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Research on the Training Strategy of Pupils' Mathematical Problem Solving Ability

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Abstract: In the 2022 edition of mathematics curriculum standard for compulsory education, different students have different requirements for problem solving. For example, in the first learning period (Grades 1-3), students can find and put forward simple mathematical problems from daily life and try to solve them under the guidance of teachers. Experience the process of cooperating and communicating with others to solve problems. In the second learning period (grades 4-6), problems are solved: try to find and put forward simple mathematical problems from daily life, and use some knowledge to solve them. Experience the process of cooperating and communicating with others to solve problems, and try to explain their own thinking process. Words such as "asking questions", "cooperation and communication" and "solving problems" will appear in these two stages. It can be seen that to cultivate pupils' ability to solve problems, we can create problems from daily life situations to guide students to ask questions, and then carry out cooperative communication to try to solve problems. Therefore, this paper will analyze from the aspects of asking questions, creating situations, communication and cooperation, and put forward strategies for cultivating pupils' mathematical problem-solving ability.

1. Introduction

Mathematics, as a basic subject, can be seen everywhere in our life, and the abstract characteristics of mathematics also make primary school students' learning in the classroom seem boring. However, mathematics literacy is the basic literacy that every citizen in modern society should have, and solving problems is the basic ability that every citizen in modern society should have. As a mathematics teacher, we should actively encourage students to be good at thinking, dare to question, be good at solving problems, and stimulate students' desire to solve problems. So how should we cultivate pupils' ability to solve mathematical problems? This paper will analyze from the following three aspects, and put forward strategies for cultivating pupils' mathematical problem-solving ability.

2. Provide students with problem situations and cultivate their ability to ask questions

Einstein once said: it is more important to raise a problem than to solve it. Therefore, in our teaching, we should pay special attention to the cultivation of students' ability to find and raise problems. It is the most important part of cultivating students' ability to "solve problems" to let students find and raise problems in problem situations. In a sense, it is more important than letting

students solve problems. Therefore, in order to cultivate students' ability to find and raise questions, first, we should create a realistic situation for students, and this situation can trigger students' motivation to raise questions; The second is to make it easier for students to find and ask questions. The third is to give students time and space to find and ask questions.

2.1 Provide questions from textbooks and ask questions based on experience

In the process of solving problems, students begin by asking questions. Only when they ask questions will students begin to think about how to solve this problem. The ancients said: "doubt is the beginning of thinking and the end of learning". If you have doubts about learning, you will have thoughts. If you have gains in learning, you will have interest and form motivation. It can be seen that cultivating students' problem awareness is the starting point of innovative education. In teaching, only teachers constantly encourage and guide students to find and raise problems, can students have the motivation to solve problems.

For example, in the preliminary understanding of scores, there is such a question situation: ask primary school students to divide moon cakes and use numbers. When there are four moon cakes for students to divide equally between two children, they will say that no one divides two and use the number 2. After that, the average score will also answer that everyone gets one and use the number 1. But when the teacher asked again, "how can one moon cake be divided equally between two children again?" Although we all know that one person is divided into half, at this time, some students will ask the question "how can the half be expressed in numbers?", This question reveals the preliminary understanding of the subject score. Based on the previous experience of learning numbers, students will write integers: 1, 2, 4, etc. on paper, but they don't know half of them, so they ask questions under the scenario of moon cake sharing. This not only improves students' interest in learning, but also learns to ask questions and solve them

2.2 Question topics, ask questions, and clarify learning objectives

In the teaching process, teachers can consciously train students to "see this topic, what do you think? What do you want to know about this topic?" As a student, I will integrate myself into the student's group discussion and give the platform to the students. In the long run, we should cultivate students' habit and ability to ask questions and solve problems as soon as they see the topic.

For example, for the understanding of countdown in the first volume of grade 6, we can first guide the knowledge to be learned in this class - Countdown through some Chinese character games. As soon as the reciprocal subject appears, you can ask questions. Seeing the reciprocal of the subject, what do you want to know about the reciprocal so as to guide students to ask questions such as "what is the reciprocal?" "How to find the reciprocal of a number" and "what are the characteristics of the reciprocal?" And so on, so that students can develop the ability to see what a certain mathematical topic to question and then ask questions.

3. Creating problem situations to stimulate students' interest in learning

Einstein said, "interest is the best teacher." If we can stimulate students' interest in learning and mobilize their enthusiasm for learning, we can activate students' potential learning desire to the greatest extent, so that more students can participate in learning activities and become masters of learning. Therefore, in classroom teaching, teachers should constantly improve the teaching art, create problem situations from the teaching materials and students' reality, stimulate students' interest in learning, mobilize their enthusiasm, and let them participate in the whole process of learning independently.

3.1 Connect problem situations with life to increase their perceptual cognition

After class study, students have mastered a lot of knowledge, but also solve some simple practical problems. However, these knowledge are relatively simple, and they are all problems that our ancestors dealt with through processing. If these knowledge is applied to practice, students will be easy to master and digest.

For example, when learning the "discount" problem, you can assign a task to the students the day before: go back to collect the data about the discount, and write your own application questions. In this way, many students will go to the store in person to understand the price of goods and the sales of goods. The "discount" application questions compiled by them are rich in content and diverse in forms. Students will also be very happy when their self-made questions are presented in class. After students have learned and mastered the concept of "discount", they will show such a question: 59 workers are working at a construction site, and the contractor sends a worker to the store to buy mineral water. Store regulations: 2 yuan for each bottle, 10% off for each box of 20 bottles, and 8.8% off for each box of 30 bottles. How can each worker drink a bottle of mineral water and save the most money? Students can review the questions first, and then have a group discussion. Suppose that students can come up with the following solutions:

Scheme 1: buy 59 bottles, 2 ×59=118 yuan.

