Application of TBL Teaching Improvement with a Digital Tool in Undergraduate Management Courses

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Abstract

The teaching effect of management courses is not ideal for undergraduate education because own concept abstraction and lacks of enterprise practice. So, the TBL teaching method is introduced in enterprise strategic management course to improve the intrinsic motivation of the learning. Also, the simulated entrepreneurship project is designed to create simulated application environment in curriculum by using digital teaching tools. The project's adoption has greatly increased students' inherent learning engagement and classroom involvement attendance, according to follow-up studies conducted in 2018-2020 on the project before, first, and second implementations.

Keywords: Team-based Learning (TBL), Intrinsic motivation, Simulated entrepreneurship projects, digital tool, Interactive participation in class

1 Research Background

Economic globalization has brought great changes to the business environment and put forward new quality requirements for management students. Globalization has aided the proliferation of modern technologies, allowing economies to become more environmentally friendly and efficient. It also gave learners the option to assess economic policies in various countries and devise various approaches. Datar et al. (2011) believe that future managers should have a cross-cultural, diverse perspective, high emotional intelligence and motivational skills, the ability to solve problems in multiple ways, the ability to understand the operation of teams and organizations, the ability to collect and process data [1]. As a result, management education is facing unprecedented challenges and business schools need to adjust the content and methods of management courses in a timely manner to adapt to the rapidly changing reality [2].

However, another practical problem is that undergraduates are seriously lacking in practical experience in business management [3], the management curriculum itself is abstract in concept, which increases the difficulty of learning management courses. Management discipline is close to philosophy in nature. The study of management courses should not only start from the general conceptual theory, but also be analyzed from the concept, thinking and framework of management philosophy, combined with practical experience, in order to effectively understand the deep connotation and essence of management courses. Due to the limitation of their personal experience, undergraduate students are often in a state of far-reaching view in the study of management courses, it is difficult to feel the connection between themselves and the content of the course, it is easy for learners to lose the internal motivation of learning. The traditional teaching methods centered on teachers and teaching materials have been difficult to meet the needs of the times for the training of management personnel [4]. Therefore, how to let undergraduate students without practical experience in management understand management courses and have the pleasure of active learning is an urgent problem to be solved in the teaching of management courses.

This study is based on the above-mentioned thinking, from the perspective of stimulating undergraduate students' internal learning motivation, design simulation of the enterprise environment, introduce, improve the TBL teaching model and try to improve the effectiveness of management curriculum teaching. The construction of the simulated project environment allows students to place themselves in a virtual enterprise practice that conforms to the characteristics of reality, and study based on a problem-oriented approach. TBL's teaching method transforms individual learning into team learning. By putting students in team tasks, it establishes the connection between students and classroom, makes communication take place fully, and promotes the flow and renewal of knowledge.

The main contribution of the manuscript is:

- ✓ TBL teaching method is introduced into the course of Enterprise Strategic Management.
- ✓ The implementation of the project has significantly improved students' intrinsic learning motivation and classroom interaction participation.
- ✓ Simulated entrepreneurship projects is created to simulate an application environment in the curriculum.

This manuscript organized as follows. In section 1, the research background of economic globalization in teaching effect of management students to improve the quality of the TBL teaching model. The systematic learning background study in section 2. In section 3, research design is analyzed. Finally, the report concludes in section 4 and 5 with future studies and recommendations.

2 Literature review

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2.1 Intrinsic Learning Motivation

Self-determining theory holds that human development, from the point of view of internal motivation, depends mainly on the satisfaction of the needs of autonomy, competence to competence and relevance to the environment [5]. Autonomy mainly refers to providing people with decision-making information and the opportunity to make their own choices, to make them feel the meaning of behavior, to encourage them to take more responsibility for their own behavior [6], rather than being forced or controlled to act; Competency for ability refers to people's confidence and ability to be competent for a certain job or task, rather than ability or skill itself [7]; Relevance with the environment refers to people's sense of belonging in the behavioral environment and their need to be accepted, valued and recognized by others, communities or others [8]. According to this theory, whether the student's intrinsic motivation to actively participate in learning is strong depends to a large extent on the teacher's ability to create conditions in his curriculum to meet these three needs [9]. Students are more willing to learn when they are able to choose their own time and energy to devote themselves to their studies, and studies have shown that students are more aggressive when they feel they are capable of meeting the challenges of their lessons and when they feel that they are liked and valued by teachers and classmates, they can demonstrate greater self-regulation in difficult learning tasks [10].

