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Research on Strategies of Creating Mathematics Teaching Situation in Senior High School

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Abstract

The creation of teaching situation is a classroom teaching activity that front-line teachers of basic education constantly practice and explore, which plays an important role in promoting competence education and implementing new curriculum reform. This paper, guided by the concept of core literacy in mathematics, and based on the analysis of the connotation of creating teaching situation. Starting with discussion of the practical problems existing in the creation of high school mathematics classroom teaching situation, this paper puts forward some implementation strategies and suggestions, such as paying attention to and implementing the creation of high school mathematics teaching situation, being close to students' life practice, being scientific, etc., in order to better improve the quality of classroom teaching and develop students' mathematics core literacy.

Keywords

High School Mathematics; Classroom Teaching; Teaching Situation; Core Literacy.

1. Introduction

With the advancement and development of the new curriculum reform of basic education in China, aiming at the embodiment and implementation of core literacy in high school mathematics classroom teaching, new requirements are put forward in the revision process of high school mathematics curriculum standards. "Ordinary Senior High School Mathematics Curriculum Standard (2017 Edition)" points out that "Senior high school mathematics should be guided by developing students' core literacy in mathematics, creating a appropriate teaching situation, inspiring students to think, and guiding students to grasp the essence of mathematics content ", and requires that" through the learning of high school mathematics courses, students can abstract mathematical concepts, propositions, methods and systems in the situation and accumulate activity experience from concrete to abstract; Develop the habit of thinking about problems in daily life and practice, grasp the essence of things, Simple and complicated; Think and solve problems by using mathematical abstract thinking mode "[1]. Thus, It can be seen that the creation of classroom teaching situation is an important carrier and way to implement and cultivate students' core literacy. Teachers should create a process for students to experience the discovery of knowledge and methods in the teaching process of mathematical knowledge and mathematical thinking methods. Create a problem situation of knowledge proof and application, so that students can get thinking training and core literacy promotion in this situation.

The creation of classroom teaching situation has always been a hot topic of concern and research for educators. For example, The Vanderbilt Cognition and Technology Group in the United States is an important experimental group, which integrates mathematics learning with actual teaching situations to establish an original teaching model.[2] Li Jilin, which made systematic research on the creation of teaching situation earlier in China, by extending

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situational teaching from primary school Chinese to all fields of education and teaching, the theory of situational teaching in China has been greatly developed. [3] With the development of curriculum reform, in recent years, high school mathematics teachers have also studied a lot about it, but the research results of combining with the cultivation of mathematics core literacy are still few, and the research pertinence and depth are not enough. What's more, at present, in the actual teaching of mathematics in senior high schools, there are some problems, such as teachers' ignorance of the creation of teaching situations, misunderstanding of the concept of the creation of teaching situations, lack of methods and means of creating teaching situations, inability to be close to students' lives, lack of attention to the scientific nature of subjects and so on, which make it difficult to implement the cultivation of students' core literacy.

Therefore, this paper tries to analyze the connotation and requirements of the creation of mathematics classroom teaching situation from the perspective of cultivating the core literacy of mathematics discipline. On the basis of analyzing the current situation of the creation of high school mathematics teaching situation, this paper discusses and puts forward some strategies for the creation of classroom teaching situation, with a view to providing reference for teachers and jointly promoting the reform process of high school mathematics curriculum.

2. The Current Situation of the Creation of Mathematics Classroom Teaching Situation in Senior High School

Through classroom observation and visiting investigation, through sorting out and analyzing, it is found that the following problems mainly exist in the creation of high school mathematics teaching situation:

2.1. Teachers Ignore the Creation of Mathematics Teaching Situation

In the practical teaching of mathematics in senior high school, some teachers have not realized the importance of creating situations and neglected the creation of situations. For example, when learning the exponential function, some teachers directly explain the textbook example-the relationship between the carbon 14 content P in organisms and the number of death years, which makes it difficult for students to understand. This is because the teacher failed to deepen his understanding of the problem situations listed in the textbook. Teaching thinking about the problem is superficial; It is precisely because of the lack of problem situation teaching that the interaction between teachers and students is lacking, and it is difficult to have in-depth understanding and development of knowledge, let alone the cultivation of core literacy. At the same time, there are also some teachers who create teaching situations, but the creation becomes a mere formality, which leads to students' inability to explore the problems. Although these teachers created teaching situations and tried to guide students into learning, the situations were only set up for the purpose of setting up situations, and the background information irrelevant to the teaching content was too messy, which led to students' lack of observation, abstraction and summary of knowledge, which blurred the main learning contents of students and lost the significance of creating situations.Mr. Zhang Dianzhou, a mathematician, once pointed out that the creation of mathematical situation is an important part to reflect the ins and outs of mathematics [4]. This also confirms that teachers' neglect of classroom teaching situation setting will lead to a large number of problems.

2.2. The Creation of Teaching Situation does not Fit the Students' Life Practice

Some teachers failed to connect the created situation with the students' real life, and the questions put forward did not combine the students' learning situation, which was inconsistent with the students' cognition, resulting in no resonance with the students when introducing the situation. For example, in the section of "Logarithm and Logarithm Operation", some teachers apply textbook examples and give the complex formula of Richter scale m, so that students can

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calculate the magnitude of earthquake. This teacher simply introduced the concept and properties of logarithmic function, which in the long run, will inevitably make students lack learning motivation, which will result in the completion of teaching objectives and weaken the enthusiasm and creativity of learning. The new mathematics curriculum standard points out that "To create a problem situation that can fully reflect the characteristics of daily life,Let students find familiar situations in real life and better understand mathematics knowledge ".[5]

2.3. The Creation of Teaching Situation is Lack of Scientificity and Innovation

What can students learn in the teaching situation? This problem is often neglected in the process of teachers' teaching. When creating a problem situation, many teachers tend to pay too much attention to the situation mode, such as whether to use multimedia technology. This kind of practice, which focuses on the gorgeous form and ignores the essence of the content, will make students feel at a loss. On the contrary, it will lose the foundation of mathematics teaching-revealing the essence of mathematics. At the same time, when creating mathematics teaching situations, some teachers do not clearly analyze students' cognitive basis, ignore the interrelation between knowledge, and fail to guide students to use the transformation of new knowledge to promote the connection of piecemeal knowledge points into knowledge chains. Some teachers lack innovation in the classroom, choose a single way of materials when creating situations, sometimes rely too much on teaching materials ,and even some teachers abuse other people's achievements.

3. Strategies and Suggestions on Creating Mathematics Classroom Teaching Situation in Senior High School

3.1. The Creation of Mathematics Teaching Situation Needs Attention and Strict Implementation.

The creation of teaching situation is significance to teachers' teaching and students' literacy development, and it can never be achieved by simple introducing stories or fancy courseware displays. In this regard, the reform can be started from two aspects. On the one hand, schools should pay attention to it, and teachers can be provided with relevant training on advanced teaching methods such as the creation of teaching situations according to existing conditions. Let teachers develop and grow continuously in practice; On the other hand, through the guidance of experts or famous teachers, teachers can gain a deeper understanding of the relationship between knowledge in textbooks, and clarify the importance and operability of situation creation in mathematics classroom.

For mathematics teaching situation creation, general methods include using classic historical stories, contemporary influential events, multimedia technology, creating from the source of knowledge itself. For example, for the content of the first section "Functions and Equations" in Chapter 3 "Application of Functions" of Senior High School Mathematics - finding approximate solutions of equations by dichotomy. Before learning the content of this section, students already have a certain idea of the combination of numbers and shapes. However, students' knowledge of dynamics and statics is still weak, and there is also a lack of knowledge of the relationship between functions and equations, all of which make it difficult for students to narrow the range of zero points. Moreover, the graphics in the textbook are "dead pictures", which are unable to show the process of "dichotomy". For the introduction of this teaching content,We can use multimedia to dynamically "dichotomy", and in the vivid manifestation of shape changes, we can perfectly show the internal relationship between numbers and shapes. This kind of situation creation has the interest of the situation, pays attention to students' learning emotion and highlights the mathematical characteristics of the content.

