

ORIGINAL ARTICLE

Perception of students about Team-based learning (TBL) & Problem-based learning (PBL)

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ABSTRACT

Background: Medical teaching has evolved over the past few years, from traditional teaching methods such as lectures and practical classes using blackboard, slide projector to more student-centered activities such as self-directed learning, problem-based learning (PBL), and team-based learning (TBL). Problem based learning is an integral part of our MBBS curriculum. We introduced TBL to 2nd-year MBBS students in the Pharmacology department, who are also practicing PBL in the 2nd year.

Aim: The study aimed to know student's perceptions about TBL and PBL.

Methods: Students were asked to anonymously fill the questionnaire regarding each teaching strategy using both open and closed-ended questions. The data were analyzed by using SPSS version 21.

Results: A total of 120 students filled the questionnaire regarding their perception about TBL, and 94 students filled the questionnaire regarding PBL. Students found the readiness assurance tests and immediate feedback useful for their learning in TBL. While for PBL, students found that group members respected different points of view, and there is better integration among different disciplines.

Conclusion: It is the need of the hour to include new strategies in our curriculum which promote teamwork and effective communication skills. Both PBL and TBL have advantages of their own and can provide better student learning if incorporated in a medical curriculum, keeping in view the students' responses in our study.

Keywords: Team-based learning (TBL), Problem-based learning (PBL).

Introduction: The healthcare system in the world is changing and is in the process of continuous renewal. (Dolmans, Michaelsen, Van Merriënboer, & van der Vleuten, 2015) The curriculum is also shifting from teacher-centered to student-centered, in which the role of the teacher is changed from an instructor to a facilitator (Hansen & Imse, 2016). At the University College of Medicine, we follow an integrated modular curriculum in which the mode of information transfer includes PBL (Problem-based learning), small group discussions, and interactive lectures.

PBL history falls back to the late 1980s, and it serves as a starting point for collaborative learning (Ludmerer, 2011). For finding the rationale of PBL, many researchers had done work on it (Taylor & Mifflin, 2008). Kinkade's found that over 70% of American medical schools had included PBL in their curriculum in a greater or lesser form (Kinkade, 2005).

PBL is an integral part of the integrated modular curriculum followed in UCM. A PBL session consists of 8-10 students and a facilitator. Students elect a leader and a scribe among them for each PBL session (Wood, 2003). PBL is conducted in 2 sessions; each consists of 2 hours. In the 1st session of PBL, students are provided with an interesting and challenging clinical scenario. Students use triggers from the provided clinical scenario and define their learning objectives, which are made by brainstorming in the group and accepting opinions. Subsequently, the students will go for independent, self-directed study to get the answers for the proposed learning objectives. Students are encouraged to consult books, the internet, or evidence-based current guidelines before coming back for the 2nd session for group discussion and clarification of concepts. The students then apply the learned concepts to the scenario given during the 1st session. During both sessions, the faculty member works as a facilitator and encourage all group members to participate (Moust, Berkel, & Schmidt, 2005).

In contrast to PBL, Team-based learning (TBL) is another student-centered learning strategy. It is practiced in many medical schools worldwide that enable students to use their knowledge by the progression of events, including individual effort, team effort, and immediate feedback by a facilitator (Parmelee, Michaelsen, Cook, & Hudes, 2012). TBL was used initially by

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business education, but now it has gained popularity in medical education (Michaelsen & Sweet, 2008). TBL starts by assigning mandatory pre-reading material (Michaelsen & Sweet, 2008). Students begin by giving a short test of the assigned pre-reading material called IRAT (Individual readiness assurance test). After IRAT, students are given the same test again, but in teams. They discuss their answers and reach a consensus to mark the correct option as a team test called TRAT (Team readiness assurance test), in which they are allowed to consult books. At the end of TRAT, there will be a brainstorming session based on team answers by the facilitator (Dolmans et al., 2015). Students are given options to appeal against any question marked as incorrect or irrelevant to the course material. In the end, a clarifying lecture is usually given in which the facilitator targets information that TRAT scores show students do not yet understand.

Keeping in mind the importance of TBL mentioned in the literature (Frame et al., 2015; Ofstad & Brunner, 2013; Whitley et al., 2015) and the lack of data about its use in medical schools of Pakistan, we decided to start TBL sessions in the department of pharmacology with the intention to improve the students' learning experiences and motivate them to be active learners.

