

Research on the Quality of Mathematics Classroom Teaching in Middle School in China

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Abstract

With the continuous deepening of new curriculum reforms, schools and society have higher and higher requirements for middle school mathematics teaching. Classroom teaching is the core of mathematics teaching, which makes many educators attach great importance to mathematics classroom teaching, this has led to many types of research on the quality of middle school math classroom teaching. But it is not clear to what extent these studies have reached. So we have done a review of the literature in the CNKI in the past ten years by using the literature method, and the conclusions are as follows: (1) The research on the quality of middle school mathematics classroom teaching has mainly focused on the problems in middle school mathematics classroom teaching and the measures to improve the quality of mathematics classroom teaching. For these two aspects, predecessors have conducted more in-depth research and achieved results. More often, because the researchers are mostly middle school teachers, they have certain reference significance for teaching measures. (2) There are still some problems in the existing research: the existing literature mostly adopts the method of theoretical speculation, and there is few empirical research, so it lacks a certain degree of scientificity; in terms of the solutions proposed by the predecessors, some measures lack certain practical effects, and the explanation of the measures is also relatively general. (3) There are still some gaps in existing research: the current physical condition of teachers has become a major factor affecting teaching efficiency, but no scholars have proposed certain solutions to this problem; few researchers consider the design of math classrooms from the study habits and psychology of students with learning difficulties. Therefore, future research must use empirical research methods based on existing research, implement solutions to actual classroom teaching to verify the actual effectiveness, and consider the design of mathematics classroom from the physical condition of teachers and the learning condition of students with learning difficulties.

Keywords

Middle School, Mathematics, Classroom Teaching, Teaching Quality

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1. Introduction

With the continuous advancement of the new curriculum reform, more and more problems are exposed in the mathematics classroom, and various problems lead to the failure to improve the quality of classroom teaching and ultimately affect the professional development of teachers and the academic progress of students. Mathematics classroom teaching is the core of the entire mathematics teaching process. Most of the students' knowledge comes from the classroom. It can be said that it is the carrier for students to master

mathematics knowledge and cultivate mathematical ability [1]. At the same time, classroom teaching is also an important part of the most important test of teachers' abilities. All teachers' teaching preparations must eventually be reflected in the classroom, especially novice teachers must show their teaching abilities through the classroom, to be recognized by students. In recent years, researchers have done a lot of research on improving the quality of middle school mathematics classroom teaching. However, there is no general research on the overall research situation at present, to clarify the current research status, research deficiencies, and research

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on middle school mathematics classroom teaching, this article intends to make an overall summary of the conclusions of existing studies. This research can not only provide useful information for novice teachers to understand the mathematics classroom, establish teacher image, and improve teaching quality, but most importantly, it can provide the basis of current research for related issues and help future researchers grasp the situation and characteristics, and can deepen the research on the quality of middle school mathematics teaching.

The main questions studied in this article are: (1) What are the characteristics of the current research on the quality of middle school mathematics teaching in China? (2) What are the deficiencies or gaps in the current research on the quality of middle school mathematics teaching?

2. Method

2.1. Information Source

The documents involved in this article are all from the China CNKI (Chinese National Knowledge Infrastructure) database. At present, CNKI has developed into a world-leading online publishing platform integrating journals, doctoral dissertations, master's theses, conference papers, newspapers, reference books, yearbooks, patents, standards, Chinese studies, and overseas literature resources. It includes 168 professional subject digital libraries, covering documents in various disciplines, and is a highly authoritative document retrieval platform. Therefore, this article selects this database to retrieve target documents to ensure the scientific nature of the research.