2.2 Team-based Learning

Team-based learning is a teaching method that adopts group teaching in large class. TBL's teaching philosophy of attaching importance to learners' leadership, communication skills and teamwork skills has met the teaching needs of many majors [11-12]. Since 2000, TBL has been popular in medical education, and it has been proved that it can improve students' learning participation rate and teaching effect [13-16]. At the same time, this teaching method has been proved to have a positive effect on the cultivation of students' interpersonal communication ability [17], teamwork skills [18-19], and self-identity [20], problem-solving ability [21] and leadership [22].

TBL is a structured group teaching method. The application of this teaching method requires three elements: preparation before class, preparation for test and feedback, and application practice [11-12]. According to the operation process, it can be roughly divided into the following six steps [23-24]: (a) Team formation; (b) Preparation before class; (c) Prepare for the assurance test; (d) Test feedback; (e) Application exercises; (f) Discussion and evaluation. In practical application, teachers can make necessary adjustments or improvements to TBL according to the curriculum background and students' needs [11]. These adjustments can be due to the limitation of course time to cut down some steps [25-26] or to improve the operation mode of some steps [27-28].

Although many previous studies have shown that the TBL teaching model is of great help to the improvement of teaching effects, some scholars' studies have also pointed out some challenges faced by the TBL teaching model. For example, the pre-class preparation based on the flipped classroom style makes students feel work. The pressure of increased volume [24], team tasks make free-riding occur more frequently, which affects the sense of fairness of evaluation [29]. Therefore, appropriate adjustments based on specific teaching conditions are considered necessary. The combination of TBL and cloud platform [30-31], and the introduction of simulation technology in TBL [32] have all achieved good results in applications. On the basis of adhering to the basic principles of the TBL teaching model, this research introduces simulated entrepreneurial projects from the perspective of stimulating students' internal learning motivation, combined with online teaching technology, which is a new attempt for both TBL teaching mode and management course teaching.

Although TBL is widely used in medical education, in fact, this teaching method originated from business schools and was designed for the application of management concepts and the cultivation of problem-solving ability [11]. TBL pays attention to learners' communication skills, teamwork skills and problem solving ability, which are the important qualities that management personnels are required to possess in the current era. The purpose of this study is to adjust the TBL teaching method from the perspective of intrinsic motivation and introduce the simulated entrepreneurship project to make it suitable for the teaching application of contemporary management courses.

3 Research Design

3.1 The Research Object

This research was carried out in school of economics and management of Wenzhou Institute of Technology (formerly known as Oujiang College of Wenzhou University) from 2018 to 2020. The course of Enterprise Strategic Management was selected for TBL instructional design experiment. Among them, the number of participants in the course of "Enterprise Strategic Management" in 2018 was 114, and the course was carried out by traditional teachers' teaching methods. The data collected this semester was mainly used for comparison of the implementation results of subsequent projects; In 2019, the number of participants in the course was 255, and the improved TBL teaching method of this study was applied for the first time; In 2020, there were 158 participants in the course, and the TBL teaching method of this study was applied again. The teaching effect of each semester will be evaluated and analyzed through the process data records of the course and the investigation of the students participating in the course.

