

## The key points and effect of TBL: A research review

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**Abstract.** TBL has been used more and more in university teaching, which has set off a wave of teaching reform. However, under this trend, there are still many questions about the application of TBL, which restricts its further development. Are the components of TBL the same in different courses? Can TBL bring about positive teaching effect? If so, what are these effects? What are the key issues to solve in implementing TBL? These three main questions are discussed in order to provide useful references for the follow-up researchers.

### 1. Introduction

In 2002, Michaelsen, a professor at Oklahoma university, formally named a teaching strategy for promoting active Learning, which is called team-based Learning (TBL). More and more educators are applying TBL to the classroom. By 2012, more than 60 schools in the United States, Japan, Canada and other countries had adopted TBL<sup>[1]</sup>, and most of them have improved the teaching effect. Although TBL is becoming more and more popular, it is not really a major teaching method. This situation exists because people are confused about three aspects. First of all, are the components of TBL the same in different courses? Secondly, can TBL bring positive teaching effects? If so, what are these effects? Finally, what are the key issues to be addressed in implementing this new approach? Based on the summary and analysis of the implementation effect of TBL, this paper hopes to provide references for subsequent researchers.

### 2. The main components of TBL

A high degree of modularity is an important characteristic of TBL, which contains seven core design elements. The seven elements are team building, readiness assurance (RA), immediate feedback, team application, 4S principles (major issues, same issues, specific selection and synchronized reporting), incentives, and peer review. Building standard TBL instruction in any course requires these elements, but their design needs to be tailored to the course's requirements. Therefore, people can not help but think, does this highly modular teaching model bring about the improvement of teaching effect?

### 3. Improvement effect of TBL on teaching

#### 3.1 Student Engagement

Student Engagement reflects the degree of integration into learning. The level of interaction between students in TBL courses has been greatly improved. Mennenga<sup>[2]</sup> explored the relationship between participation and achievement of TBL teaching group (n= 69) and traditional teaching group (n=74) in the one-semester community health care course. The statistical results of the eight class participation surveys showed that the scores of the traditional teaching group ranged from 11 to 32, with an average of 21.3 (SD = 1.97), and those of the TBL group ranged from 16 to 39, with an average of 30.03 (SD = 4.43). The scores of the two groups were significantly different. Therefore, the author thinks that compared with students receiving traditional teaching, students receiving TBL have higher participation in class ( $p < 0.001$ ).

Currey and colleagues<sup>[3]</sup> explored the differences in the participation of 32 nursing students in TBL teaching and traditional teaching. The researchers used three ways to measure students' engagement, namely, strobe, Student self-report and the Student Evaluation of Teaching and Units (SETU). The

strobe showed that 228 interactions between students were observed in TBL classroom teaching, but not in traditional classroom teaching. Students' self-reports showed that their contribution, attention and activity levels in TBL class were highly evaluated, and the average student score of TBL (4.21) was significantly higher than that of standard class (3.20)( $p=0.05$ ). In addition, the SETU index in TBL is also very high, with an average score of 4.31 for intensive care courses and 4.75 for cardiac care courses with a full score of 5.00.

TBL can improve the effect of students' interaction level, which may be because the preparation guarantee and application practice module of TBL promote students' participation in discussion. This promotion can be systematic, as any standard TBL needs to include these modules

### 3.2 Satisfaction

Student satisfaction is an important variable that researchers pay attention to, which will affect the implementation plan of the next step to some extent. Mennenga<sup>[4]</sup> conducted a semester of TBL teaching for two groups of students ( $n_1=72$ ,  $n_2=64$ ) respectively in the community health care course, and recorded the data of the two groups of students with the validated team-based learning student assessment tool. The analysis results showed that both groups of students had higher accountability for TBL, and although the second group of students showed a higher preference for TB than the first group, both groups of students had higher overall satisfaction with TBL, which may be due to the increase of experience of the implementors.

Bleske and colleagues<sup>[5]</sup> designed a randomized crossover to compare the long-term learning outcomes of TBL with those of traditional teaching methods. They will be 30 students into two groups each group received three themes of TBL teaching to accept 3 theme of traditional teaching, six months after the end of the course test and questionnaire, the test results show that the TBL teaching and traditional teaching, there were no significant differences in the long-term evaluation score but the questionnaire results show that the students of TBL teaching satisfaction is higher.