2.2. Data Collection

The author uses "mathematics, classroom teaching, quality" as the search subject term, and "text" as the search item, and searches in the order of time from nearest to far, and got 459 results. The earliest document that studies the quality of mathematics classroom teaching is "How We Improve the Quality of Mathematics Classroom Teaching" published by the Mathematics Teaching and Research Group of Bengbu No. 1 Middle School in Anhui Province in 1960. It can be seen that the research on the quality of mathematics classroom teaching has a long history, and the frequency of its research also proves the importance of studying this topic. Taking into account the timeliness of the article and the subject of this article as middle school mathematics classroom teaching, the author chooses the literature published from 2010 to June 2020 as the target literature for the research, and only selects the literature related to junior high school and high school. Also, because the content of the referenced documents do not meet the research requirements, and considering the amount

of citation, 38 references are finally selected.

2.3. Data Processing

The author records the research questions, research methods, and research conclusions of the target literature by taking notes. After reading and sorting out all the literature, the author preliminarily determines that the current research mainly focuses on the problems in mathematics classroom teaching and measures to improve the quality of mathematics classroom teaching.

3. Results

According to the summary and analysis of existing research, it is found that previous studies on the quality of middle school mathematics classroom teaching mainly focus on the problems in mathematics classroom teaching and the measures to improve the quality of classroom teaching.

3.1. Problems in Mathematics Classroom Teaching

3.1.1. Factors About Teachers

1. *The teacher's concept is outdated and the student's subjectivity is not reflected*

Wu and Yan believe that although the new curriculum standard emphasizes that students are the main body of learning and teachers are the guides of student learning, there are still many teachers with traditional thinking and it is difficult for students to play their main role. In the actual classroom teaching, many teachers still use the traditional duck-filling teaching method. Teachers occupy the center of the classroom. Students only passively accept knowledge. Over time, students lose their interest in learning mathematics [2, 3].

2. *The teaching mode is old-fashioned and single, lacking new ideas*

In the teaching mode, many teachers still follow the tradition. Chen points out that the current classroom teaching model is too single, and it is still the traditional teacher-passing student-acceptance. The teacher does not pay enough attention to the students while giving lectures, which leads to loose discipline in the class [4]. Yue believes that in the current mathematics classroom, the main problems are as follows: (1) straightforward narration, the teacher did not create a good situation for the students; (2) the teacher blindly gave lectures, did not pay attention to the students' practical activities; teachers usually will presuppose certain problems without considering fully stimulating students' thinking [5].

3. *The teacher's body is in a sub-healthy state, which affects teaching efficiency*

The health of teachers is also one of the important factors affecting the quality of classroom teaching. Huang and Yue point out that the physical health of teachers has become a relatively obvious social problem. Faced with the daily pressure of teaching, many teachers' bodies are in a sub-healthy state, which makes many teachers have more than enough energy, leading to a decline in the quality of classroom teaching. Therefore, the physical condition of teachers has become a problem that cannot be ignored [4, 6].

4. New teaching methods such as multimedia cannot be used scientifically

Wu believes that multimedia teaching is a means of helping teachers to give lectures. It plays an auxiliary role in the teaching process. However, many teachers hand over the teaching content to computers, use multimedia to show students, and then withdraw from the classroom. This is out of the practical meaning of multimedia teaching [7]. Combining the network with the mathematics classroom is undoubtedly an important measure to improve the quality of teaching. However, the integration of network elements in the current mathematics classroom still has certain problems. Fu believes that under the influence of traditional teaching models, the teaching concepts of many junior middle school mathematics teachers are relatively old. Under this circumstance, they do not pay enough attention to students' emotions and attitudes, nor do they respect students' dominant position in classroom teaching. As a result, it is difficult to integrate network technology into classroom teaching and affect the quality of classroom teaching. Secondly, the current integration of network technology and mathematics classroom teaching ignores the integration of subject characteristics. Some teachers even do not fully integrate students' cognitive development laws to pursue results, which leads to increased student dependence, which is not conducive to the improvement of classroom teaching quality. Third, with the development of the new curriculum reform, the role of teachers has changed, which has led to a lack of understanding of the status of teachers in many schools. When integrating network elements, they have not given full play to the role of teachers, making it difficult for modern teaching technology to play a role, and it is difficult to achieve good auxiliary teaching effects, which affects the integration of network technology and classroom teaching [8].