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3.2. Creation of Mathematics Teaching Situation Should be Close to Students' Life Practice

As a vehicle for teaching content, teachers should be close to life and close the distance between students and problems when creating problem situations in high school mathematics. Creating situations with scenes familiar to students can help them relax and integrate into teaching more quickly. When creating situations, teachers should consider more about the connotation and essence of mathematics teaching knowledge. The problem situation should be close to life, so as to achieve explaining profound theories in simple language. For the first section of Chapter 3 "Concept and Nature of Functions", many teachers can correctly understand the setting of problem situations in textbooks, in order to let students understand the concept of functions, and give four questions at the beginning. They respectively represent the relationship between the traveling distance of high-speed trains and the running time, find out the functional relationship between a worker's salary and working days, determine the value of air quality index at any time in a day in Beijing, and determine the relationship between Engel coefficient and year. The above situations are very close to real life, and those contents are all daily situations.The advantage is that they not only enhancing students' curiosity, but also arousing students' passion to explore knowledge, allowing students to experience the whole mathematical process of problem situations, triggering students' mathematical thinking, pointing to mathematics teaching objectives, and restoring abstract mathematical knowledge to vivid problem situations based on students' knowledge and experience, so as to achieve the purpose of self-construction of knowledge.

3.3. Creation of Mathematics Teaching Situation Should be Scientific

To create a teaching situation for high school mathematics, it’s important to follow the content of teaching materials, but also to go beyond it and present it in a more enriching way, to show the teaching content in an appropriate form, to focus on the scientific nature of teaching and highlight the essence of mathematics. At the same time, creating situation serves the mathematics classroom teaching activities, which should run through the whole process. Professor Yuxin once said,A good teacher will make the problem run through the classroom, not just as a stepping stone. For example, vivid stories are an effective way to create situations for classroom introduction. Although mathematical language is well organized, the introduction of learning situations by means of stories can make students experience the fun of mathematics and maximize students' desire for active inquiry.Teachers' emotional intonation and freely retractable limbs can usually stimulate students' learning passion by throwing out questions and introducing new lessons through stories. However, the story of teaching content must also be based on the appropriateness of mathematics teaching form, which includes the appropriateness of knowledge difficulty and integration with science and technology.The appropriateness of knowledge difficulty is to grasp the students' recent development area, to avoid students' fear of difficulties, and to learn the most knowledge under the teacher's instruction; The appropriateness of scientific integration means that the proper use of scientific and technological means has also attracted students' attention to learning, but technology is a double-edged sword, such as multimedia technology, because of its intuitive and vivid features, as a result, some teachers don't understand that it will lead to too much information in creating situations, and even deprive students of practical problems. Proper use of science and technology can achieve a substantial grasp of the concept. For example, in the history of mathematics, the introduction of the concepts of imaginary number and plural number has gone through a tortuous process.It is full of mathematicians' imagination, creativity and indomitable spirit of Excellence. In the era of Diophantine, an ancient Greek scholar, people already know that quadratic equation of one variable has two roots, but when one of the roots is imaginary, they would rather think that the equation is unsolvable. Until the 16th century,

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people generally agreed with Diophantine's method. [6] thus,In the teaching of plural concepts by teachers, we can properly introduce the historical development process, and let students feel the culture and spirit of mathematics.

4. Conclusion

Classroom teaching is the main front of implementing quality-oriented teaching, and improving students' literacy is its important content. The creation of teaching situation in high school mathematics classroom is a scientific and applicable way of curriculum reform, which makes up for the deficiency of traditional teaching. The majority of mathematics teachers should have a deep understanding of how to create mathematics teaching situations. On the basis of liveliness, so that students can refine mathematics problems in real life, build a suitable mathematics classroom teaching situation for students, and truly develop and enhance the core literacy of mathematics.

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