Numerous studies have shown that students are highly satisfied with TBL through various forms of measurement. But most of the studies were short lived, and students may have been surprised by the novelty of the experience rather than the charm of TBL itself.

### 3.3 Test score

Test scores are an effective way to evaluate students' knowledge mastery and an objective indicator to prove the effect of TBL teaching. El Banna and colleagues<sup>[6]</sup> for comparison before and after the experiment was adopted to design the 338 preppie is divided into two groups, respectively, the traditional teaching mode and TBL teaching mode of teaching, the experimental results show two groups of students there were significant differences in the final exam, and USES the TBL teaching group of student achievement than the traditional teaching group of students.

Zgheib and colleagues<sup>[7]</sup> used TBL teaching in two case discussion sessions for second-year pharmacology students, in which the answers of each student and group on the TBL test were recorded. Final exam scores showed significant improvements in the TBL students' test scores compared with those who received the same content using traditional methods a year and two years ago, and students' feedback was more positive. In addition, studies have found that TBL test sites are less successful when problems are very difficult, and suggest a difficulty range of 30-70% is most appropriate.

Although there are some limitations in the research on test scores, the results show that TBL is a promising teaching method. Further research using consistent student learning measures will determine whether TBL should be more widely used.

### 3.4 Literacy and ability

Improving students' ability and quality has always been an important goal of education. Studies have found that TBL can effectively improve students' thinking ability. The cultivation of students' core competence plays an important role in nursing education. Faezi and colleagues<sup>[8]</sup> divided 199 students in the adult health care course into a TBL group and a traditional group to compare their impact on core competencies. In students for three consecutive weeks after 2 hours per week of the course with a series of questionnaire to evaluation of the core competence of the students, the results show that

TBL teaching group of clinical ability, communication skills and leadership ability score is significantly higher than traditional teaching group ( $p < 0.05$ ), but did not significantly improve critical thinking ability, the author points out that this may be related to intervention time is too short.

Cornelius<sup>[9]</sup>, in order to explore the correlation between TBL teaching and students' ability to apply knowledge to clinical practice, used the nurses' clinical decision scale (CDMNS) to measure the students. The results showed that there was only a weak relationship between TBL and improved CDMNS score, while there was no significant difference between the patients group using traditional methods and TBL. When looking at CDMNS longitudinally, students using TBL did achieve greater gains.

In a word, the implementation results of the above courses show that the learning effect of TBL is not only proved by the improvement of objective test results, quality and ability, but also by the increase of students' participation and satisfaction. However, at the present stage, TBL is rarely used as the main teaching mode, so solving the key problems in the implementation of TBL is the key to its smooth promotion.

#### **4. Key problems to be solved in the implementation of TBL**

The key to the implementation of TBL is to solve the problem of role transition between teachers and students. In traditional teaching, the relationship between teacher and student is that between teacher and receiver. In TBL, teachers are mentors and students are team players. As instructors, teachers will face the challenge of teaching and management roles, which requires teachers to shift from the emphasis on knowledge transmission to the emphasis on teaching design. Meanwhile, teachers need to change from the original focus on maintaining classroom order to better promote students' discussion and further improve their management ability.

As a team player, students need to change from passive learners to active learners. In this transition process, students first have to experience the challenge of learning habits from waiting for teachers to teach knowledge to independent learning, from waiting for teachers to answer problems to solving them through various ways. The challenge of information literacy is another difficulty that students encounter. Students need to make reasonable use of various tools to obtain the information they need to help them learn.

#### **5. Conclusions and prospects**

Existing studies have shown that TBL, as a learning and teaching strategy, may have a certain impact on students' participation, satisfaction, test scores, quality and ability. Various studies have shown great differences in the design, implementation and reporting of TBL programs, which poses some challenges to the research on their effectiveness. At the same time, in order to better promote the TBL promotion, researchers need to be better solve teachers are faced with the challenge of teaching and management role and students' learning habits challenge and information literacy challenges, in the implementation of the future researchers need to establish a standardized framework, in order to better understand TBL to the effects of students' learning. With the arrival of the "Internet +" wave, the combination of network technology diversity and Internet technology with TBL teaching mode will further stimulate the potential of TBL teaching mode and improve the teaching effect.

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