Research on the Teaching Strategy of Mathematics Project-Based Learning from the Perspective of Core Literacy

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Abstract: With the change of The Times and the continuous improvement of the social requirements for the quality of talents, the cultivation of learners' core literacy has become the focus of attention in the education circle. Project-based learning is a new teaching mode with students-centered and projects as the main line. It focuses on cultivating students 'independent learning ability and problem solving ability, and provides a new path for realizing the improvement of students' core literacy. This paper describes the characteristics of project-based learning, combined with its significance and value in teaching practice, and discusses several practical strategies, in order to provide ideas for teachers to implement project-based teaching.

Keywords: Project Learning; Core Literacy; Teaching Strategy

Introduction

Our country with "infusion", "cramming" as the typical characteristics of traditional teaching mode in motivate students, improve students 'independent inquiry ability, cultivate students' core literacy, so innovation school classroom teaching way, the implementation of the teacher leading students subject education idea, become an important way to let the students core accomplishment to the ground. Project learning driven problem oriented, let the students in the real learning situation in a group to explore the problem, in the process of practice by collecting relevant information, contact their own existing knowledge experience eventually solve the problem, it with the core literacy education connotation in many ways. Therefore, in the process of implementing education reform in China, project-based learning has been accepted and practiced by more and more educators.[1]

1. Characteristics of project-based learning

1.1 Driving problems based on real situations

Driving problems can be said to be the soul of project-based learning, which refers to the transformation of obscure and abstract essential problems into problems that are interested to students who design around the theme of the subject knowledge. In project-based learning, students first need to clarify what the project task is and what the problems need to be solved, and these questions can be guided to find the direction of exploration by designing a driven problem based on the real situation. Real projects do not require that every element of student work must be "real", but to make students see some connection between knowledge and the world.[3]This requires teachers to learn the situation and some elements related to the real world to design projects and driving problems. On the one hand, students acquire knowledge and improve skills in the situation, and understand that the knowledge and skills are not separated from the social situation; on the other hand, students will gradually form the way of solving problems in the process of inquiry, and apply them to real life.

1.2 Independent inquiry and cooperation of learners

Continuous inquiry is based on the reflection of the project process. The process reflection helps students to better understand and improve their strategies used in the process of solving problems, timely adjust the project plan and process, and make the exploration of project problems more continuous and in-depth.[2]In addition, due to the openness of the project theme, many questions without unified, standard answers, students can with different purposes from different angles into the learning content, the learning process is not passively from knowledge directly to teachers and books or simply positive or negative answer, but on the basis of collecting integrated data of information depth processing, using high-order thinking problem analysis and thinking, form their own understanding. Project implementation process is the

division of labor cooperation situation, students once get new knowledge, will return to the group to communicate, share their experience and insights, create a solution to the problem, deepen the understanding of the concept of thinking collision, together each task until the project results, form a "learning community", let the students deeply realize the significance and value of team cooperation.

1.3 Comprehensive nature of project-based learning

The comprehensive performance of project learning is manifested in two aspects. First, the traditional classroom teaching emphasizes the systematization of knowledge, and the boundaries between disciplines are clearly divided; while project learning generally revolves around a project theme or problem, and such complex problems often require the participation of multiple disciplines, which breaks the boundaries between disciplines, enables students to establish connections between different disciplines, and comprehensively use relevant knowledge to solve problems. Second, in terms of learning means, to complete a "project", students need to mobilize the participation of cognition, action, emotion and other aspects, need to carry out a variety of learning activities, including observation, information collection, memory, discussion, design, production, report, etc. A single means and learning method can not solve the problem.[1]In the process of practice, students get rid of the mechanical and rigid learning methods, get through different fields such as cognition, action and emotion, and improve their comprehensive practical ability.

2. Practical significance and value of project-based learning in teaching

2.1 Enhance students' interest in learning

Traditional teaching is a process in which teachers, as the leader of mathematics classroom, separate knowledge points and analyze students passively accept fragmented knowledge. These knowledge separated from the real situation is easy to cause students to understand, and thus fear difficulties in mathematics learning and lose their interest in learning. Project-based learning starts from driving problems and is based on life phenomena and hot social events around students. When students find that existing knowledge cannot solve the problems raised, they will actively devote themselves into the learning of new knowledge driven by curiosity and thirst for knowledge. In the process of the project, the process of communication and discussing with team members is also a process of expressing their opinions and showing themselves. In this relaxed and harmonious learning atmosphere, students are more willing to invest more energy and time to complete the project task. Project learning makes the math learning process move and alive, students' interest in learning is enhanced, and classroom participation is also improved.

