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Team-Based Learning: Benefits on Learning and Students' Perception

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ABSTRACT

Team-based learning (TBL) is relatively new in medical education and has yet to be implemented in Malaysia. The main purpose of TBL is to change the classroom experience from acquiring to applying knowledge in a team. The aim of this study is to identify the student's perception of TBL and the impact on the student's learning in Universiti Sains Islam Malaysia (USIM). The TBL pedagogy was imparted into the teaching of Haematology module among the 3rd year medical students of USIM. Part of the face-to-face teaching sessions (25%) was changed to online learning packages while the tutorial and practical sessions were transformed into readiness assurance tests (RATs) and application exercises. The TBL implementation and the students' performance were observed closely and at the end of the module, a feedback form was distributed to the students (n = 79). Data was analysed using SPSS version 19.0. We found that TBL encouraged students to work more seriously and effectively in teams (93.59%). They are comfortable working in teams and satisfied with the team members' participation (98.72%). They agreed that TBL enhanced their understanding, evidenced by improvement in the tutorial marks (98.72%). TBL also improves their communication skill and self-confidence (84.42%). In general, they preferred the TBL compared to the traditional method (89.61%). Many are not comfortable with online learning and would appreciate more face-to-face lecture sessions (52.56%). However, they commented that adequate facilities are required for an effective TBL (94.87%). In conclusion, students' perception and outcome assessment showed promising results and should be considered for implementation.

Keywords: *Medical education, TBL, Pedagogy, Outcome, Assessment*

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INTRODUCTION

Team-based learning (TBL) in medical education is new and has not been used widely in Malaysia. The modes of curriculum in most medical school includes lecture-based, problem-based and a combination of lecture-based with small group teaching (1, 2). Lecture-based

curriculum has been the most common strategy, but it has been challenged because of the passive form of learning and lack of critical thinking among the students. As medical educators recognised the importance of active learning, applications of problem-based learning (PBL) were implemented years ago. PBL tends to increase active learning among students.

However, it requires more academic staffing by the faculty (3). TBL may be successfully delivered across multiple courses and in all years of an undergraduate medical curriculum (4). TBL, the recent teaching method in medicine is hoped to give a better quality of teaching and learning with minimal number of instructor (3, 5).

TBL is a form of collaborative learning that consists of strategically formed permanent teams, readiness assurance tests (RATs), application activities and peer evaluations (6). In TBL, most of the class time is used for group work. The continuous group work enhances their ability to apply the course content. The courses taught with TBL typically involve multiple group assignments that are designed and sequenced to improve learning and promote the development of self-directed learning (7). The primary learning objective in TBL is to go beyond simply “covering” content and focus on ensuring that students can apply the course concepts to solve problems (6–7). Most of the class time is used for team assignments that focus on using course content to solve problems that students are likely to face in the future (7). Thus, TBL is designed to provide students with both conceptual and procedural knowledge.

In TBL pedagogy, students spend their classroom time applying course materials in teams rather than simply acquiring it individually (7). The main purpose of TBL is to change the classroom experience from acquiring knowledge in a lecture-based format to applying knowledge in a team format. Students are accountable for the pre-class preparation and contribute to team success (7). A few reviews and reports on the implementation of TBL, mainly in the western countries, showed promising results (8–16). Reports on the experience of TBL within Malaysian medical schools also showed positive feedback but were scarce (17–20). This study was carried out to identify the student’s perception of TBL and the impact on the student’s learning in Universiti Sains Islam Malaysia (USIM).

METHODOLOGY

In this study, the TBL module was designed as described by Michaelsen et al. (7). Students were strategically organised into permanent groups for the entire semester. The teams should be diverse that it consists of good and poor students, introvert and extrovert students (7). We organise the groups based on their gender, previous academic performance and their personality. The course content is organised into major units (typically 5–7). Each TBL unit begins by studying assigned learning material (reading materials, website tutorials, video demonstrations, etc.) prior to class. In the first session of a TBL unit, students sit for an individual readiness assessment test (iRAT) over the assigned material. Right after this individual test, the students re-sit the same test as a team (team readiness assessment test, tRAT), and immediately find out how they scored on both the individual and team test (7) (Figure 1). Both grades are counted in the summative assessment. Marks attained for iRAT and tRAT will be counted into their final marks. The questions posted were of problem solving and they are required to make complex decisions individually (iRAT) and in team (tRAT). They were also given frequent and timely feedback on their performance. Following this process, each team is assigned with application exercise on the same topic.