Methods: The study was conducted in the Department of pharmacology at the University College of Medicine & Dentistry (UCM&D), University of Lahore. It was a descriptive cross-sectional study, and the sampling technique was non-probability sampling. A questionnaire designed by A. Burges (Burgess et al., 2017) for TBL and PBL was distributed among students. The questionnaire included both close-ended and open-ended questions. A five-point Likert Scale was used to record the data. Open-ended questions were also asked to check the pros and cons of these strategies. There were 150 students in 2nd-year of MBBS. The inclusion criteria were 2nd-year MBBS students who have done both PBL & TBL. They were 150 in strength. And the exclusion criteria were 1st year, 3rd year, 4th year, and final year MBBS students who have not attended TBL. Data was entered and analyzed on SPSS version 21. All the variables were presented in the form of frequencies and percentages. Ethical approval was taken from the ethical review board.

Results: A total of 120/150 (80%) students completed a questionnaire regarding TBL, and 94/150 (63%) completed a questionnaire on PBL.

Student responses regarding the perception of TBL and PBL are shown in Figures 1 and 2, respectively. 88% of students strongly agreed or agreed that team members respected different points of view in PBL than 82% of students in TBL. Notably, 83% of students strongly agreed or agreed that they received useful and timely feedback from the TBL tutor compared to 73% of students in PBL. 86% of students strongly agreed or agreed that the tutor helps them focus on discussions and learning during TBL compared to 83% of students in PBL. Surprisingly, 87.5% of students strongly agreed or agreed that both IRAT and TRAT helped them achieve their TBL goals and understanding. 83% of students strongly agreed or agreed that the group actively discussed multiple points of view before deciding on a final answer in PBL compared with 79% of TBL students. 82% of students strongly agreed or agreed that their problem-solving skills are improved after PBL compared to 81% of TBL students. In response to that, the students read the reading material before the session; 75% strongly agreed or agreed that they come prepared before PBL compared to 49% in TBL.

Our open-ended questions were also answered by students considering the pros and cons of these strategies. Students found PBL to be a better way of improving communication skills and integrating different subjects. Brainstorming skills, confidence building, and exposure to clinical scenarios in early pre-clinical years were marked as pros of PBL. Some of the students showed concern about the scenario formation, which made them clueless regarding the diagnosis. Some students also wrote that they felt shy in presenting information during a PBL session.

Students reported that they learned leadership skills, respect others' points of view, and encourage other team members during TBL sessions. They reported that TBL enhanced teamwork and promoted mutual learning among the students. They liked the concept of individual and team tests before the discussion as they help them in self-evaluation regarding their concepts. They reported that the student came unprepared, and the duration of the session was short. Some students pointed out that some of the team members don't actively participate during TRAT.