5. The classroom atmosphere is depressed and dull

A good classroom atmosphere helps to increase students' participation in the classroom and stimulate students' desire to learn. However, due to the heavy workload of high school, teachers mostly use the "full class" method of teaching, which leads to a depressed and dull classroom atmosphere, affects students' interest in learning, and then leads to a decline in

teaching quality [9].

6. The tactics of the sea are too heavy

For a long time, for junior high school mathematics, the subject of the sea of questions has been a teaching method adopted by many teachers. Wei and Chen point out that traditional teaching believes in the "sea of questions tactics". Teachers think that the more students do and think, the more knowledge they will master, but they ignore the basic acceptance ability of students, so that students often abandon themselves because they can't bear the burden, and even get tired of learning. Teachers use question sea tactics so that students usually practice a certain question repeatedly, forming a mechanical response mode, which is not conducive to students' analysis of variant questions. Moreover, this method is a waste of time and energy. If things go on like this, students' interest in learning will also be wiped out in a large number of exercises [10, 11].

7. The teacher-student relationship is unbalanced in the classroom interaction, and the interaction is more formal and not deep enough

Teacher-student interaction is an indispensable part of classroom teaching. Good interaction can help students better master knowledge and help teachers understand students' acceptance of knowledge. However, there are still some problems with actual interactive teaching. Jiang points out that in to meet the requirements of the new curriculum reform, some teachers overemphasize the student's dominant position and neglect their leading role. If students lack the guidance of teachers, they will inevitably lack directionality, thereby reducing classroom teaching. In addition, there is a more prominent problem in the interaction process, that is, the formalization problem is more serious, and the lack of in-depth thinking [12].

Questioning is the most typical form of teacher-student interaction. Good questioning can help students grasp the key points, and also help teachers understand the students' knowledge of the students. However, there are still some problems in actual classroom questioning. First of all, questioning only faces a small number of students. Teachers often choose students to answer questions according to their preferences. They cannot consider all students. Secondly, some teachers only think that the number of questions is the determining factor in measuring the participation of students in each class. The quality of the question is not considered as an important factor, which leads to a lot of worthless questions. Third, the emphasis is on asking questions and ignoring feedback. Some teachers simply ask questions and do not perform in-depth analysis after students have answered them. As a result, students lack in-depth thinking about the problem [13].

8. Collaborative inquiry falsification

Group cooperative inquiry is currently a commonly used learning method. In class, teachers usually give students a certain amount of time to analyze and discuss problems, and then share conclusions, which can usually help students develop their ability to ask questions, analyze problems, and solve problems. However, the inefficient collaborative inquiry will also reduce the quality of teaching. Wu points out that many discussions and inquiries in the teaching classroom are superficial work done by teachers, and teachers only pay attention to novel and over-exaggerated teaching modes. There is not enough time and space for students to discuss, and there is no clear discussion purpose and principle, and there is no elaboration of the students' self-view in the classroom, and no summary and extension by the teacher [7].

3.1.2. Factors About Students

1. *Students rely too much on teachers and teaching aids and lack the awareness of independent learning*

When learning mathematics knowledge, students need to have strong logical thinking, be able to use their brains, and actively think in the exploration of mathematics problems, to achieve efficient learning. However, in the current stage of middle school mathematics teaching, students have not formed a sense of active learning. The fundamental reason is that students have been in a passive position for a long time and lack the time for independent thinking. At the same time, students rely too much on teachers and teaching aids and have not formed the consciousness of independent learning [14].

2. *The enthusiasm for learning mathematics is not strong, and the interest is not high*

Li points out that in mathematics classroom teaching, students are often in a passive state, and there is almost no interactive communication between teachers and students like other subjects. Students rarely respond proactively to teachers in class. This leads to a lack of enthusiasm for students to learn mathematics actively [15].

