

A Practical Investigation of PBL Model in Chinese Classroom teaching

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Abstract: The New teaching model must regard students as the center of the whole teaching activities. Teachers, teaching materials and other teaching means should serve students' "Students should be actively involved in teaching activities and act as the "protagonists" of teaching. However, there are some problems in the process of changing from a single teacher's lecture to teacher-student interaction. These problems make it difficult for classroom teaching to achieve the expected effect. Therefore, this study combines the PBL teaching model with junior high school mathematics teaching to improve students' mathematical literacy and comprehensive ability in junior high school mathematics classroom teaching. By teaching in problem situations, it improves students' ability to discover and solve problems, focuses on cultivating students' practical spirit and cooperative consciousness, and meets the contemporary requirements of cultivating talents and the development of mathematics teaching.

Keywords: New curriculum standards, PBL model, problem-situated teaching.

1. Background of the Study

The New Curriculum Reform as put forward new requirements for junior high school mathematics teaching: teachers should stimulate students' interest in learning and cultivate students' independent learning ability of cooperative inquiry. The role of the main body of the student the teacher-led. Learning is a personalized behavior, as teachers should be in the classroom teaching environment to create a conducive to the development of students' personalities "place", so that students' personalities in a relaxed, natural, pleasant atmosphere to be released, to show the vitality of life [1]. The core concept of the new curriculum is based on student development, so that students participate in the implementation of the new curriculum is the core. How to implement it, we should respect students, give them the freedom to learn, improve their interest in learning; optimize the teaching environment, strengthen communication and cooperation; give each student expectations and incentives, so that students have a sense of success; appropriate teaching of mathematics open problems.

This paper will firstly review and organize the relevant literature and journals on PBL teaching mode, analyze the development and application status of PBL, and describe the relevant concepts and theoretical basis of PBL teaching mode. Secondly, the development status and problems of the current

stage of junior high school basic mathematics course teaching in China will be investigated, and the study will conclude the wide applicability and practical feasibility of PBL teaching mode in promoting the teaching reform of junior high school basic mathematics course in China. Some suggestions are provided to promote the research on the effective use of PBL teaching mode in China's junior high school mathematics classroom.

Although the PBL method has been introduced in China for many years, it plays a very important role in elementary school and universities. However, due to the current situation in China, the method has not been widely used at the secondary school level under the pressure of both the secondary school and college entrance examinations. Not only that, the assessment of PBL results has been restricted by the traditional examination system, and there is no reasonable assessment standard. Therefore, this paper will focus on the practice and application of PBL teaching method in China's secondary school classroom.

2. PBL Model

2.1. Definition of PBL

According to Howard Barrows and Ann Kelson, PBL is both a curriculum and a process: it is a curriculum in the sense that it consists of carefully selected, well-designed problems that learners need to acquire critical knowledge, skilled problem solving, self-directed learning strategies, and the ability to engage in teamwork [2]. It is a process in the sense that it follows a commonly adopted systematic approach to solving problems or addressing challenges in life and career. process, as it follows a commonly adopted systematic approach to solving problems or addressing challenges in life and career. [3]

Throughout the various definitions of PBL, different people have different understandings and definitions have different focuses. However, there is a commonly accepted and widely quoted definition, which is as follows: "Problem-Based Learning", also translated as "Problem-Based Learning" (PBL), PBL refers to setting learning in complex, meaningful problem situations and having students work in groups to solve complex, practical or authentic problems in order to learn the scientific knowledge behind the problems, develop problem-solving skills, and develop independent and lifelong learning skills. By guiding students to solve complex, real-life problems, PBL aims to enable learners to construct a broad and flexible knowledge base; develop effective problem-solving skills; develop self-directed and lifelong learning skills; become effective collaborators; and develop internal motivation for learning.

2.2. Origin and Development of PBL

The PBL teaching model was firstly proposed in the 1950s. It first began in Canada at McMaster University School of Medicine. According to the traditional teaching practice of medical schools at that time, students memorized the basic medical knowledge from books in the classroom and then applied it in the clinical setting. This approach allowed students to perform excellently on exams, but the knowledge gained was difficult to apply to actual case diagnoses. As a result, the transition from basic knowledge to the clinical setting is particularly difficult and ultimately unsatisfactory, and new teaching models are being considered and sought.