2.2 Promote the role change of teachers

In the classroom under project-based learning, teachers also come out of the traditional classroom role, reversing the rigid image of teachers as "leader" and "demonstrator". In the implementation process of project activities, teachers are more likely as guides and facilitators. First of all, students are in a confused and ignorant state in the initial stage of the project, and some students may not find the entry point of the project task or problem. At this time, teachers need to "hide" in the students' learning process, guide students to conduct independent exploration, continuous trial and error, and provide guidance when necessary. Secondly, teachers are no longer the narrator of subject knowledge. Teachers do not instill knowledge into students, but guide students to understand knowledge, produce their own understanding of things, and achieve good learning results. Finally, project learning for teachers 'education concept, teaching ability put forward new requirements, teachers to the attitude of learners learn excellent project learning classroom teaching experience, constantly looking for can be designed into project teaching resources, in again and again to generate better subject integration theme, methods, etc., from the perspective of reflection balance teachers' multiple identity in the classroom.

2.3 Promote students' deep learning

In the learning mode of promoting students' deep learning, project-based learning is undoubtedly a more effective practice mode, which

is a beneficial attempt to guide students to carry out deep learning in problem solving.[4] In terms of learning mode, project-based learning has changed the teaching mode based on imparting systematic knowledge. A series of real comprehensive practice activities guide students to study together with group members, and to experience high-level cognitive learning activities such as decision-making, analysis and problem solving together. In terms of learning results, due to the openness of project-based learning, there is no standard answer for the project results. Each student can create the "optimal solution" in his heart, and the display of project results can also be sticking to one style. The personal experience, deep understanding, practical innovation and high-order thinking reflected in project-based learning are all consistent with the connotation of deep learning. Therefore, project-based learning can effectively promote students' deep learning.

2.4 Develop students' core qualities

Project-based learning strives to learn the content of life, situational, and advocates the form of teachers and auxiliary students to guide students to acquire knowledge in the process of exploring problems. By the creation of problem situation, students are conducive to understand the connection between mathematics and the real world, understand the phenomenon of the real world can be incorporated into the perspective of mathematics, and can find meaningful mathematical problems from the actual situation to explore. While "doing projects", the student group is also "doing mathematics". In the process of the project, students have experienced practical activities such as information collection and processing, and project planning and implementation. They communicate with members based on the collated data, and analyze and solve problems. Teachers guide students to learn to see, learn to think, learn to express from the perspective of mathematics, improve their application awareness and practical ability, and develop core literacy.

3. Implementation strategy of project-based learning in teaching

3.1 Make good preliminary preparations and pay attention to situational introduction

If teachers want to successfully complete a vivid and efficient project-style teaching activity, they must make adequate preparations. Understand the students 'existing cognitive level and knowledge reserve, preset what level the students should reach after experiencing the project activities, and what knowledge and skills they should acquire, so as to fully mobilize the students' learning enthusiasm. At the same time, teachers should also "understand" the teaching content in advance, design reasonable project content according to the degree of difficulty, arrange the corresponding class hours, and ensure that the questions raised are within the scope of students' ability, improve the implementation of the project, and lay a foundation for the subsequent smooth development of project activities. When designing teaching activities, teachers should closely contact with the materials in the real world and students 'existing life experience, and set students' learning activities in the practice field of real and meaningful knowledge generation and application. In the process of experience, operation, communication and reflection, students can really feel the sense of context substitution in the learning process, can deeply understand the practical significance of mathematical activities, and can deeply understand the application value of mathematical knowledge.[5]

3.2 Clarify the project theme and build the project framework

Project theme is the first step in designing the overall project activity, and also the core of project-style learning. Teachers first of all, need to understand what the questions and contents that students are interested in, and at the same time analysis the learning situation. On the premise of grasping the general direction of teaching, teachers should refine the theme of the project from the materials that students are interested in, and determine the theme around the core concepts and curriculum standards of mathematics, so as to meet the teaching needs at the present stage. The second step is to build the project framework, which serves as a guide to the development of project-based learning. Teachers need to clarify the project objectives, driving problems, the composition of each sub-project, the relationship between the sub-project and the necessary supplementary explanations. In the implementation process, teachers can improve and modify the framework according to the actual situation.for instance, When designing the project of "Making a stereo model of the school" in the seventh grade mathematics teaching classroom, Teachers should make clear the goal of the project, on the one hand, to allow students to acquire mathematical knowledge such as

view, expansion, ratio and proportion, measurement and estimation, On the other hand, it is to develop students' spatial concept, geometric intuition, computing ability and other mathematical core qualities; Raise the driving questions throughout the entire project process, Connect the project theme closely with the teaching content; Reasonable split out "how to get the length, width and height of campus buildings", A series of sub-questions, such as "how to make models similar to campus buildings," And pay close attention to the completion of student projects.