3. *Wrong way of thinking hinders problem-solving*

In mathematics teaching, this situation often occurs. Students are serious in class and understand the knowledge of the professor, but when they finish their homework after class, they cannot apply what they have learned. They will not analyze the problem and have nowhere to write. But under the analysis of other students or teachers, it suddenly became clear. Some students will fall into the misunderstanding of mathematical thinking in solving problems so that they think that the mathematics subject itself is difficult, and even doubt their ability to learn mathematics, and have a psychological resistance to the learning of this subject. These are the consequences of not forming correct mathematical thinking

[15].

4. *The psychological problems and bad habits of students with learning difficulties cannot be corrected for a long time*

Bao analyzes the reasons for the low efficiency of classroom teaching from the perspective of students with learning difficulties in rural middle schools. He believes that the so-called students with learning difficulties are simply students with poor learning. They are not that they have an IQ problem, but are not interested in learning, have a poor foundation, have lost their confidence in learning, and are significantly different from other students in behavior habits and learning methods. Mainly manifested as being unable to sit still in class, looking around; being unable to stay idle and not listening carefully; having a relatively low ability to understand problems, and easily committing things that violate school rules and disciplines. At the same time, the mentality of students with learning difficulties is more complicated. They have strong self-esteem and rarely get respect from others. They often show timidity and low self-esteem. Some students never raise their hands to answer questions in the class [16].

3.1.3. Environmental Factors

Huang points out that the environmental factors affecting the quality of mathematics teaching for junior high school students are mainly reflected in two aspects. First, the school faces the entrance rate of students from the high school entrance examination and puts pressure on students. In the face of increasingly severe employment pressure and competition, parents are too anxious to hope that their son will become a dragon, and fail to grasp the education methods correctly, causing psychological harm to students and losing their motivation and confidence in learning. Also, the temptation of bad factors in the society will cause certain misleading to the growth and values of students so that students can not concentrate on learning, and their hearts are distracted, resulting in low classroom teaching quality [6].

3.2. Measures to Improve the Quality of Middle School Math Classroom Teaching

3.2.1. Change Teaching Concepts and Optimize Teaching Thinking

Teachers must deeply realize that teachers are not only knowledge imparters, but also organizers, guides, and collaborators of student learning activities. Teachers should change from the master of the classroom to the organizer of student learning. Students are the masters of learning, and an important task of teachers as organizers is to provide students with space and time for cooperation and communication [17]. Zhao and Lu point out that mathematics teachers should change their teaching concepts in time, establish a

student-oriented classroom environment in the process of mathematics teaching, and fully mobilize students' enthusiasm for learning through interactive communication in mathematics classrooms, allowing them to actively participate in the learning process. Through effective teaching guidance to improve students' mathematical thinking ability, teachers must adhere to the principle of combining subjectivity, comprehensiveness, and teaching students by their aptitude [18, 19].

3.2.2. Use Situational Teaching Methods to Stimulate Students' Interest in Learning

Situational teaching is a commonly used teaching method, and its importance has been affirmed by the majority of teachers. Shi believes that situational teaching can be carried out from four aspects. The first is the design of problem situation, which is problem-oriented so that students and students can actively participate in the discussion and thinking, and then explore a variety of programs, which is conducive to the active classroom atmosphere, and also improves the efficiency of students' learning. The second is the design of life situations. In the process of mathematics teaching, teachers use some practical problems in life to create teaching situations, fully mobilize students' life experience, and with the help of mathematical knowledge to solve related problems in life, and then improve the ability of practical application of mathematical knowledge. The third is the creation of dynamic situations, that is, with the aid of multimedia assisted teaching, mathematics teachers can display abstract graphics through intuitive mathematical vision, and then create dynamic situations. The last is the creation of literary context, that is, in the actual teaching process, mathematics teachers should combine Chinese-related literary knowledge to create literary scenes, thereby cultivating students' sentiments and fully stimulating students' enthusiasm for mathematics learning [20].

