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Mathematics Innovative Homework Design under the New Educational Reform

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Abstract: ***Education reform has been carried out in an all-round way. With the deepening of the reform, some scholars believe that "the theory of multiple intelligences is the best interpretation of quality education". The improvement process and dimension of intelligence-ability-accomplishment make quality education implement the diversified development of different individuals and the same individual, and provide an effective implementation path. The new education reform in 2021 proposes to further reduce the students' heavy homework burden in compulsory education. As a front-line teacher, I know more about what kind of homework students need. What kind of homework is suitable for your students? It is imperative to highlight the individualized development of students and innovate homework design. Human intelligence is constantly influenced by nature and nurture, with special emphasis on the application of human intelligence in real situations. The theory of multiple intelligences provides many inspirations for homework design. Under the vision of multiple intelligences, innovative homework design should face up to students' individual differences, design various types of homework suitable for different students, and strive to make homework the growing point of students' development, so that students can have diversified and sustainable development.***

Keywords: Mathematics; Multiple intelligences; Innovative operation.

1. Connotation of Multiple Intelligence Theory

According to Piaget's cognitive theory and the traditional view of intelligence, intelligence is a kind of ability that exists in an integrated way, with language ability and mathematical logic ability as the core. But this traditional theory of intelligence is too narrow and neglects other aspects that are equally important to human development. The theory of multiple intelligences, proposed by Gardner in 1983, states that "intelligence is the ability to solve a problem or create a product that is considered valuable in a particular culture or context." He believes that human intelligence is not only one, but has many aspects and is pluralistic. In terms of its basic structure, it is found that there are seven relatively independent intelligence in the framework of human intelligence, namely, speech-language intelligence, logic-mathematical intelligence, music-rhythm intelligence, visual-spatial intelligence, body-kinesthetic intelligence, communication-communication intelligence, and introspection intelligence. The classification of intelligence is not limited to these seven categories, and as research progresses, more types of intelligence will be identified or the original classification of intelligence will

be modified, and Gardner proposed an eighth type of intelligence - natural observation intelligence in 1996.

On March 30, 2014, China's Ministry of Education officially issued the Opinions of the Ministry of Education on Comprehensively Deepening the Curriculum Reform and Implementing the Fundamental Task of Moral Education and Cultivating People. With the deepening of the reform, some scholars believe that "the theory of multiple intelligence is the best interpretation of quality education". The process and dimension of the improvement of intelligence, ability and accomplishment enable quality education to be implemented in different individuals, the multiple development of the same individual, and provide an effective implementation path.

2. Mathematical Innovative Assignment Design based on Multiple Intelligence Theory

"Work" first appeared in the pre-Qin literature "Guanzi · heavy and heavy Ding", has the meaning of "labor", "Xueji" has its connotation is "activity", inherent "work is activity" said. Throughout modern education, we can only see the time of work, but not the content of work; See the student group, not the individual students; Only the students' behavior, not the teachers' behavior is obvious. The focus is on "increasing or reducing homework time and homework amount", while ignoring the differences of individual students, more mechanical and repetitive homework, single form of homework, lack of interest, no way to mobilize students' interest.

The new education reform in 2021 proposes to further reduce the heavy homework burden of students in the compulsory education stage. As a front-line teacher, I know what kind of homework students need more clearly. What kind of homework is suitable for their students? It is imperative to highlight the individual development of students and innovate job design.

2.1 Innovative Operation Methods

Gardner believes that human intelligence is constantly influenced by nature and nurture, especially emphasizing the application of human intelligence in real situations. The theory of multiple intelligence provides many inspirations for job design: (1) innovation of job forms. Not only the design of written work, language, visual space, music can be involved. (2) Innovation of hierarchical task difficulty. Add operation level requirements, divided into: A know, B understand, C application, D comprehensive. Let students of different degrees learn to have their strengths. (3) Promote independent choice of innovative operations. Let students choose their own homework according to their own situation, and promote the full development of diversified intellectual ability. In short, innovative homework design should face up to the individual differences of students, design a variety of homework suitable for different students, and make homework a growth point for students' development.