3.3 Carry out group cooperation and explore projects in depth

Project-based learning is a practical activity carried out in small groups, so teachers need to follow the principle of "homogeneity between groups and heterogeneity within groups" to assist students to form learning groups. Guide students on the basis of the project objectives, make each student can receive the corresponding task, in the difficulty with group members timely communication, communication, in the process of interaction in the collision sparks of thinking, let each student can play their role in the project, mutual achievement with team members, make progress together. In addition, students' participation in learning and the depth of inquiry determine the effectiveness and quality of the project. For example, in the "measuring flagpole height" mathematical project activities, teachers to measure the school playground flag flagpole height for the task, guide students to think about how to design scheme, further explore within the group, jointly make specific operation plan and process, use of classroom activity time to the playground field measurement, integrating measurement data reasoning calculation, through the teachers and students, raw communication project results, reflection summary. In the process of activities, students are familiar with the campus and peers to explore the project, reached the physical and emotional input, through personal measurement data, combined with the Pythagorean theorem, similar triangle mathematical knowledge such as flagpole height, emphasizes the combination of direct experience and indirect experience, implements the students' physical and mental investment, depth to explore.

3.4 Display the project results and conduct multiple evaluation

After completing the project tasks, the teacher should guide the students to show the project results of the group, and encourage the students to share the difficulties encountered in the implementation of the project, as well as their own feelings, harvest and thinking process. Evaluation is an important part of project-based learning. Teachers should give timely feedback on the overall learning status of students in the project, establish a diversified evaluation system, and give full play to the incentive, pointing and promotion role of evaluation.[6]According to the diversity of evaluation subjects, teachers, in addition to evaluating students, also help students with self-evaluation. In the group, groups and students evaluate each other, and make comprehensive comments on their own learning situation from different perspectives. According to the diversity of evaluation criteria, teachers no longer only pay attention to students 'knowledge construction, but make a comprehensive evaluation of students' problem consciousness, cooperation spirit, communication ability and other aspects. According to the diversified evaluation methods, teacher evaluation should run through the project learning, carefully record the students 'performance in the project process, pay attention to the formative evaluation; carefully observe the students' achievements at the end of the project, pay attention to the final evaluation, and properly use different evaluation methods to conduct the overall evaluation of students' learning. Through multiple evaluation, the problems of static evaluation and one-sided evaluation in classroom teaching can be improved, and the project-based learning can be carried out more effectively.

4. Summary and suggestions

In a word, project-based learning, as a set of systematic teaching mode, emphasizes that students continuously explore problems in group learning in real and complex situations. By collecting and organizing information, designing and implementing plans, they can finally find solutions to the problems, complete the project and show the results. It emphasizes the guiding role of teachers in the process of the project, and requires teachers to be flexibly transformed in multiple roles such as designer, instructor, and helper, and pay attention to the learning results and evaluation of the project. It combines theory with practice, which helps students to truly understand and master mathematical knowledge and realize deep learning; realize the application value of mathematical knowledge and integrate knowledge and practice; know

how to use various skills to solve problems and improve the core quality. Therefore, integrating project-based learning into daily classroom teaching is of great significance for implementing curriculum reform and improving the effectiveness of teaching.

In addition, in order to better play the function of project-based learning in teaching, the author has the following suggestions: First, take project-based learning as an auxiliary tool for routine teaching. Due to the limitations of project-based learning, it cannot replace any teaching method, and it is not applicable to the teaching of all mathematical knowledge content. Teachers should properly use project-based teaching according to the specific learning content, students' actual situation, combined with other teaching methods. Second, both project results and knowledge and skills. Although project-based learning ends with "achievement display", students should only avoid completing the project as the goal, thus ignoring the learning and understanding of knowledge. This requires teachers to skillfully infiltrate the learning content into every link of the project, so that students can "learn knowledge" while "doing the project". Third, make full use of information technology. A great advantage of project-based learning is that students can personally participate in the project and get the experience and feeling. However, some project activities take a long time, and the pace of activities is not easy to control. At this time, teachers can use video, animation and other information technology means to demonstrate to students in class, so that they can understand how knowledge comes from life, act on life, and improve teaching efficiency.

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