Han emphasizes that mathematics teaching should allow students to realize that mathematics comes from life and goes into life. Therefore, he advocates the creation of mathematics life situations, which are specifically divided into four situations, That is, life experience situation, hands-on operation situation, lively and interesting situation, and questioning inquiry situation. The life experience situation means that the teacher should use the life examples familiar to the students to design the content of the course, carefully create a situation for the students to use mathematics, and let the students feel the application value of mathematics knowledge in life. The hands-on situation means that teaching should be based on students' psychological characteristics and knowledge level, and strive to create situations for students to do it themselves, such as games, experiments, life prototypes,

etc. Lively and interesting situations mean that teachers start with life examples familiar to students and use animations, stories, games, and other forms to create vivid and interesting problem situations to mobilize students' enthusiasm for thinking. Questioning the inquiry situation means that teachers should encourage students to dare to question, be diligent in asking questions, use their minds to think about problems, and strive to provide students with sufficient time and space for questions and innovation [21].

Based on their own teaching experience, Wan and Shi propose the use of situational teaching to improve the quality of classroom teaching. Wang advocates setting life situations to improve the quality of teaching. He believes that games, stories, and multimedia can be used to create life situations, while Shi advocates teaching through the creation of problem situations. She emphasizes that the initial setting of problem situations must follow the following four principles: pertinence, that is, the problem situation cannot be separated from the teaching reality, and must be closely integrated with the teaching content; moderation, that is, the problem situation must serve all students; heuristic, that is, the problem must be precise and can inspire students' thinking; interactive, that is, there should be interactive learning between teachers and students, and students keep asking teachers questions, and teachers can improve students' problem-solving ability by providing correct guidance to students [22, 23].

3.2.3. The Scientific Use of Multimedia and Other Teaching Aids

Multimedia teaching is a new teaching method, which has the function of optimizing teaching and improving the actual effect. However, there are still some problems with the actual application. Therefore, we must pay attention to improving the application of multimedia. Lu points out that for multimedia technology to play its superior role in actual teaching, in addition to combining emerging technologies with traditional teaching methods, there are also the following points to note: 1. Fully prepare before class. Teachers must not only have a certain grasp of the students' learning situation but also weigh the proportion of multimedia application in teaching and grasp the timing of application. 2. Elaborate courseware production. Excellent multimedia courseware should have a clear structure and reasonable layout, and can effectively cover the knowledge learned and stimulate students' interest in learning. 3. Scientific use of courseware. Firstly, teachers can use multimedia to play the imported materials collected before class, such as pictures, audios, videos, etc. Secondly, use multimedia to display the content of mathematics example questions, which can save time for copying. Finally, the use of multimedia to present mathematical difficulties, as well as their production process and change results [24].

Deng, Chang, and Xu all believe that teachers should use multimedia and other Internet information technologies to carry out teaching and give full play to the role of multimedia and other emerging teaching methods. First of all, the Internet information technology is applied to mathematics teaching courses, and mathematics classroom teaching knowledge is presented to students using pictures and texts or dynamic audio-visual methods, which can attract students' attention and stimulate students' interest in learning mathematics. Secondly, teachers can use multimedia to analyze the important and difficult points of teaching, and effectively solve those difficult problems through Internet information technology, simplifying the content of mathematics teaching. Finally, teachers can use the Internet to download mathematics topic lectures or mathematics lecture videos to learn teaching experience and methods. Students can also be arranged in the classroom for online resource learning of mathematics course content, and students can also be assigned homework for online learning of mathematics teaching content after class, which can save time and broaden the channels for students to learn mathematics [25-27].