Haematology module, which runs over four weeks, was chosen for the pilot study of TBL implementation. This course is taught to the 3rd year medical students. Learning materials were prepared accordingly in which 25% of the lectures was converted to online learning packages. Students were provided with the online pre-reading materials and study time was allocated in the timetable. The other 75% of the study topics were delivered as interactive lecture. The tutorials were converted into iRATs and tRATs while the case-based discussion was converted into application activities.

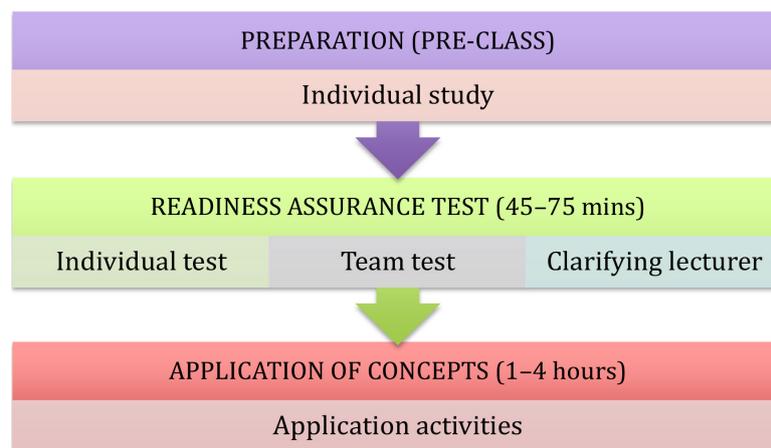


Figure 1: The general outlines on how a unit of TBL course is organised.

The students were put into 12 small groups comprising of six to seven person per group. The RATs were given in the form of one best answer (OBA) questions. The marks for iRATs and tRATs were collected after the activities. Close observation of the TBL implementation and students' performance was done. At the end of the module, a feedback form was distributed to all subjects ($n = 79$). Students were asked to give their feedback on the benefits of TBL on their learning and their acceptance of TBL pedagogy. They were encouraged to give their suggestions on how to improve the TBL implementation in an open-ended question. Data was analysed using SPSS version 19.0. This study is part of the faculty's continuous quality improvement process, thus do not require any ethical approval.

RESULTS

Benefits of TBL on Students' Learning

The students agreed that TBL enhanced their learning and understanding, evidenced by improvement in the RATs marks. The students also benefit from TBL where it improves their soft skill and self-confidence (Figure 2). Students showed improvement in the marks obtained in tRATs compared to iRATs (Figure 3). During the discussion, they were able to give reasons for their

answers. The RATs and application activities were noted to be more dynamic and active with the TBL pedagogy.

Students' Reaction towards TBL

Students were comfortable working in teams and satisfied with the team members' participation. In general, they preferred the TBL compared to the usual tutorial/practical session. However, they commented that the facilities need to be improved for an effective TBL implementation (e.g. internet connection, sound system and seating arrangement). Almost half of the students commented that they were not comfortable with the online learning and would appreciate more face-to-face lecture sessions (Figure 4).

DISCUSSION AND RECOMMENDATIONS

Benefits of TBL on Students' Learning

TBL produces a wide variety of benefits for students and educators. TBL enables a number of outcomes that are rarely achieved in a lecture-based curriculum and with any other small-group based instructional approach. In this study, students agreed that TBL enhanced their learning and understanding. This was clearly evidenced by the marked improvement in the tRAT

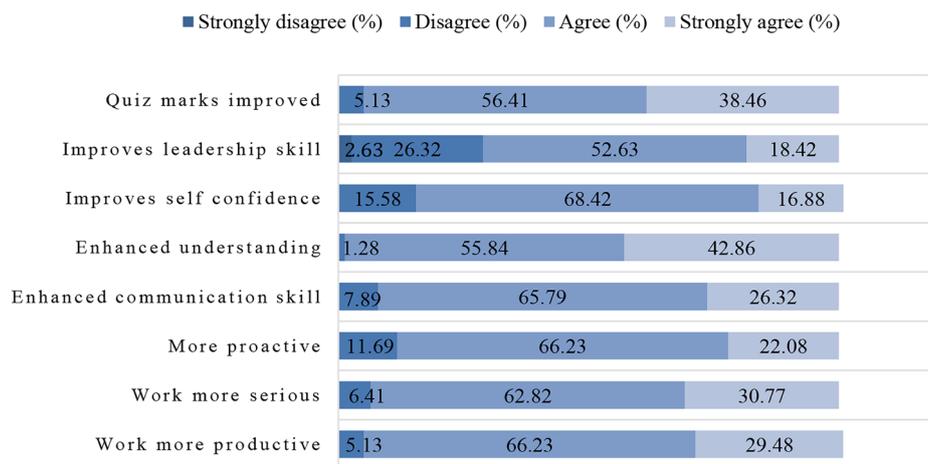


Figure 2: Benefits of TBL on students' learning.

