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Hierarchical Design Optimization Strategy of Primary School Mathematics Homework from the Perspective of Core Literacy

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Abstract: Homework is the extension and expansion of classroom teaching, it is inextricably linked with teaching and evaluation, and plays an irreplaceable role in consolidating, expanding, evaluating and reflecting on teachers' teaching and students' learning. The "double reduction" policy requires reducing the heavy homework burden of students, and emphasizes improving the quality of homework design and encouraging the layout of hierarchical, flexible and personalized homework. In view of some problems existing in assignment design, this paper studies hierarchical assignment design strategies from the aspects of level, form and evaluation, so as to make assignment more scientific and reasonable, truly reduce the burden for students, and promote the overall development of students.
Key words: Core literacy; Math homework; Layered design

Introduction

Homework is one of the important links in the process of primary school mathematics teaching practice, it is the extension and expansion of classroom teaching, and it is a key area that cannot be avoided in the curriculum reform. Homework is inextricably linked with teaching and evaluation, which plays an irreplaceable role in consolidating, expanding, evaluating and reflecting on teachers' teaching and students' learning. On the one hand, through the detection of homework, students' existing knowledge level can be judged, which is helpful for teachers to grasp the learning situation and make analysis and diagnosis, help students to consolidate exercises in the process of cognitive understanding in time, and make necessary adjustments to the teaching progress and process according to different situations. On the other hand, through the examination of homework, we can review the old knowledge in time to help students establish the connection between the new and old knowledge in their minds, so as to form the transfer of knowledge and promote the continuous improvement and development of students' cognitive structure. If there is a problem in homework, it will lead to a chain reaction, which will not only affect the teaching effect, but also have a bad impact on students' learning interest.

In 2021, the General Office of the CPC Central Committee and The General Office of the State Council issued the "On Further Reducing Compulsory Education.One of its goals is to effectively reduce the excessive homework burden of students in the compulsory education stage, and emphasize the need to improve the quality of homework design and encourage the layout of hierarchical, flexible and personalized homework. However, in practical teaching, due to various reasons, there are still some problems in the level, form and evaluation of homework. Based on students' individual differences, characteristics of thinking development and characteristics of mathematical knowledge structure, this paper proposes corresponding optimization strategies for relevant problems, reverses many drawbacks of hierarchical homework design "one-size-fits-all", gives full play to students' subjective initiative, taps students' inherent potential, and develops students' problem awareness, application awareness and innovation ability. And then promote the all-round development of students themselves.

Literature Review

1. Research on core literacy

Core literacy was first developed in the West by the Organization for Economic Cooperation and Development (OECD)operation and Development and the Council of the European Union in their study [1]. In 2003, the United Nations Educational Organization (UNESCO),The Scientific and Cultural Organization (Scientific and Cultural Organization) summarized the core literacy as "five pillars of education", which are "learning to learn", "learning to work", "learning to live together", "learning to survive" and "learning to change" [2], and suggested that all countries in the world should list its index system as a reference frame. This will serve the deepening reform of all kinds of education at all levels and lifelong learning of the whole society.

In 2016, the research results on the development of core literacy of Chinese students were released, which announced that "all-round development of people" was the core, and it was divided into three aspects: cultural foundation, independent development and social participation, and followed the principles of adhering to science, focusing on The Times and strengthening the national character [3]. The Mathematics Curriculum Standards for Compulsory Education (2011 edition)

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clearly put forward ten important abilities that should be paid attention to in mathematics teaching, which are number sense, symbolic consciousness, spatial concept, geometric intuition, data analysis concept, calculation ability, reasoning ability, model thought, application consciousness and innovation consciousness [4].

After the core literacy was put forward, how to combine the development of students' core literacy with curriculum and teaching has attracted more and more attention in the educational circle. In the field of mathematics, core literacy refers to how to apply the learned mathematical knowledge to the cultivation of the ability to discover, propose and solve problems. The core quality of mathematics demonstrates the value of discipline education and is an important guide of teaching activities. This paper proposes a primary school mathematics teaching strategy based on the cultivation of mathematics core literacy, aiming at improving students' comprehensive learning ability, providing scientific guidance for teachers' teaching design and practice, and helping students' formation and development of mathematics core literacy.