3.2.4. Innovating Teaching Methods to Make Them Diversified

Teaching methods need to be innovated. For this, Song proposes some methods that can be used for reference. 1. Abstract concrete teaching method, that is, using multimedia or physical teaching aids to make abstract things concrete. 2. A sense of accomplishment cultivation method, that is, when students encounter a problem that students do not know when teaching, they should be asked to think for a while, and then start to slowly guide them, tell them where the problem should be started, and then let them think. In this way, the students will be guided gradually to make the problem to the end, so that the students can experience the process of solving the problem and feel the sense of accomplishment. 3. The anthropomorphic teaching method is to make knowledge alive. What we are talking about here is not to let students use knowledge flexibly, but to make knowledge anthropomorphize [28].

Sui and Tan advocate the use of intensive teaching methods to improve the quality of classroom teaching. The specific method is: First of all, the key content in the syllabus shall be elaborated to ensure that it is thoroughly explained. Secondly, adopt a teaching mode combining lectures and exercises, and consolidate and strengthen knowledge through exercises. Third, in classroom teaching, pay attention to cultivating students' thinking ability and problem-solving ability. Finally, in the process of intensive teaching and practice, encourage students to interact with the teacher [29, 30].

Zhou emphasizes that teachers should make full use of

efficient teaching methods to make students actively participate in the teaching process. For example, the ingenious setting of exciting situations to stimulate students' interest in learning; use of inquiry teaching to make students actively participate; use of variable teaching to ensure the continuous enthusiasm of students to participate in classroom activities [31].

3.2.5. Using Hierarchical Teaching Mode to Carry Out Teaching

Liu and Qi point out that the teaching goal of hierarchical teaching is to face the middle-level students, develop the backward students, and improve the excellent students, to make the students at different levels have some harvest, achieve the teaching task successfully, improve the teaching quality, and provide students with opportunities for innovation and development. To be specific, first of all, teachers should accurately divide students' levels, which can be achieved through home visits and informal discussions, or using interviews and written tests. Then, the teacher's teaching method must be based on the previous analysis for the design of hierarchical teaching. For example, students with a good foundation should try new knowledge by using excellent students to cultivate their ability to find and solve problems by themselves. For the students with a poor foundation, the teaching method of configuration compensation for poor students is used to bridge the old knowledge with the new knowledge to solve problems [32, 33].

3.2.6. Combine Mathematics History, Mathematics Culture with Mathematics Classroom

The new curriculum standard requires a combination of mathematical history, mathematical culture, and practical mathematics teaching. Wang points out that teachers have a certain understanding of mathematical knowledge, and actively learn the relevant knowledge of mathematical history, to clarify the relationship between mathematical history and mathematics teaching, integrate the knowledge related to the history of mathematics into mathematics classroom teaching, and guide students to form a correct understanding of mathematics learning. Pay attention to introducing the background of knowledge in teaching, so that students have a deep understanding of the nature of knowledge, and also pay attention to the selection of appropriate examples of historical materials [34]. Li believes that the infiltration of mathematical culture into high school classroom teaching can arouse students' interest in mathematics through a certain story or a certain person. Only by stimulating students' interest in mathematics can they help them understand something that they can't understand at ordinary times [35].

3.2.7. Use the Wrong Question Set Skillfully to Optimize the Classroom Teaching Effect

Yan believes that the set of mathematics wrong questions plays a very important role in improving the quality of mathematics teaching. First, the set of wrong questions can effectively summarize and classify the wrong questions. For example, after completing the whole set of exercises, teachers can encourage students to sort out the knowledge points and theoretical frameworks in the whole set of exercises, and then sort out and analyze the types of questions they made mistakes. Secondly, the set of wrong questions helps students find ways to solve problems more efficiently. In teaching practice, teachers encourage students to sort out different question types and problem-solving methods for the same knowledge point. Then it is easier for students to find "shortcuts" to solving problems in comparative analysis. Also, our teachers should regularly check the collection of wrong questions for students to ensure that the wrong questions are corrected once a week. This can not only effectively avoid increasing the burden on students, but also ensure the correctness and effectiveness of the collation and application of students' wrong question sets [36].

