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Research on Strategies for Improving Teaching Efficiency of Middle School Mathematics Classrooms under the Background of Key Competencies

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Abstract: With the deepening of the new curriculum reform, the cultivation of Key Competencies has become a key task in subject teaching. The Key Competencies of the mathematics discipline reflects the nurturing value of the mathematics discipline and has an important role and significance for the growth and development of students. The classroom is the main position for cultivating students' Key Competencies and imparting knowledge, so it is very necessary to improve the efficiency of classroom teaching and cultivate students' Key Competencies. This paper analyses the importance of improving the efficiency of classroom teaching in the context of Key Competencies and the current status quo of junior middle school mathematics classroom teaching, and on this basis proposes strategies to improve the efficiency of classroom teaching, to promote the cultivation and enhancement of students' Key Competencies.

Keywords: Key Competencies; Junior Middle School Mathematics; Teaching Efficiency; Methods and Strategies.

1. Introduction

Under the continuous advancement of the new curriculum reform, Key Competencies has become the key content of education reform, in which the importance of mathematical Key Competencies in junior high school mathematics education is becoming more and more prominent. Mathematical Key Competencies refers to the key abilities and qualities formed by students in the process of mathematical learning, including mathematical thinking, mathematical language, mathematical application, and mathematical affective attitudes [1], which can be adapted to the development of individuals and the needs of society. The Mathematics Curriculum Standards for Compulsory Education (2022 Edition) clearly states that it should be based on the development of students' Key Competencies, focus on the nurturing value of the mathematics discipline, and cultivate students' ability to observe the real world with mathematical vision, think about the real world with mathematical thinking, and express the real world with mathematical language [2]. Against this background, how to improve the teaching efficiency of junior secondary mathematics classrooms based on the implementation of Key Competencies in mathematics to promote the development of students' mathematical thinking and ability has become an important issue that many teachers need to pay attention to and think about. Based on this, this paper explores the strategies to improve the teaching efficiency of junior middle school mathematics classrooms in the context of Key Competencies to help some educators provide certain references and assistance to improve the efficiency of classroom teaching and implement the requirements of the curriculum standards.

2. Materiality Analysis

In the new era of educational change, the cultivation of Key Competencies is regarded as one of the key points of teaching, and the new curriculum proposes to "cultivate students' correct values, necessary character and key abilities for the future", and cultivate students to become talents adapted to the requirements of the future social development and progress [3]. Therefore, in the process of implementing the mathematics curriculum, the focus of teaching should be on helping students to form the necessary character and key abilities to adapt to the future development of their development and the development of society, which also puts forward higher requirements for mathematics teachers. Mathematical knowledge has a certain degree of abstraction, which is difficult for students to learn, while teachers need to implement the core qualities of mathematics in the mathematics classroom to achieve the requirements of the new standards, but also to teach mathematical knowledge, which leads to the emergence of a limited amount of classroom teaching time can not be balanced between the two, resulting in the classroom efficiency and quality, as well as the reduction of students' interest in learning mathematics and other issues. As can be seen from the above, it is extremely important to improve the efficiency of classroom teaching in the context of Key Competencies. Improving the teaching efficiency of the mathematics classroom and creating efficient classroom teaching can not only better help students develop good mathematical literacy, such as logical reasoning, mathematical operations, and other literacy, but also improve student participation in the mathematics classroom, and through active participation in the classroom teaching and learning activities, further improve the students' mathematical thinking and interest in learning mathematics [4]. In addition, improving the teaching efficiency of the mathematics classroom and creating an efficient classroom teaching can also improve the teaching quality of the classroom and student's academic performance, although the new teaching concept is no longer based on grades as the only criterion for

evaluating students, grades are indeed an important reference for evaluating students. The improvement of classroom teaching efficiency, to a certain extent, will promote students' further understanding of mathematical knowledge, deepen their mastery of knowledge, and improve their ability to learn mathematics, which will improve students' learning achievement in mathematics, strengthen students' confidence in learning mathematics, and can also better implement the core qualities in classroom teaching, and promote the development of students' essential character and key competencies.