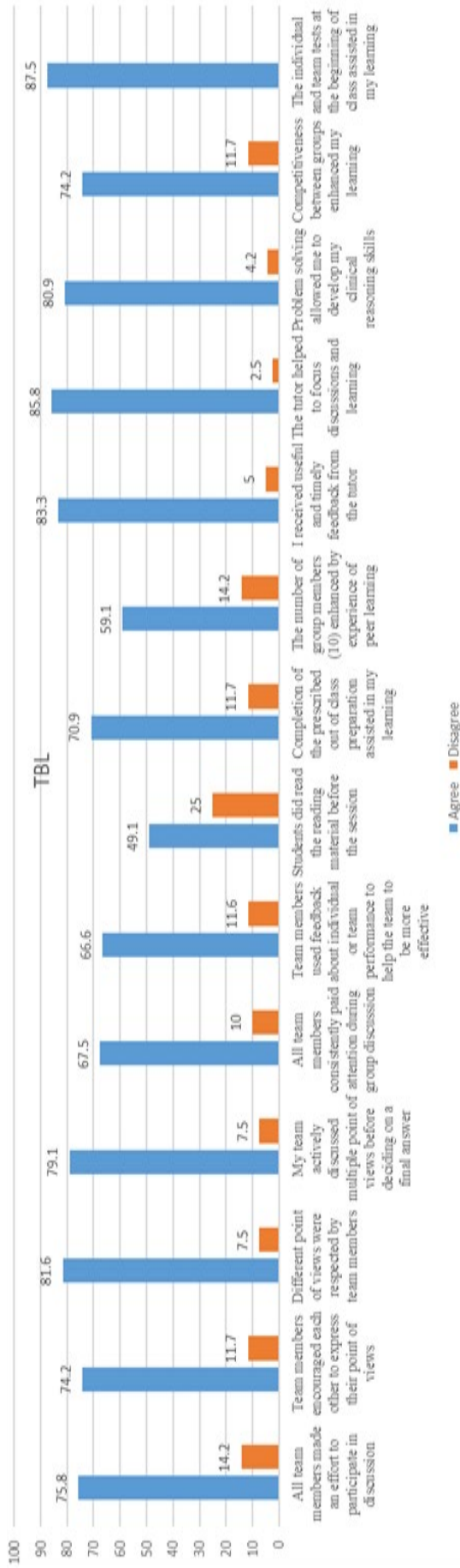


Figure 1. Student responses to close-ended questions regarding TBL (in percentages %)

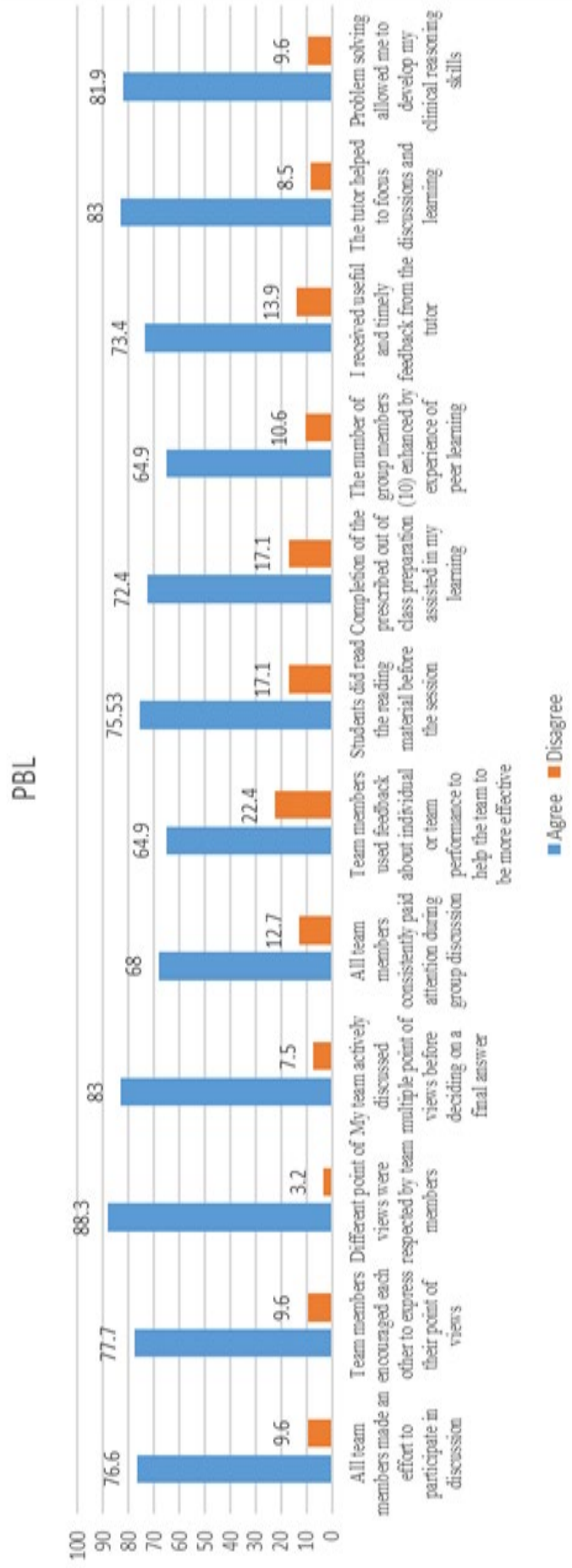


Figure 2. Student responses to close-ended questions regarding PBL (in percentages %)