3.2.8. Optimize Group Cooperative Learning and Improve Teaching Quality

Wang believes that the key to giving full play to each student's personality and strengths in cooperation with groups and complementing each other's strengths is to optimize the formation of cooperation groups. Teachers can optimize the combination according to the differences of students' gender, personality, grades, and abilities. Cooperative learning is a collective behavior, but it is inseparable from individual independent thinking. Therefore, for students to participate in discussions and collaborative investigations, they must have their insights and cognitive abilities as the basis. Individual independent thinking cannot be replaced by others or groups. Teachers must build a free and democratic teaching environment for students, which is the key to ensuring cooperative learning [37]. Guo believes that the establishment of a cooperative system between students and the establishment of mathematics study groups is a useful exploration for high school math classrooms. In the process of discussion, students play both the role of learning and the role of teaching. Only through learning can they know their deficiencies, and only through teaching can they know that they do not understand clearly. Only if you know your academic deficiencies can you strictly demand yourself, if you know that you still don't understand the knowledge, you can study tirelessly. In this way, the subjective initiative of the students will be mobilized [38].

In addition to the measures mentioned above, Fu also emphasizes that interest cultivation is the basic premise for improving the quality of classroom teaching, group interaction is an important means to improve teaching quality, and classroom management is an important guarantee for improving teaching quality. Therefore, teachers should maximize the enthusiasm of students to participate in learning, guide students to engage in interactive and cooperative learning, do a good job in classroom management, and effectively improve the overall teaching quality [39].

4. Discussion

In general, the current research on the quality of mathematics classroom teaching in middle schools mainly focuses on the problems in mathematics classroom teaching and the measures to improve the quality of mathematics classroom teaching.

As far as the problems existing in middle school math classroom teaching are concerned, the predecessors mainly discussed from the three aspects of teachers, students, and the environment. First of all, from the perspective of teachers, the main problems of classroom teaching are the obsolete teachers' concepts and the lack of attention to the subjectivity of students; the old and simple teaching model lacks novelty; the teacher's body is in a sub-healthy state, which leads to low teaching efficiency; cannot use multimedia and other teaching aids scientifically; the classroom atmosphere is depressive and dull, which makes students unable to raise students' interest in mathematics; the problem sea tactics are too heavy, and a large number of repeated exercises make students bored with mathematics; in the classroom interaction, the teacher-student relationship is unbalanced, and the interaction is more formal and not deep enough; the teaching model of cooperative inquiry is too formal. Secondly, from the perspective of students, the main problems in classroom teaching are that students rely too much on teachers and textbooks, and lack the awareness of independent learning; they are not motivated to learn mathematics and interest is not high; students have wrong ways of thinking and are hindered in solving problems; the learning psychology and bad habits of students with learning difficulties have not been corrected for a long time. Finally, from an environmental perspective, the high school entrance rate, severe competition environment, and ardent expectations of parents cause students to study under pressure, which in turn affects teaching efficiency.

In terms of the measures proposed by predecessors to improve the quality of mathematics classroom teaching, it can be summarized as the following: 1. Teachers should change their teaching concepts and recognize the subjectivity of students. 2. Teachers should carefully design classrooms and use

situational teaching methods to stimulate students' interest in learning. 3. Use multimedia and other teaching aids scientifically. 4. Teachers should innovate teaching methods and adopt a variety of teaching methods suitable for students to start teaching. 5. Adopt the hierarchical teaching mode to start teaching. 6. Combine the history of mathematics, mathematics culture with mathematics classroom. 7. Use the wrong question set skillfully to optimize math classroom teaching. 8. Optimize group cooperative learning. Among them, the solutions commonly mentioned by the predecessors are the scientific use of multimedia, the use of situational teaching methods, and the layered teaching mode to carry out teaching. It can be seen that multimedia and other auxiliary teaching equipment play an important role in mathematics classrooms, which greatly assist in improving teaching efficiency. At the same time, teachers also generally recognize the role of situational teaching method and layered teaching mode in actual teaching. From the above measures, it can be seen that current mathematics teaching is more and more student-centered. Teachers use various measures to increase students' interest in learning and then improve teaching efficiency.