3.2 TBL Improved Design

3.2.1 TBL Structure Design

Because this course is in accordance with the regular teaching schedule of the whole semester, the teaching time of each class is limited, in order to ensure the complete implementation of TBL teaching in each lesson, we refer to the existing research practice [25-26], eliminating the two links of readiness assurance test and test feedback in the regular process, only implementing four steps including team formation, pre-class preparation, application practice, discussion and evaluation. Team building is mainly to form a formal learning unit, and it is necessary to avoid the problem

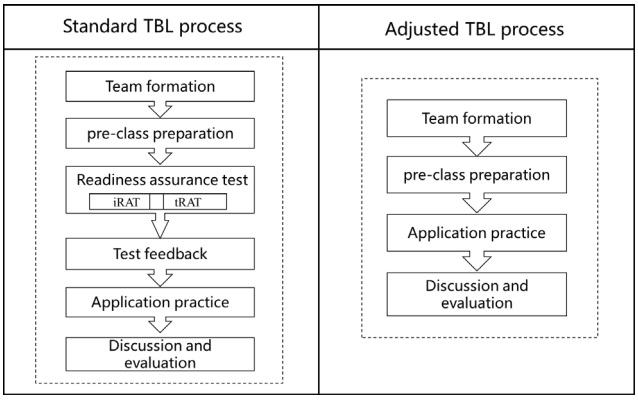
of insufficient intellectual resources caused by too few personnel or "idleness" caused by too many personnel. The pre-class preparation is mainly to attract students to participate through task setting, clarify learning goals, and guide the team to carry out the process of independent learning. The focus of the application practice is to promote the reproduction of knowledge in the form of problem-solving tools. The focus of the discussion and evaluation is to promote the explicitization of knowledge in specific issues through interactive exchanges within and between groups. In other words, the study implemented an adjusted TBL teaching method (as shown in Figure 1). The main points of implementation are as follows:

(a) Team building: 5-7 people/group are divided into groups [22], and the formed team is fixed in this semester.

(b) Pre-class preparation: assign tasks to students in advance and ask them to preview and prepare relevant knowledge.

(c) Application practice: apply theoretical knowledge to practical problem solving, and each team will present and introduce it.

(d) Discussion and evaluation: according to their own understanding of relevant knowledge, the teams evaluate and discuss each other's team display, and the teachers systematically summarize it based on theoretical knowledge.



3.2.2 TBL improvement based on intrinsic motivation

According to self-determination theory, three intrinsic and essential emotional experiences drive participants to enhance and improve. People may become self-determined, according to this concept, whenever the requirements for ability perception, autonomy, and environmental relevance are met. In view of this, this research improves the design of the adjusted TBL from the aspects of ability perception, autonomy, and relevance to the environment (as shown in Table 1).

(a) The design of ability perception: to pull the learning scene back to the scope of students' vision, and set learning tasks according to students' ability. First of all, this study introduces the simulated entrepreneurship project, which makes the students who lack the practice of enterprise management change from the distant viewer of the course to the practical authority, making them the implementers of the course knowledge. Let students play the role of managers or directors in general goal planning, business decision-making and other high-level economic activities, so that they "own their own hands" in business, and make them feel that their knowledge can affect the destiny of an enterprise. Secondly, in the pre-class preparation, the preparation content is changed from the theoretical knowledge preview that students are not good at to the information collection work that all students have the ability to participate in. Students are required to collect relevant information about a specific problem of simulated entrepreneurship projects before class, and guide students to consult theories and collect development information with specific problem orientation. From the perspective of strategic management, the internal and external information sources of enterprises are extremely rich, so it is not difficult to simply collect relevant information. But at the same time, there are many interference factors of key information, so it is difficult to obtain the required materials accurately and with high quality. Therefore, this work can satisfy the students' sense of accomplishment at different ability levels.

(b) Autonomy design: to provide students with sufficient autonomy in the choice of partners and research objects. On the one hand, it is the freedom of team building. On the premise of the scale of 5-7 people, students choose the objects they are willing to cooperate with to form learning teams according to their own preferences. On the other hand, it is the freedom to choose simulated entrepreneurial projects, that is, in the application practice, the problems that students should solve by using theoretical knowledge are independently selected by team members according to their interests.