3. Analysis of the Current Situation

3.1. Single Teaching Form

The new curriculum emphasizes that mathematics teaching activities in the classroom should "choose teaching methods that can trigger students' thinking", and advocates that mathematics teachers should adopt inspirational, exploratory, group cooperation and other teaching modes to carry out teaching [5]. However, in actual teaching, many mathematics teachers often take a single teaching method, that is, the combination of lecture and practice way of teaching. Although this approach allows students to master and consolidate the mathematical knowledge they have learned in a short period, this teaching method allows students to focus on the learning objectives of completing mathematical homework, tasks, and the corresponding exams, and there is no more interest in learning other relevant mathematical content outside of these aspects, and students are in the classroom in the classroom in passive learning, which is not conducive to the development of the student's mathematical thinking and mathematical learning ability. These are not conducive to the development of students' mathematical thinking and learning ability. In addition, a single form of classroom teaching often reduces students' motivation and interest in learning mathematics, and students will feel bored when learning mathematics in a single teaching method, which to a certain extent leads to the low efficiency of classroom teaching and affects the quality of teaching. Therefore, under the background of Key Competencies, teachers should actively update the teaching concept and enrich the form of teaching to improve the quality and efficiency of classroom teaching and achieve the effect of educating people.

3.2. Formalization of Classroom Teaching

In the context of the new curriculum reform, the Key Competencies of mathematics has been taken seriously and the cultivation of Key Competencies has been regarded as one of the important contents of teaching. In the design of teaching, most teachers integrate the Key Competencies of mathematics into the lesson plan and put it in the important position of teaching objectives. However, in the actual teaching situation, teachers did not implement the core mathematical literacy well. Although some teachers attached importance to and practiced the cultivation of core mathematical literacy in the classroom, they did not carry out the core mathematical literacy in the whole classroom teaching process, which led to the problem of the formalization of core mathematical literacy as a teaching goal, and did not achieve the real effect of educating people. In addition, in the arrangement of homework after class, some teachers do not pay attention to the penetration of mathematical Key Competencies, the content of the homework arrangement is only a simple consolidation of knowledge after class practice, which also makes the cultivation of mathematical Key Competencies formally, and fails to meet the requirements of the new standards.

3.3. Teachers' Lagging Teaching Concepts

In the current trend of the new curriculum reform, new teaching concepts and teaching ideas are gradually accepted and practiced by teachers, most mathematics teachers have realized the importance and necessity of changing classroom teaching, and also understand the necessity of cultivating students' Key Competencies in mathematics, but there are still some teachers whose concepts are lagging. This part of the teachers is deeply bound by the traditional teaching concepts, in the classroom are still by the traditional teaching concepts for teaching, ignoring the students in the classroom of the main position. Classroom teaching lacks the cultivation of students' mathematical thinking, only focusing on the teaching and training of mathematical knowledge, and more mechanical memorization methods taught to students, resulting in the lack of students' innovative thinking and logical reasoning ability to cultivate, that the students often unable to do anything when encountering complex mathematical problems, difficult to solve the problem. On the other hand, due to the influence of traditional teaching concepts, some teachers tend to focus on themselves in the classroom to impart knowledge, and there is less interaction between teachers and students and between students, which leads to a certain degree of inhibition of students' motivation and initiative in mathematical learning, which also results in a lack of active and positive atmosphere in the classroom, which is not conducive to the development of students.

4. Enhancement Measures

4.1. Using Diversified Forms of Teaching to Promote the Development of Student's Abilities

The new curriculum standard advocates that teachers use a variety of teaching forms to carry out teaching activities, and the traditional single teaching method cannot meet the requirements of today's educational development. Mathematical abstraction, mathematical modeling, and so on are the expression of the core qualities of mathematics, which are also the key abilities that need to be cultivated in students. In the teaching process in practice, teachers can set up appropriate specific tasks in the classroom teaching activities to train students in mathematical modeling, analysis of data, etc., through the task-driven method to guide students to use mathematical knowledge to analyze problems, explore, and solve problems with mathematical methods, to exercise the key abilities of students [6]. In applying task-driven teaching, teachers can design a variety of situations and tasks so that students can apply the mathematical knowledge they have learned to solve practical problems. In this way, students will have a deeper understanding of mathematical concepts and principles and will be able to apply what they have learned to real life. For example, in the teaching of the Degree of Fluctuation of Data, teachers can set up teaching activities for students to analyze the task: there are two kinds of wheat, A, and B, respectively, 10 randomly selected wheat, measured the seedling height of wheat A (unit: cm) were: 12, 13, 14, 15, 10, 16, 13, 11, 15, 11; the seedling height of wheat B (unit:

cm) were. 17, 14, 13, 19, 6, 8, 10, 16. Please use what you have learned to determine which type of wheat grows more neatly. Students can analyze the data according to the content of the classroom, and then calculate to be able to get the growth of wheat type A is more neat. This process can promote the formation of mathematical thinking while exercising their reasoning, arithmetic, analysis, and other skills to develop students' Key Competencies. In addition, teachers can also use inquiry, discovery, group work, and other teaching methods to teach, so that students can explore knowledge independently, and develop students' independent learning ability as well as core mathematical literacy. Through the application of a variety of teaching forms and methods, classroom teaching is not monotonous, which can attract students' interest in learning, exercise students' abilities, and achieve the purpose of cultivating Key Competencies and improving teaching efficiency.

4.2. Changing Traditional Teaching Concepts and Improving Teachers' Teaching Level

With the development of the times, traditional teaching concepts are no longer suitable for today's times and the requirements of talent training. In the new era, the country needs to cultivate new people with ideals, skills, and commitment, with the correct values, necessary character, and key abilities to adapt to future development. The thinking of talents cultivated by the traditional teaching view is often limited, the innovative consciousness and innovative ability are weak, the ability to adapt to the future society is not well cultivated, and it does not meet the trend of the talents needed for the development of today's era [7]. Therefore, teachers should change their teaching concepts, actively learn new teaching concepts and teaching methods and approaches, and change the traditional teaching methods as well as the view of should-type examination. The concept of the new curriculum reform requires highlighting the student's main position, teachers change the traditional teaching position to become the classroom guide. Teachers should change the traditional teaching mode, that is, the teacher in the three-foot podium constantly lecturing knowledge, and students sitting below passive listening and learning, this mode does not take students as the main body of teaching, but the teacher as the main body is not conducive to the development of students. In addition, the traditional concept of teaching is to let students do a lot of practice to achieve the purpose of consolidation after the lecture, but this approach not only violates the concept of the new curriculum reform but also conflicts with the current policy of "double-decrease", which is not conducive to the cultivation of students' ability and literacy. Therefore, teachers not only need to change their teaching concepts, pay attention to the cultivation of students' core qualities, and improve students' learning ability and thinking level, but also need to improve their teaching level. If the teaching level of teachers cannot meet the requirements, it is difficult to implement the cultivation of core mathematics literacy and the requirements of the curriculum reform in the classroom. Teachers should actively improve their teaching level through various ways, such as learning from excellent teachers around them, participating in relevant training activities, reading relevant books and magazines, and so on.

4.3. Creating Appropriate Situations to Attract Learning Interests

As the saying goes: "Interest is the best teacher", stimulating students' interest in learning is one of the keys to implementing the development of students' Key Competencies in mathematics. In traditional teaching, most teachers in the pre-course introductory links will often take the old knowledge to pull the new knowledge means or boring old knowledge review as the introduction, this rigid form of introduction makes it difficult to stimulate students' enthusiasm and interest in learning mathematics. Therefore, teachers should actively design suitable teaching situations to attract students' interest in learning. These teaching situations can be mathematical culture, junior high school students are often full of curiosity about new things, interesting stories, etc. If teachers make good use of mathematical culture in the classroom, it can have a very good effect. For example, in the teaching of "positive integers", the teacher can introduce the development process of the number, introduce some of the ancient methods of counting, etc., which can attract students' interest more than the direct introduction. In addition, the creation of context should be more connected with real life or reflect the value and role of mathematical knowledge in life, because many of the students' experiences come from real life, and mentioning the content related to their lives will often make them interested. Students, who are learning some of the more difficult knowledge will often want to learn the knowledge of what use, if the teacher in the teaching context of the introduction of the role of knowledge in life embodied, will be able to let the students feel the importance of the knowledge learned, and then will be serious about learning, to achieve the purpose of improving the efficiency of classroom teaching. For example, in the teaching of the "understanding of the system of quadratic equations", the teacher can be an example of life designed as a problem as the introduction: a school of a maths teacher intends to go to the stationery shop to buy stationery, known as the price of pencils for 2 yuan, the price of exercise books for 1 yuan a. The final number of pencils and exercise books is priced at 1 yuan. The final number of pencils and exercise books for a total of 20, and a total cost of 24 yuan, asked if the pencils and exercise books were bought less. The students are more familiar with life problems as the introduction point, not only can attract students' interest in learning but also can let students feel the role of learning the system of binary equations, to further improve the students' interest in the knowledge they learned, to create a good learning atmosphere, to improve the efficiency of teaching.