Predecessors' researches have raised the problems existing in middle school mathematics classroom teaching and proposed corresponding solutions to these problems. Since most of the researchers are middle school teachers, their conclusions are scientific. The measures they put forward to improve the quality of mathematics classroom teaching also have certain reference significance. However, there are still some shortcomings, such as research methods. The existing literature mostly adopts theoretical speculative methods, and the articles are mostly the authors' experience summaries, lacking empirical research, which reduces the scientificity and persuasiveness of the research to a certain extent. Also, some of the measures proposed by the predecessors still lack certain effectiveness, and the explanation of the measures is relatively general. For example, for the measure of integrating the history of mathematics and mathematics culture into the classroom, the researchers did not explain the timing of introduction and the introduction, and how to make the most of the history and culture of mathematics, etc. Therefore, as far as current research is concerned, researchers must implement empirical research based on existing research, and implement solutions to actual classroom teaching to test its actual effectiveness.

It can be seen from the above studies that there are still some blank points in previous studies. For example, the current physical condition of teachers has become a major factor affecting teaching efficiency, but no scholars have proposed certain solutions to this problem. So how to improve the quality of mathematics classroom teaching while taking into

account the teacher's body is a problem that needs further research by scholars. For another example, existing studies have shown that the learning psychology and study habits of students with learning difficulties are also a factor affecting the quality of teaching, but few researchers consider measures to improve teaching quality from the perspective of students with learning difficulties. Therefore, future research must design classroom teaching based on the learning habits, learning psychology, and learning situation of students with learning difficulties.

5. Conclusion

This study analyzed the literature on the quality of middle school mathematics classroom teaching in the past ten years and found that:

1. The research on the quality of middle school mathematics classroom teaching has mainly focused on the problems in middle school mathematics classroom teaching and the measures to improve the quality of mathematics classroom teaching. For these two aspects, predecessors have conducted more in-depth research and achieved results. More often, because the researchers are mostly middle school teachers, they have certain reference significance for teaching measures.
2. There are still some problems in the existing research. For example, in terms of research methods, the existing literature mostly adopts theoretical speculative methods and few empirical studies, so it lacks a certain degree of scientificity. As far as the solutions proposed by previous people are concerned, some measures lack a certain degree of effectiveness, and their explanations are also relatively general.

For example, about the measure of integrating the history of mathematics and mathematics culture into the classroom, the researchers did not explain the timing of introduction, the method of introduction, the time of introduction, and how to maximize the effect of the history of mathematics and mathematics culture.

There are still some blank points in existing research. For example, the current physical condition of teachers has become a major factor affecting teaching efficiency, but no scholars have proposed certain solutions to this problem. For another example, few researchers consider the design of math classrooms from the learning habits and learning psychology of students with learning difficulties.

Therefore, future research must implement the solutions to the actual classroom teaching based on the existing research and empirical research method to verify the actual effectiveness and consider the design of mathematics classroom from the

physical condition of teachers and the learning situation of students with learning difficulties.

In this paper, the literature method is used to make a summary of the previous research on the quality of middle school mathematics classroom teaching. The summary of previous views is more comprehensive, but the selection of samples is still subjective, leading to some omissions in some aspects. Therefore, the author hopes that in the future, researchers can expand the range of sample selection when doing similar review studies, and multiple people can screen the literature together to reduce the negative impact of the researcher's screening criteria on the research.

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