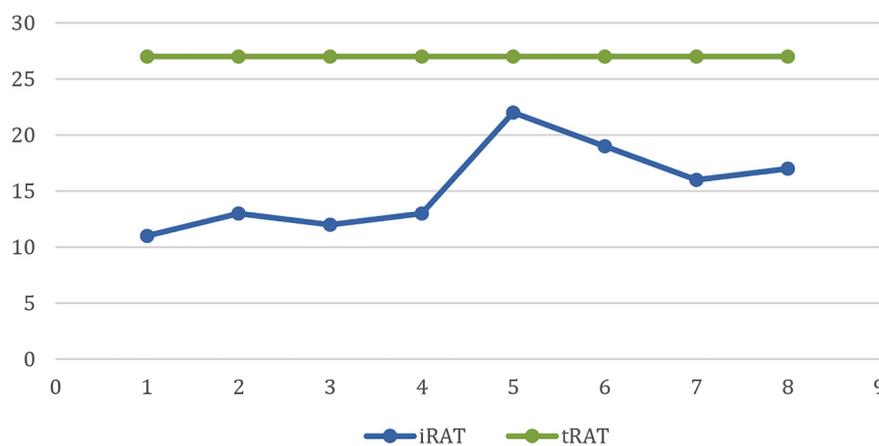


Figure 3: Marks obtained in RATs by members of a group – showing marked improvement in the tRATs marks.

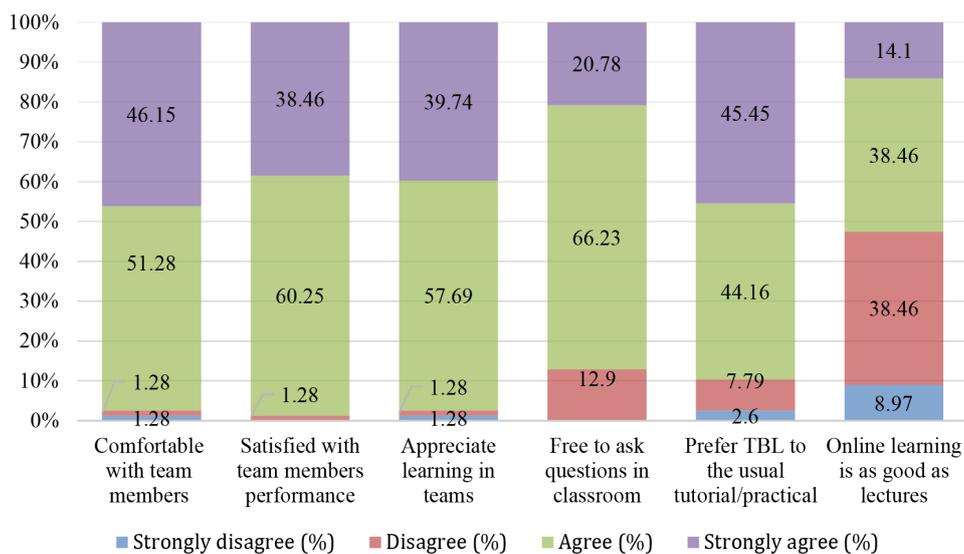


Figure 4: Students' reaction towards TBL.

marks. With TBL, most students progress well beyond acquiring factual knowledge and achieved a depth of understanding that can only be achieved through solving a series of problems, which are complex and difficult to be completed through individual effort. A study by Kim et al. demonstrated that TBL is an effective teaching strategy to enhance problem-solving ability, knowledge and clinical performance (16).

Many students gain profound insights into their strengths and weaknesses as learners and as team members. Compared to a traditional curriculum, TBL encourages the weak students to successfully complete and stay on track in their course work (8). From the administrative view, the groups grow into effective self-managed learning teams. As a result, the faculty needs only minimal number of facilitators. TBL is highly cost-effective since it can be successfully employed in large classes and across the entire spectrum of courses (3).

Students also benefit from TBL where it improves their soft skill and self-confidence (21). The students work more productively and seriously while in team. They were more proactive, improved in communication skill, self-confidence and leadership skill. Other authors also reported similar findings. Alizadeh et al. reported TBL improved shared leadership (22) while Oldland et al. found out that students believed participation in TBL helped them to develop effective learning, increased confidence, enhanced communication and teamwork (23).