Discussion: Around the world, there is a wave of change in the mode of information transfer in medical schools (Bin Abdulrahman, 2008). TBL and PBL are the learning strategies widely accepted and used in many medical schools (Abdelkhalek, Hussein, Gibbs, & Hamdy, 2010). PBL has reported benefits on students' problem-solving skills (Koh, Khoo, Wong, & Koh, 2008). Various researchers have noted that introducing TBL to MBBS students in pre-clinical years would help their PBL experience in the future (Abdelkhalek et al., 2010). We conducted our study to find out student's perceptions about PBL and TBL in the Pharmacology department. We introduced TBL to our 2nd-year MBBS students who are already experiencing PBL sessions to know their perception about both learning strategies. Results show that students well appreciated both approaches. In TBL, students found the readiness assurance tests (individual and team tests) helpful and favorable for their learning. The tests motivated the students to understand better. They felt encouraged during TRAT and the facilitator's wrap-up session to clarify the students' queries and difficult concepts identified after TRAT. In contrast, the students felt that the role of facilitator during the PBL session is limited, which leads to hindered learning.

Excellent communication skills and the ability to work efficiently in a team is important for patient safety (O'Daniel & Rosenstein, 2008). TBL and PBL are structured to promote team learning and work efficiently in a team. In response to "All team members made an effort to participate in the discussion," 76% of students strongly agreed or agreed in favor of both PBL and TBL. Only 49% of students strongly agreed or agreed that students did read the reading material before the TBL session, which is considered a drawback. One of the biggest reasons is the cultural and educational dilemma in which the students are spoon-fed and used to teacher-centered learning. Students showed less interest in pre-reading assigned material because, after years of traditional lectures, students are used to it and may not be willing to participate as self-directed learners (Hunt, Haidet, Coverdale, & Richards, 2003).

Most of the students (87%) agreed that the IRAT and TRAT during TBL helped them self-evaluate their learning. Students learn by comparing their answers with peers and confront each other answers to reach a final solution. The TBL strategy enables them to work in a team efficiently and critically evaluate things (Hrynchak & Batty, 2012). On the other hand, these tests immediately provide an idea to the facilitator about the student's understanding and needs regarding the topic (Parmelee et al., 2012). By giving the individual tests (IRAT), students felt personal accountability and the team test (TRAT) enhances teamwork (Hunt et al., 2003). In TBL, 74% of students strongly agreed or agreed that competitiveness between groups improved their

learning. Research has proved that healthy competition among students as a team motivated them to perform better (Thompson et al., 2015).

Students expect teachers to guide and help them in active learning (Hunter, 2008). The main advantage of TBL was the presence of subject experts (facilitator), who provide them constructive feedback (Dolmans et al., 2015). Research shows that subject specialist facilitators helped the students enhance their learning experience (Obad et al., 2016). In contrast, in PBL, different subject experts are present as facilitators, which leads to a lack of feedback that impedes learning (Learning, 2001). Feedback is considered the most vital tool for learning and achievement (Hattie, 2007). Improved knowledge, skills, and behavior are noted for feedback purposes (Burgess & Mellis, 2015). For TBL, feedback is a must thing, and by on-spot feedback, students' ambiguities are cleared. Feedback is provided in individual, team tests, and discussion (Burgess et al., 2017). 83% of students strongly agreed or agreed that they received useful and timely feedback from TBL tutors. It is a well-known fact that there should be a facilitator instead of a subject expert for a PBL session (Gilkison, 2003), but when feedback was not provided to students, a sense of incomplete information is felt.

A distinguishing feature of PBL includes encouraging students to do self-directed learning (Burgess et al., 2017). Students make their questions or queries for self-study, on which they will discuss in the group. When students are made responsible for their learning, they achieve learning skills to further their studies (Aksela & Haatainen, 2019). There are many reported pieces of evidence which suggest that PBL promotes self-directed learning (Norman & Schmidt, 1992; Ryan, 1993)

Limitations of the study: Our study was based on student's perceptions of TBL and PBL. Their views may or may not be representative of the wider student population or applicable to other universities.

Conclusion: The need of the hour is to include new strategies in our curriculum to promote teamwork and effective communication skills. Both PBL and TBL have advantages of their own and can provide better student learning if incorporated in a medical curriculum, keeping in view the student's responses in our study.

Declaration of interest:

The authors report no conflict of interest. The authors alone are responsible for the content and writing of this article.

Notes on contributors:

- Khizar Ansar Malik: Conception and design of the work;

the acquisition, analysis, & interpretation of data from work. Drafting the work & revising it critically for important intellectual content

- Usman Mahboob: Critical Review & final approval of the version to be published

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