4.4. Respecting the Laws of Physical and Mental Development and Developing Mathematical Thinking and Learning Skills

Individual physical and mental development has a stage, different stages have different characteristics and main contradictions, facing different development tasks [8]. The abstract logical thinking of students in junior high school has reached a stage of rapid development, and in this important stage, teachers should pay attention to cultivating students' mathematical thinking and further improving students' mathematical learning ability. Junior high school students are in adolescence, their emotions are easily influenced and fluctuate more, when teaching or arranging extracurricular homework, we should consider the current cognitive level of students, and should not go beyond the current nearest development zone of students. Maths topics should be difficult enough to enhance students' ability but also take into

account students' current level, so as not to undermine students' confidence in maths, and to help students overcome their fear of maths as well as enhance their confidence and interest in learning maths. In the context of Key Competencies, teachers should focus on cultivating students' mathematical thinking and improving their ability to learn independently, which will promote the improvement of classroom teaching efficiency and the implementation of the requirements of the curriculum standards. Enhancing students' mathematical thinking can be taken in the classroom teaching of group cooperation so that students in the group through the exchange of discussion produce the collision of thinking, to improve students' mathematical thinking ability. Secondly, teachers can also design open-ended topics for students to think about and discuss, which can not only improve students' mathematical thinking and make them think from multiple perspectives but also cultivate students' sense of creativity and innovative ability, laying a certain foundation for students to adapt to future development. For example, the "weighted average" of the teaching can be designed to open the topic: in the campus "ten singers" competition, A, B, two contestants in the competition results are as follows, contestant A's skills, emotional scores were 92 and 82 points, contestant B's skills, emotional scores were 85 and 90 points, please design an election program to make the final results. an election program so that the final result is that A is selected. Teachers can allow students to explore the solution to the problem of group cooperation, students can produce in the discussion of the exchange of ideas in the collision, open up the perspective of the problem, and brainstorming, through the way of group cooperation to allow each student to participate in the classroom, not only conducive to improving students' interest in learning, but also to promote the development of students' thinking.

4.5. Using Information Technology to Improve the Quality of Teaching and Learning

With the development of the times and the progress of science and technology, information technology is more and more favored by teachers. The popularity of multimedia in primary and secondary schools is quite high today, which has an important impact on the way of teaching. In the context of the current Key Competencies, the use of information technology in teaching is an important and practical way for mathematics teachers to improve the efficiency and quality of teaching. The use of information technology can turn abstract knowledge in mathematics into concrete and observable, making it easier for students to understand and master knowledge. For example, in the teaching of "quadratic function", the teacher can use information technology to show the image of the quadratic function, so that students can observe the different quadratic function graphs is how, what they have in common, different, through the image of the image so that students find the summary of the characteristics of the quadratic function, this way not only can be an abstract quadratic function to show students to observe, fully understand this kind of function, but also to avoid simple knowledge teaching, enhance the interest of the classroom, and deepen students' knowledge and understanding of mathematical knowledge.

5. Conclusion

Improving the teaching efficiency of the mathematics classroom in the context of Key Competencies is an important task. Teachers need to change the traditional teaching concepts and improve their teaching level, respecting the physical and mental development of students, through the application of a variety of teaching forms and methods, creating appropriate teaching situations, and use of information technology to improve the efficiency of classroom teaching and implementation of the cultivation of the core qualities of mathematics, and promote the development of students' mathematical thinking and key competencies.

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