(c) The design of relevance to the environment: mainly through two optimizations to strengthen the relationship between students in team learning and the classroom, classmates, teachers, improve their sense of belonging to the classroom. On the one hand, in the discussion and evaluation process, each group should analyze and display the simulation practice problem, each student and teacher can evaluate it or provide advice, there is sufficient space for students and students, teachers and students to communicate and interact, establish learning links. On the other hand, the classroom interactive reward mechanism that benefits teammates is designed, that is, if any student takes the initiative to participate in classroom interaction, other members of his team will receive bonus points in proportion, so that the efforts of each student in the team will affect others and the team connection will be extended to all aspects of learning.

Table 1. TBL operation improvement based on intrinsic motivation excitation

Segments	Conventional practice	Improvement Based on Intrinsic Motivation
Team formation	Randomly group according to the class size.	Free grouping, 5-7 people/group, fixed during the semester; Free choice of simulated entrepreneurial projects according to interests.

pre-class preparation	Preparation of teaching materials or reading of materials prepared by teachers in advance.	Problem-oriented task: collect information (including theoretical knowledge) on the specific problems of simulated entrepreneurial projects, and try to analyze and solve the problems.
Application practice	Assign a problem related to the real world, and discuss it within or between teams to deepen the understanding of concepts.	Based on a problem of a certain stage of simulated entrepreneurial projects, combined with theoretical knowledge, the analysis results of the group and the solutions to the problems will be displayed in class.
Discussion and evaluation	Companion evaluation is used to feedback the performance of individuals and teams	Discuss and evaluate the application results displayed by other groups, and the teacher makes a review and summary of theoretical knowledge, By the classroom interactive reward mechanism that benefits teammates, the interests of individuals and teams are connected.

3.2.3 Simulated entrepreneurship project

Because of the abstraction of management course knowledge, most colleges and universities take case teaching as the main means in the teaching of this course [33-34], and improve students' understanding of relevant conceptual knowledge by analyzing cases combined with theoretical knowledge. Compared with traditional theory teaching, case teaching brings students to specific enterprise scenes [35], shortens the distance between theory and practice, improves the learning effect to a certain extent. However, its shortcomings are also obvious. For ordinary undergraduate students who have never been exposed to enterprise practice, isolated and one-sided case scenes scenarios mostly lack contact points with themselves [36]. Student's cannot think of the case of enterprises in addition to written expression of the multi-dimensional environment, such as internal conditions and external environment, corporate culture and leadership style, it is difficult to analyze and make decisions according to the strategic management system, overall requirements. Therefore, the classroom case teaching effect of MBA students is often significantly better than that of undergraduates. Studies by Alimoglu et al. (2017) have shown that the introduction of real-world scenarios can better establish a combination of theory and practice than written case scenarios [28]. In view of the shortage of case teaching, this study introduces simulated entrepreneurship projects (as shown in Figure 2) in the chapters of enterprise mission, strategic analysis and strategy development in the course of Enterprise Strategic Management, to reduce the distance between theory and practice by making students immersion subjects in the simulated enterprise environment. Because the strategic implementation and strategic control part involves the actual operation of the project, the simulation planning cannot be completed, so the case teaching is still used. Specific practices are as follows:

(a) At the beginning of the course, students form a business planning team in groups, and the student team chooses the project independently.

(b) The students' entrepreneurial projects are integrated into all aspects of the curriculum teaching, such as the important theoretical study links of enterprise mission formulation, external environment analysis, competitive advantage analysis, strategy formulation, and the student teams are required to analyze and design the corresponding realistic problems in each stage of the simulated entrepreneurial project based on theoretical knowledge.

(c) Under the guidance of solving practical problems of entrepreneurial projects, through classroom display and inter-group evaluation, promote students' understanding of relevant theoretical knowledge.