2. Research on math homework

In foreign countries, many educators attach great importance to the role of "homework" on students, they think that homework is a part of students in the learning process can not be ignored, many educators in foreign countries have conducted long-term and a lot of research on "homework". The educational vision of former Soviet educator Kailov [5] has a great and far-reaching influence on China's educational theory. Kailov believes that homework is an integral part of teaching and an extension of classroom content, which can essentially consolidate students' knowledge and improve their skills [6]. Dewey believes that a valuable assignment must have three characteristics at the same time. First, the assignment must be suitable for the needs of children's development; Second, homework must be helpful to students' future development; Third, homework must have a positive impact on the cultivation of students' abilities [7]. Chinese education scholar Zhu Zhongmin pointed out that homework is a kind of learning task designed by teachers and completed by students at home. Homework is a supplement and continuation of classroom teaching, which is conducive to consolidating students' classroom teaching knowledge and improving their academic performance [8].

Mathematics homework plays an important role in improving students' ability and developing their thinking. Ausupor believes that it is the essential requirement of math homework for students to reflect on what they have learned every day. Math homework can enable students to combine old and new knowledge and have a deep understanding of math content, thus internalizing their own knowledge. Liu Guanghui believes that the completion of mathematics homework is the key link and important means for students to complete the task of mathematics learning. Under the guidance of teachers, the completion of mathematics homework is a learning activity for students to understand and apply the mathematics knowledge they have learned at the current stage, which promotes the formation of students' skills and skills and the improvement of their literacy [9].

3. Research on hierarchical work

Some foreign scholars have come to such a conclusion about homework research: The steepness of the learning curve can be mitigated to some extent for students with relatively difficult learning [10] if there are two layers of homework assignments to be completed in each subject, and the deliberately set assignment questions with errors, self-reflection, and temporary revision requests can enable experienced students to engage in challenging tasks. Promote the balanced development of students.

Compulsory education requires that education must be open to all students, recognizing students' progress and development, and paying attention to individual differences among students. Liu Tongxi believes that in the context of the new curriculum reform, education researchers are gradually paying attention to the individual differences of students, and hierarchical teaching models are gradually becoming popular [11]. Stratified assignment design plays an important role in stratified teaching and is an important method to consolidate students' intelligence and realize students' development. With the implementation of the double-reduction policy in the second half of 2021, some scholars emphasize that according to the concept of stratification, the design of homework tasks can be divided according to interests, hobbies, learning ability and other aspects. According to the actual status quo of the work, it is stratified to achieve the efficiency and task ranking goals, so as to achieve the purpose of "reducing the burden" [12]. The reform and optimization of mathematics teaching mode cannot be separated from the exploration and practice of homework stratification mode, which directly affects the quality of teaching [13]. Adhere to the teaching principle of individualized teaching, combine the relevant knowledge of course work and classroom learning reasonably and effectively, strengthen the implementation of hierarchical homework system, and promote students to gradually improve the comprehensive ability of the subject.

Main Research Methods

1. Literature method: By consulting database resources and books and periodicals related to education and teaching, the materials are sorted out to form a preliminary understanding of the core mathematics literacy and the current situation of hierarchical mathematics homework design in primary schools, master relevant concepts and theories, and conduct literature review from three aspects of core literacy, homework design and hierarchical homework design to provide theoretical basis for the paper.

2. Interview method: Based on the core mathematics literacy of primary schools and the basis, objective, hierarchical principle, type and assignment design scheme of homework design, the current primary school math teachers were interviewed from seven aspects, including math homework time, math homework quantity, math homework type, math homework difficulty, math homework content, math homework correction feedback, and math homework stratification. And carry on the operation analysis and summary.

3. Experimental research method: In view of the content of homework design, this paper conducts practical research on students in two classes of the same grade, sets uniform homework forms for the two classes, and observes students'

completion of daily homework under the premise of teaching by the same teacher. At the end of the chapter, a unified unit test is carried out on the two classes to analyze the effect and feasibility of the hierarchical mathematical homework design method.