Barrows, a professor of neurology, proposed and conducted the earliest research on PBL teaching to address the characteristics of medical education, which is usually centered around a specific and vivid case in real life. The focus of the class is on problem-solving, and this is applied in practice in his classroom. In Barrows' PBL classes, students are divided into learning groups, each with a mentor. They are then exposed to real or near-real cases in which they begin to collect, analyze, and discuss valid information, asking questions of the instructor if necessary. Finally, the group gives reasonable

examination methods and prescriptions for the signs and symptoms of the case. As a result, the students changed their original passive learning style in PBL and gradually shifted to self-active learning.

Woods subsequently modified and refined the PBL model in the chemical engineering curriculum at McMaster University, adding interpersonal skills, time management, and decision-making leadership to the curriculum, and developing students' independent learning, social skills, and self-awareness through group work and self-assessment and mutual evaluation.

Since its creation, the PBL teaching model has been developing rapidly. The medical education and engineering education fields in western universities have been the first to introduce the PBL teaching model, which has been practicing and explored for a long time. McMaster University in Canada, University of Denmark, Linköping University in Sweden, etc. are active practitioners and promoters of PBL. All of them have achieved remarkable results. PBL, an innovative educational model, has received more and more attention and development worldwide. Its popularity has long extended beyond the previous medical education and engineering education to reach out continuously to architecture, psychology, education, Economics, management, law, and many other disciplines.

2.3. The Theoretical and Practical Value of PBL

2.3.1. Theoretical Value

As a teaching model that "concentrates on constructivist ideas", it has attracted the attention of more and more educational researchers. Since this teaching method originated from Western higher medical education, we need to study whether it is applicable to China's basic education, whether it can be applied to China's secondary school classroom teaching, and how teachers should design classroom teaching based on this teaching model [4].

Through the practical study of PBL teaching mode, this paper provides a theoretical basis and method for front-line teachers to make a change of teaching mode in the actual classroom, so that teachers can have a better understanding of PBL teaching mode and thus achieve a comfortable application;

2.3.2. Practical significance

The study is based on the existing theories of PBL teaching mode in the middle school mathematics classroom, focusing on creating problem situations that meet students' cognitive development, guiding students to learn to think independently and cooperate in groups to explore problems, and providing teachers with ideas and guidance for effective mathematics teaching activities. Throughout PBL teaching, students gradually build up their knowledge system in experiential subjective learning, understand the nature of knowledge through independent exploration and cooperative communication, enhance their comprehensive ability and improve their learning effect. By exploring the conclusions and shortcomings of the practice, this paper summarizes the experience of classroom teaching under PBL mode.

2.4. A Case of the PBL model

2.4.1. Victorial University, Australia

This is a case from the curriculum of many programs at VUIT (e.g. Electrical and Electronic Engineering, Automation and Control Engineering, Architectural Engineering, Civil Engineering and Mechanical Engineering) is designed under the PBL philosophy [5]. The project approach accounts for 50% of the course, while the remaining 50% is in the form of traditional lectures [6]. In the PBL

section, a project is completed collaboratively by about 20 students, who are divided into 4 groups of about 5 students. Each group is assigned a mentor [7]. The lecture component provides the core fundamentals for problem-solving and project work in PBL. Upon completion of the PBL component, students acquire not only discipline-specific skills but also a variety of general skills that can be applied in the workplace, such as an understanding of the social and technical role of a professional engineer, the ability to present and communicate their work to other professionals and non-professionals, and the ability to manage time in a team setting [8][9][10].

3. Conclusion

The assessment of PBL outcomes has been limited by the traditional examination system. Based on this, this paper suggests a two-way assessment method. First, it includes students' evaluation of teachers from the seven perspectives: 1) Mutual communication; 2) Teaching attitude; 3) Course content; 4) Breadth of knowledge; 5) Language expression; 6) Humanities Education.

In addition, students are evaluated by teachers. According to the actual situation of domestic institutions, it is suggested that the evaluation of students after the course is divided into two parts: the first part uses traditional examination methods (e.g., multiple choice questions); the other is dynamically assessed by the teacher according to the students' performance in the usual group discussions, and the criteria are mastered by the teacher and the students in charge of each group.

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