2.2 Examples of Innovative Job Types

2.2.1 "Little Math Instructor" assignment: Developing speech-language intelligence ability.

The form of "small math instructor" for the teacher to design several math problems, by the students to sign up to explain which problem, prepare themselves, you can explain on-site, you can also record video, you can first in the teacher's trial, in the teacher's guidance constantly improve, and finally show their own style. Not only let the students themselves to understand this problem, but also need to

organize their own language, to make it clear to the students. In this process, each student's ability can be developed, we found that usually speaking in a low voice of the students can also play more open in the video explanation, the voice is brighter, the body is more generous; With the same problem, different students have different methods and different styles, and students who listen can learn from each other and play the effect of 1+1>2. In this kind of homework, no longer using a single written homework, using the way students like to reduce the amount of mechanical homework, this way does not limit the type of homework, nor limited to a certain age, so that students can diversified and sustainable development.

2.2.2 "Hierarchical task List": developing logic-mathematical intelligence.

The "hierarchical job list" is usually placed in a unit's pre job and unit practice job. The pre-assignment list emphasizes the continuity of knowledge learning, both the review of the content related to this unit and the homework preview, so that students have the awareness of using "old knowledge" to solve "new knowledge". In the work can also build up the knowledge of the integration. The unit exercise list focuses on the repetition and comprehensive application of knowledge in several lessons of the unit, so teachers will design questions for different academic levels in the hierarchical homework list, as shown in Figure 1:

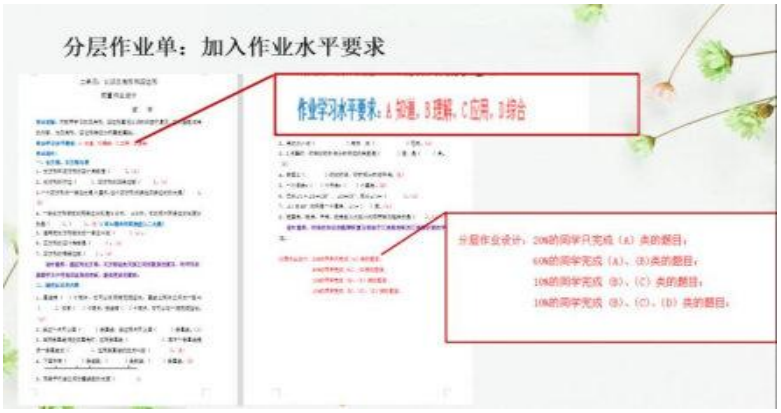

Figure 1

Work level requirements are divided into: A knows, B understands, C applies and D synthesizes, and students complete according to their own situation. According to teachers' grasp of students' actual situation, about 20% of students complete category (A), 60% of students complete category (A) and (B), and 10% of students complete category (B) and (C). 10% of students completed questions in categories (B), (C), and (D). Let different degrees of students in their own suitable range of intellectual ability, jump a jump can reach the goal, which can stimulate students' interest in learning, homework is not so boring and boring, but also can experience the fun. Students who have the ability to learn can also have more opportunities to show their advantages.

Teachers will also control the amount of homework according to students' mastery. For example, in Figure 2, questions 1 to 4 can be matched directly to two questions. This design enables students to do homework more carefully, avoids repeated exercises of their own knowledge, and improves each student's learning efficiency. Figure 2:

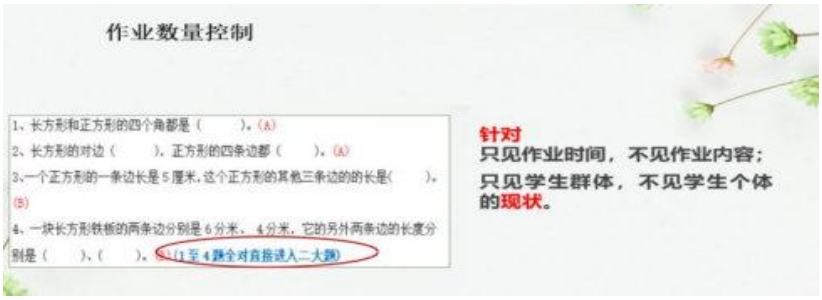

Figure 2

Such homework design can be said that only front-line teachers can design easily, all of which need to be familiar enough with their own students and enough understanding of the content system of the textbook can be done on the basis of. Such customized and innovative work not only develops the logic and mathematical intelligence, but also greatly benefits the cultivation of students' core literacy.

Assignment ABC Package: Developing multiple intelligences

The practice of "homework ABC package" is that teachers will design different forms of homework, including the production of statistical maps integrated with scientific disciplines to observe plant growth; There are assignments to develop students' visual-spatial intelligence by making toothpick Bridges. There is an assignment to write a math diary according to the math knowledge learned... Students can choose independently according to their own characteristics, which is different from the previous hierarchical homework. This type of homework pays more attention to students' independent choice. Maybe in the end, there is not a standard answer like a math problem, and the students choose different sets of meals and different angles, which may present a colorful, blossoming effect. Figure 3:

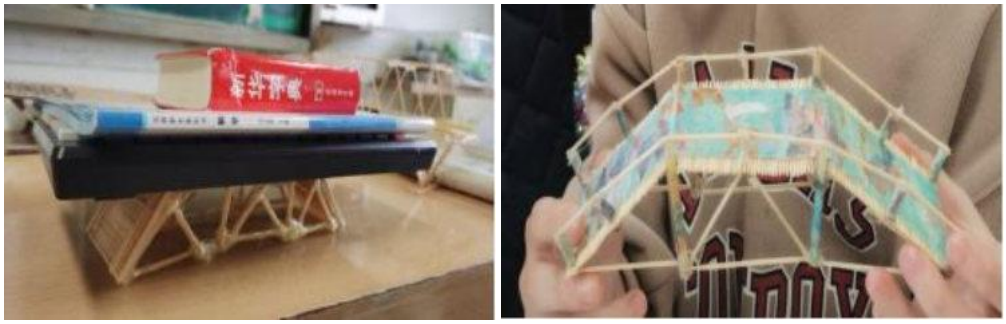

Figure 3

Two kinds of toothpick bridge, both reflect that the triangle has stability, but the first one is more beautiful, the second can bear more weight, which is good and bad, who is better and who is worse? There is no need to judge, education needs to be so, existence has rationality, and doing the best in your own space is success!

3. The Significance of Mathematical Innovative Task Design

With the full development of this new education reform work, let us teachers deeply realize that this is a subtraction problem, in fact, it is an addition problem. Reducing the homework burden of students in the compulsory education stage points to returning to the essence of education, building a good ecological environment of education, effectively improving the level of school education, and promoting the all-round development of students and healthy growth. This is undoubtedly a process of doing addition. Second, it is a systematic project, not to fill the basket, but to light the lamp. Light and efficient classroom, we must break through the existing usual mode, to create a more flexible real

learning atmosphere; It is necessary to use a more professional level to perform each normal class, promote homework reform from a more professional perspective, and implement the new education reform. We have been acting. Only progress, do not stop, do not change the original heart, to the future!

References

[1] Ying, L. (2012). Application of the theory of multiple intelligences in promoting the development of students of vocational schools. *Shanxi Science and Technology*.

[2] Howard Gardner. (1999). *Multiple Intelligences*. Beijing: Xinhua Publishing House, 1999.

[3] Yin Jianlian, Sun Dajun. (2017). *Introduction to the combination of hand and brain*. Soochow University Press.