Research and Discussion

The above research methods are effective, and the answers obtained by these methods are reliable. It provides very useful information for the smooth development of this paper, and also helps to draw conclusions.

1. Significance of hierarchical design of primary school math homework from the perspective of core literacy

Homework is an important part of the classroom, hierarchical homework design is to promote the sustainable development of students guarantee. Based on the difference of students' cognitive level, the assignment is designed in layers according to the objectives and principles of the assignment design to improve the directivity, flexibility and effectiveness of the assignment. It makes the excellent students improve, the poor students make steady progress, and the overall level of students is consolidated and improved on the original basis. At the same time, stratified homework is conducive to mobilizing students' enthusiasm for learning. Excellent students will get exercise and development through stratified homework, and will not lose motivation for learning due to repeated simple questions. Students with learning difficulties will consolidate their foundation through stratified homework, and will not lose their enthusiasm for learning due to difficulty discomfort.

Homework is also an effective way to test the classroom effect and consolidate knowledge. Optimizing homework management is an important way to improve the classroom efficiency and the quality of school education. The research on hierarchical assignment design under core literacy can provide some ideas and reference for teachers to design assignments in teaching activities. It is helpful to reduce students' homework burden caused by the imbalance between homework content and actual mastery, and provide students with hierarchical and diversified choices; It is beneficial to improve students' learning efficiency, master knowledge, stimulate internal motivation, and promote the improvement of core literacy.

2. Current situation and existing problems of hierarchical homework design in primary school mathematics

First of all, the work rarely system design, it is difficult to meet the individual needs. Many teachers have the following problems in the assignment: First, there are many repetitive assignments; Second, the form of work is monotonous, lack of thinking problems; Third, uneven distribution of work quantity; The fourth is to ignore the gap and potential of students, forming a "one-size-fits-all" situation. The source of homework content is mostly textbooks and teaching reference books, teachers seldom pay attention to the system design of homework, and the homework content is relatively uniform, which is difficult to meet the personalized learning needs of students. According to statistics, more than 80% of homework comes from some topics in reference books, exercises in textbooks and homework on learning platforms, while there are almost no homework designed by teachers based on students' own characteristics, and the content of homework is relatively uniform, which will make it more difficult for students with learning difficulties to complete homework, and the completion of homework by top students cannot meet their psychological expectations. So that students at all levels can not get the best development, it is difficult to meet the personalized learning needs of students.

Secondly, it is difficult to pay attention to students' differences because of the single way of assignment. When assigning homework, most teachers are still influenced by traditional concepts. They are used to assigning homework orally in the last few minutes of class. Instead of designing hierarchical homework according to the difficulty of knowledge structure, most teachers mainly use the form of doing questions, which is too simple. The exercises done by the students are relatively old, the teachers lack the consciousness of innovation, and ignore the individual differences of the students, which makes the learning effect is not good, the enthusiasm of learning is not high, and the emotional experience of the students is seriously affected.

Third, although there are layers of work, but ignore the actual effect. Under the background of vigorously advocating hierarchical teaching, A small number of teachers will arrange students to do hierarchical homework, but they are always just a formality, simply assigning which questions are to be done on level A and which questions are to be done on level B, without further thinking and adaptation. Students work blindly and some knowledge cannot be consolidated. In the actual teaching, because of the long-term influence of the traditional homework mode, most teachers are difficult to change the way they assign homework and do not want to change. In addition, because students are constantly developing, teachers did not timely adjust the stratification of students and improve the difficulty of homework according to the dynamic learning effect of students, so that the homework did not achieve the expected effect.

Fourth, the feedback of operation guidance lags behind, and it is difficult to achieve accurate push. In the aspect of homework evaluation, there is a certain time difference between students' completion of homework and teachers' review of homework, so homework guidance has a lag, and it is difficult to achieve timely and accurate feedback. According to the survey, in terms of homework guidance, students mainly get face-to-face classroom collective error correction guidance from teachers, and the guidance is mostly common problems in students' homework. On the one hand, the problems existing in individual students are ignored, which will lead to the accumulation of problems. On the other hand, general guidance can not adapt to students' individual homework needs, which will affect their learning enthusiasm and improvement of learning ability.

