So, it should overcome these barriers during implementation such as shortcomings of the content that cannot enable the instructors to respond to all queries of the students especially the instructors who have less experience such as novice tutors. In addition, the content may not be clear nor suitable for Team-Based Learning sessions wherein it should provide an opportunity for students to apply the ordinary basic concepts (Lane, 2008). There is another challenge that is related to the role of tutor that should not be centered in Team Based Learning wherein these sessions should be student-centered. Therefore, some traditional tutors sometimes cannot abandon their lecturer skills leading to a low level of interaction and engagement among the team members that affect also the level of deep learning for the students. Moreover, the lack of qualified and experienced tutors leads to frustrated students because of their inability to present clarified answers to the repeated students' questions (Thompson et al., 2007b).

Finally, there is a major problem about how to reform course or subject from traditional format to Team-Based Learning format that requires more experience, effort, and time. This transformation needs more preparation ahead of the session for different questions and cases, readiness assurance tests, and application exercises (Zgheib, 2012).

The effective Team-Based Learning session

To conduct effective Team-Based Learning sessions; there are some requirements that should be followed. Firstly, it should establish a collaboration among faculty members, administrators, and other stakeholders to adopt and apply Team-Based Learning as a new strategy in medical school based on a shared vision. Secondly, assign a responsible educational team to implement the Team-Based Learning process with a regular follow-up. Thirdly, organize regular training sessions for the involved faculty members to gain the required experience about how to apply the Team-Based Learning process (Parmelee and Michaelsen, 2010). Fourthly, it should provide the required different resources such as a large classroom to conduct Team-Based Learning that includes a large number of students who should be in a good seating arrangement to allow adequate interactions among the team. In addition, it should create a question bank for the readiness assurance tests along with the application exercises. Fifthly, assign personnel for preparation of the equipment and supplies needed for every session because scientific preparation of the session needs a lot of effort from tutors (Cestone et al., 2008).

In a related context, there are some scientific and educational tips that should be followed to ensure effective Team-Based Learning. At first, it should start with good course planning using a backward design during creating the Team-Based Learning course along with organization the course activities according to the learning goals to ensure that the students can reach the target learning goals (Conway et al., 2010). It should also mention that the team should be created thoughtfully as a necessity. Furthermore, the readiness assurance process should be clear with advanced preparation estimating its importance well because it is considered the link between the students' advanced preparation and the group application exercises. Moreover, these applied exercises should be developed to provide individual feedback and peer teaching within

the team because the application exercises can prompt deep thinking and engaged content-focused discussion (Zgheib et al., 2011).

Finally, the rationale of using Team-Based Learning and its distinction from other learning groups is based mainly on the accountability of the individual, team, and instructor to ensure the success of this type of learning (Team-Based Learning). So, conducting a fair appeals process will help for inspiring further learning while a well-designed peer evaluation process helps the students to identify and accept the constructive feedback (Tai and Koh, 2018).

Conclusion

Team-Based Learning is self-directed learning preparing the student for life-long learning. It is a small group instructional strategy that gives students the chance to apply knowledge via a collection of successive practices including individual work, teamwork, and instantaneous feedback. There are some obstacles and challenges that prevent the successful application of Team-Based Learning in medical education such as shortcomings of the content, lack of the required resources, and shortage of unqualified faculty members. So, it should overcome these challenges to achieve a successful implementation for Team-Based Learning via more collaboration among stakeholders, providing the facilities, training sessions for the faculty members.

The new and advanced educational methods that are used in medical education are not modern in the literal sense of the word, but it has been applied in many medical schools since many years ago. It was transformed into a phenomenon recently because of the expansion of its application in many medical schools around the world, especially in developing countries. The application of these innovative educational methods in some cases was a sovereign decision of the educational authority (the national medical sector). In another situation, it was applied as a response to the requirements of quality and accreditation because these educational methods are considered the most appropriate to meet these requirements. Therefore, many medical colleges had changed their educational curricula and adopted one of these modern educational methods while the others blended modern and traditional methods.

Apart from the struggle between the traditional and modern systems, let's agree at the outset that not all novelty is necessarily applicable anywhere. Therefore, the success in the application of any educational method depends on the extent of the appropriate choice for this educational method that should be compatible with the available facilities and the surrounding environment as well as the culture of the implementers and other stakeholders in this educational institution to get the target from the change. Consequently, many of the experiences on the ground did not achieve the desired results from the application of innovative educational methods in these medical schools wherein there were many shortcomings. Finally, the author thinks that every newness is not necessarily useful or applicable, especially if there is a difference in the situation, surrounding environment, time, and the target people. So, it should be considered that there are many factors that may limit the desired positive results from the application of this new method or system. Thus, this innovation should be adapted with these factors or doing a factor modification to be in harmony with renovation.

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Conflict of interest

The author declares that there is no conflict of interest.

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