TBL prompts most students to engage in the learning process with a level of energy and enthusiasm that makes learning more exciting (24). This was clearly shown from the feedback where the students experienced majority of the positive effects. This is rewarding for both the students and the instructor. In team-based learning, students' performance in iRAT and tRAT contributes to their final marks. Therefore, instructors seldom have to worry about students not being in class or failing to

prepare for the work that he has planned. When students are truly prepared for class, interacting with them is much more effective and meaningful. Findings in both group dynamics research and educational research highlight the positive impact of diverse input in problem-solving discussions on both learning and performance (13). When group members bring many different perspectives to a task, their process of collaborative knowledge building is more powerful.

Students' Reaction towards TBL Implementation

The current study showed that students were comfortable working in teams and satisfied with the team members' participation. Students appreciated learning in teams and was developing the understanding and skills needed to work productively in task-groups as reported by Huitt et al. (14). TBL in an intensive course format seems to be especially attractive for the best students of the year, making them even more successful in the key exam. Even the students who usually learned alone highly appreciated learning in teams, thereby developing the understanding and skills needed to work productively in task-groups. A report from India showed improvement in student engagement with course content, thus enhanced their understanding (15). They believed that it will help them to perform better in their exams. Many students view TBL favourably irrespective of their grades (16). No difference was noted between mean ratings of teamwork, which were also, overall, positive. They conclude that medical students view TBL favourably irrespective of their grades. Incorporation of TBL supports active learning, critical thinking and clinical integration of foundational knowledge using large classroom collaborative learning processes, which may raise their interest in learning (25). Basu and Biswas concluded that TBL is an effective method particularly in a highly condensed and concept-based course like pathology (4). Real-time feedback motivates students to put in more

effort to learn. TBL exercise provides students an opportunity to coach others the methodology of learning, and take an active role in a team, which will help them as a future medical practitioner as medical care is not delivered by an individual; rather by a trained team.

In most reports, students preferred TBL compared to the lecture-based pedagogy. TBL was proven to have a significant impact on student test scores as compared to didactic lectures. Majority of the students were satisfied with TBL as a teaching methodology and preferred it to didactic lectures (26–27). Unfortunately, in this study, almost half of the students did not feel that online learning is as good as face-to-face learning. This may be related to the culture of lecture-based learning that has been used since their primary school. This culture should be transformed to student-centered learning, which can be fulfilled by TBL (28). This reflects that development and implementation of new curriculum and assessments is highly relevant. The different teaching-learning methods, which increase the student's involvement, should be implemented in medical education to facilitate the learning process. However, in this study, students commented that the facilities need to be improved for an effective TBL.

Significant change was noted in student's attitude in professional development, satisfaction with team experience, and comfortable with peer evaluation. Dean et al. demonstrates that student's attitudes about working within teams, their sense of professional development, comfort and satisfaction with peer evaluation change in a curriculum using TBL (11). TBL also improves students' attitudes towards working with peers. It is an effective teaching method to ensure a consistent approach to problem-solving and curriculum integration in workshop sessions for a pathophysiology and therapeutics course sequence (29–30). TBL is an effective supplement to cadaveric

dissection in the laboratory portion of gross anatomy. It improves both students' grades and perceptions of teamwork. Bouw et al. reported that TBL stimulates proactive learning from peer-to-peer teaching where students positively perceived student-led TBL as encouraging proactive learning from peer-to-peer teaching (8). It enhanced interpersonal and communication skills by promoting teamwork and learning in a pathology residency programme. Residents scored higher on the readiness assurance tests when working in teams, demonstrating the effectiveness of team learning and achievement. In addition, the Accreditation Council for Graduate Medical Education competencies of professionalism and interpersonal and communication skills were further enhanced by incorporating TBL into pathology residency training (31). In a nutshell, TBL gives positive impact on student performance. Studies showed that TBL helps the students to get higher score in examination. The learning experience was attractive for the best students, making them even more successful in the exam (14, 16, 32–33). Students whose performance is in the lowest quartile of the class benefited more from TBL than those in the highest quartile (33).

CONCLUSION

TBL is a new paradigm in medical education. It shifts the course goal shifts from knowing to applying, teacher shifts from "on stage" to "guide at side", students shift from passive to active learner and responsibility for learning shifts from instructor to student. USIM is looking into the possibility of applying TBL in the medical curriculum. Our results on learner engagement and satisfaction with TBL were similar to those of previous reports. However, a careful assessment on the challenges, outcome and issues related to TBL need to be studied. To ensure that TBL will be successfully implemented, a few areas need to be investigated. A very good financial support from the management

team, an adequate facility in teaching and learning activities using TBL as well as the academician acceptance plays a major role.

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