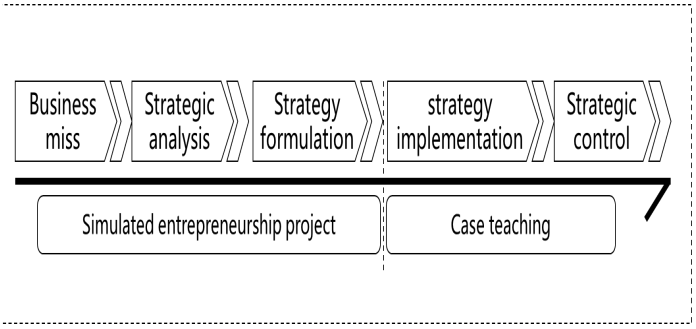


Figure 2. Application of simulated entrepreneurship project in the course of enterprise strategic management

3.2.4 Teaching support of a digital tool

In this study, Ketangpai software is used as a digital auxiliary tool to help teachers release tasks, collect students' homework, record students' participation in class and so no. Through the system online information timely feedback to students in the course of learning performance. Ketangpai software can help teachers and students master the whole process of teaching in real time, especially the powerful background data monitoring system, which can fully present the learning participation and learning effect of each student. The application of this tool makes the above-mentioned teaching design of this study effectively implemented.

3.3 Evaluation of Results

This study evaluates the teaching effect of this research from two aspects, namely, intrinsic motivation evaluation based on IMI, and interactive participation evaluation based on Ketangpai software records.

3.3.1 Internal Motivation Assessment

This study draws directly on the practices of Moy, et al. (2011), Augustyniak, et al. (2016) [37-38], using the Internal Motivation Inventory (IMI) [39] to assess the subjective experience of students participating in the Enterprise Strategic

Management course. The tool can assess how students feel about fun, autonomy, ability perception, relevance, stress, etc. when participating in a course. In order not to affect the reliability of the scale, this study strictly in accordance with the Internal Motivation Inventory (IMI) of the question design questionnaire, only change the key words in the question item. The scale is in the form of 7-point Likert scale, with answers ranging from 1-7, 1 to very disagree and 7 very much in agreement. The reliability test was carried out on the data collected in 2020, and the results showed that the overall Cronbach's Alpha value of the scale was 0.866, with higher confidence, among which the values of Cronbach's Alpha for fun, autonomy, ability perception, correlation and stress were 0.920, 0.812, 0.900, 0.788, and 0.863, respectively. Cronbach's alpha is used to measure of logical consistency, or even how strongly a community of objects are connected to one another. It is regarded as an internal consistency indicator.

The Intrinsic Motivation Inventory (IMI) issued by the classes of "Enterprise Strategic Management" in 2018, 2019 and 2020 was evaluated. It was found that before the implementation of this research project (2018), the students' intrinsic learning motivation for the course of "Enterprise Strategic Management" was at a low level, only 3.1, but after the implementation of this project, it was significantly improved, reaching 4.5, with the secondary application, it reached 5.0 (as shown in Figure 3) . From the specific dimension of intrinsic motivation, except for the unconspicuous improvement of stress, the autonomy, ability perception and relevance of targeted adjustment in this study Generally speaking, from the perspective of intrinsic learning motiv have improved significantly year by year, and the learning pleasure has shown a similar trend (as shown in Figure 4). ation, this study has achieved good results.