3. Optimization strategy of hierarchical homework design for primary school mathematics

"Teaching students according to their aptitude" originated from Confucius, emphasizing that teachers should start from the actual situation of students and individual differences, and carry out different teaching with a specific purpose, so that each student can get the best development. Hierarchical design is the key to make the operation "flexible" and

"personalized". According to students' academic performance, classroom performance, homework achievement and other teaching data, the differences between students are clarified, students are stratified, and assignments at the corresponding levels are designed and pushed, supplemented by hierarchical feedback and classified guidance, so that students at all levels can experience the happiness of learning success, and cultivate good learning habits in the process to improve academic performance.

First, highlight the level of homework according to the differences of students. The individual development of primary school students in different growth environments is different, so it is necessary to divide students into different levels based on their knowledge level, learning style, academic performance and comprehensive assessment results. Students are stratified, not to label different students, but to target the assignment so that students at each level achieve the best development.

It should be noted that for the characteristics of students at different levels, the teacher should have a clear idea, and can not tell the students clearly, so as to minimize the negative impact. At the same time, the level of students is not static, but needs to be dynamically adjusted according to their performance to improve students' learning confidence and enthusiasm. In addition, under the background of "double reduction", primary school mathematics teachers should reflect the hierarchy of homework when designing homework, assign math homework that is in line with their current learning level and can promote the in-depth development of their ability, help students at all levels to establish the connection between new and old knowledge as soon as possible, complete the transfer of knowledge, and let students think in the process of completing homework. To promote the continuous improvement and development of students' cognitive structure.

Secondly, enrich the form of hierarchical job design. One of the drawbacks of traditional primary school math homework is that the form of homework is simple, teachers often assign written homework to students, let students master math knowledge through a large number of math problems, as time goes by, students lose interest in homework. Under the requirement of the development of mathematics core literacy, teachers should enrich the content and form of homework, improve the effectiveness of stratified homework, and promote the development of students' mathematics core literacy.

By analyzing the knowledge points contained in the assignment questions, the assignment is matched with the subject ability, and the questions reflecting different subject ability are classified and combined. Mathematics subject ability is divided into three abilities: learning and understanding, application and practice, and transfer and innovation. When designing homework questions, on the one hand, the knowledge points involved in mathematics questions should be corresponding to the three abilities; on the other hand, questions designed according to the subject ability level should be combined to correspond to students at different learning ability levels. The learning platform and other technologies are used to push assignments suitable for students at different levels. The focus is to match the content of assignments at different levels with the level of students after combining, so as to respect the differences of students, realize the sustainable development of students at all levels in subject ability, and ultimately promote effective learning.

Thirdly, a reasonable evaluation of stratified operations is carried out. Homework evaluation refers to the teacher's detailed correction and evaluation of the homework completed by students to judge the degree of students' mastery of the required knowledge. The evaluation of stratified work is different from the evaluation of traditional work. The method of combining quantitative evaluation and qualitative evaluation should be adopted.

In the implementation of hierarchical homework, it is necessary to make full use of the feedback data of students' homework, find the existing problems, classify the problems and students with corresponding problems, and then provide accurate guidance and intervention, so as to further analyze the learning weaknesses of students and provide guidance, so as to help students learn effectively. It is necessary to grade both the knowledge and skills of the assignment and the attitude towards completing the assignment. If the teacher can add some simple and appropriate comments in the regular homework correction to motivate and attract students, and have equal dialogue and exchange ideas with students, it can better stimulate the enthusiasm of students, and the comments can better reflect the idea of hierarchical homework classification and correction. For example, in addition to appreciating and praising the words on the homework with a correct learning attitude and outstanding achievements, they can also encourage them to make continuous progress and go to a higher level.

Conclusion

In primary school mathematics teaching, homework is an important means to help students consolidate classroom knowledge, promote students' all-round development and realize the core quality of mathematics. Under the background of the "double reduction" policy and the current situation of primary school students' homework, the hierarchical design of mathematics homework should take students as the starting point, cultivate students' core literacy as the goal, take into account the differences of students, grasp the quality and quantity of homework, effectively reduce the burden and increase the efficiency, and promote the efficient learning and all-round development of students at all levels.

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