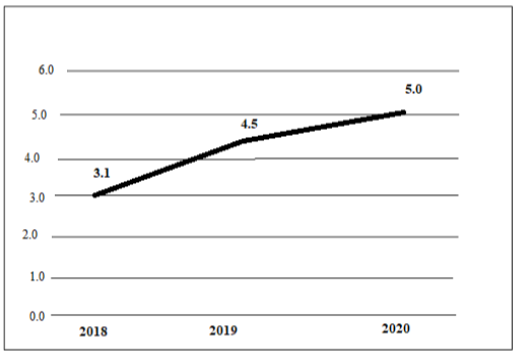


Figure 3. Average level of students' intrinsic motivation from 2018 to 2020

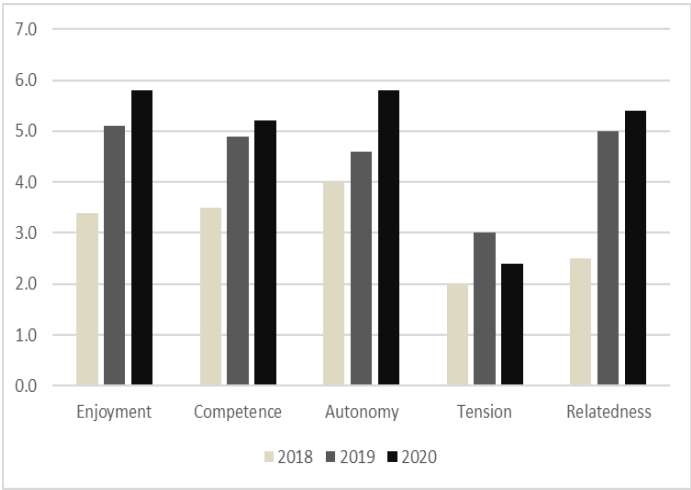


Figure 4. Average level of each evaluation dimension of students' intrinsic motivation from 2018 to 2020

Table 2. Students' participation in classroom interaction before and after the implementation of this project

Year	Implementation of the project	Number of Classes	Number of participants in classroom interaction	Interactive participation in class
2018	Not implemented	114	61	53.51%
2019	First implementation	255	199	78.04%
2020	Secondary implementation	158	131	82.91%

Data source: statistics of Ketangpai software.

3.3.2 Evaluation of classroom interaction and participation

The level of students' interaction in the classroom can well reflect students' acceptance of the classroom [40]. In this study, the ratio of the number of students who actively participate in classroom interaction throughout the semester to the total number of students in this semester is used as the measurement index of classroom participation. Ketangpai software is a good way to document students' interactions in detail. According to the statistics of the participation records, compared with the data from 2018 to 2020, with the implementation of this project, the students' interactive participation in the curriculum increased significantly from 53.51% to 82.91%, which illustrated in Table 2, and the students' participation data gave positive feedback on the effect of this study.

4 Conclusion

This study introduces TBL teaching mode in undergraduate "Enterprise Strategic Management" curriculum teaching, and adjusts TBL based on curriculum background and student characteristics, including the deletion

of preparation guarantee test and test feedback, designs the practice environment of simulation entrepreneurship project, and improves the implementation of TBL processes from the perspective of internal motivation. By comparing the pre-implementation, first-time implementation and secondary implementation in 2018-2020, it can be found that the adjusted TBL teaching mode has achieved good results, and the students' intrinsic learning motivation and classroom interaction participation have been significantly improved compared with those before the project implementation. This study shows to some extent that TBL teaching improvement based on in-house motivation is effective in undergraduate management courses, and other management courses can be extended.

At the beginning of the introduction of TBL teaching mode, the novelty of its form and abundant interpersonal communication activities may be the main highlights to attract students. However, with the long-term application of this mode, in order to maintain good teaching effect, it is necessary to innovatively solve the problems of aggravated learning tasks, lazy hitchhiking, difficult differential evaluation of team members' contributions and so on. The comparison of teaching data between 2019 and 2020 in this study shows that with the increase of proficiency in TBL teaching mode, there is still room for improvement in students' intrinsic motivation and classroom interaction participation.

As a digital teaching tool, the Ketangpai software's teaching data collection and monitoring, as well as the support of diversified teacher-student interaction functions, provide an important guarantee for the teaching application research of TBL mode. Comprehensive analysis of previous teaching research shows that Internet, big data, cloud platform and other technologies have been increasingly used in teaching activities [41-42], and have played an irreplaceable role in stimulating students' interest, promoting classroom communication and enriching classroom forms. Therefore, digital technology should become a necessary component of modern teaching activities.

Finally, the smooth development of this research has sent us a positive message, that is, in educational activities, necessary innovations should be made according to specific objects, environment and other characteristics. In particular, the application of digital educational technology in teaching activities should be tried with an open mind.

5 Research Limitations

Since this study is conducted in only one school and the controlled students are distributed over three years, it may bring unavoidable research errors due to the limitations of the scope of the subjects or the differences in learning characteristics of students of different school ages.

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