Scheme 2: buy 2 boxes of 20 bottles and 19 bottles of a single bottle, 2 ×two ×twenty ×0.9+19×2=112 yuan.

Scheme 3: buy a box of 30 bottles, and then buy a single bottle of 29 bottles, 2 ×thirty ×one ×0.88+29 ×2=110.8 yuan.

Scheme 4: buy 2 cases of 30 bottles, 2 ×thirty ×two ×0.88=105.6 yuan.

In contrast, buying 2 boxes of 30 bottles not only allows each worker to drink one bottle, but also saves the most money. Through the actual problem situation of purchasing mineral water, students not only learn knowledge, but also cultivate their ability to observe and analyze problems, so as to enhance students' awareness of mathematics application and improve their knowledge of mathematics.

3.2 Connect the problem situation with the story to improve the interest of learning

A remarkable feature of mathematical culture is that it originates from life and is widely used in life. The mathematics curriculum standard points out that "students' mathematics learning content should be realistic, meaningful and challenging". Paying attention to the connection between mathematics and life is also one of the contents of international mathematics education reform. Facing this requirement, as a mathematics teacher, we must consider making full use of life materials.

For example, in the class of thinking development, when explaining the problem of "chicken and rabbit in the same cage" to students, students can expand their knowledge of the history of mathematics. Chicken and rabbit in the same cage is one of the famous mathematical problems in ancient China. About 1500 years ago, Sun Tzu Suan Jing recorded this interesting problem: "today, there are chicken and rabbit in the same cage, with 35 heads above and 94 feet below.". After listening to the relevant stories, students will be more interested in the solution of chicken and rabbit cage, so as to improve the interest of learning.

Another example is the story in the changing law of learning quotient: the story of arranging the old monkey to divide peaches. The little monkey was not satisfied after the old monkey divided two peaches, so he said can he give more? So the old monkey said that I gave you 8 peaches but divided them into 2 monkeys. The little monkey was still dissatisfied, so the old monkey gave the little monkey 16 peaches and divided them into 4 monkeys. The little monkey was still dissatisfied that 32 peaches were eaten in 8 days, so the old monkey gave all 64 peaches to the little monkey but divided them into 32 little monkeys. The little monkey was very happy. He thought that I had so many peaches.

The little monkey thought that his face smiled. The old monkey looked at the little monkey and smiled. Who do you think is the right person to smile? Is he a real wise person? After answering the question about Lao Hou Fen's peach story, the primary school students can ask the question "since you think the old monkey is a real intelligent person, what do you think is the problem? What is the problem?" This leads to the subject of the change law of quotient, so as to solve the problems such as "the divisor, the relationship between divisor and quotient, what has changed, what has not changed". The story of little monkey and old monkey sharing peaches can not only improve the classroom atmosphere, but also arouse students' interest in learning and interest in learning.

4. Organize different classroom forms, and guide students to learn to solve problems in exploration

The new mathematics curriculum standard points out that "effective mathematics learning activities cannot simply rely on imitation and memory. Hands-on practice, independent exploration and cooperative communication are important ways for students to learn mathematics." Therefore, in teaching activities, we should always insist that teachers should not replace students who can complete by themselves. We should provide enough time and space for students to explore independently, so that students can explore independently and discover relevant mathematical knowledge according to their own experience and their own way of thinking.

4.1 Explore independently and learn to solve problems

Autonomous inquiry learning means that students explore, study and solve problems by themselves. Its essence requires us to implement an activity of students' autonomous learning in mathematics classroom teaching, tap students' internal potential, independently complete the construction of knowledge, and obtain methods to explore knowledge, cultivate students' ability to find and solve problems, and cultivate students' innovative spirit and practical ability. Students become the masters of learning. Autonomous inquiry learning is a new teaching method, which embodies the principle of "people-oriented".

For example, in solving problems: the students of class 1, grade 2 are going to rent a car to visit the science and Technology Museum. There are 2 teachers and 30 students. Is the bus below enough for the class. First, show the students a situation diagram of the bus seat schematic diagram, and ask the question "what do you see from this situation diagram, and what mathematical information can be extracted?" In order to ask questions, how will you solve the problem of whether there are enough seats and let the students begin to study independently in groups. After group exploration, the learned knowledge of multiplication, addition and subtraction will guide the students to show their thinking process, so that the students can understand that due to the different observation angles of each student, there will be different strategies to solve the same problem. The results of students' discussion may lead to the following solutions:

Classmate 1: 4 × 7 + 5 = 33 (PCS) 33 > 32 so sit down

Classmate 2: 8 × 4 + 1=33 (PCS) 33 > 32 so sit down

Classmate 3: 2 × 7=14 (PCs.) 2 × 7=14 (PCs.) 14 + 14 + 5=33 (PCs.) 33 > 32

Classmate 4: 2 × 8=16 (PCs.) 2 × 7=16 (PCs.) 16 + 16 + 1=33 (PCs.) 33 > 32

The representatives of each group will exchange ideas and methods to solve the problem, so that the students can understand that there are many solutions to the same problem from the perspective of never, and this problem has been solved.

4.2 Cooperative exploration and learning to solve problems

Through exchange, cooperation and other learning, students' cooperative spirit, exploratory thinking and problem-solving ability are cultivated. With the development of society, especially the arrival of information society, the requirements of social practice on mathematics have changed greatly. At the same time, it also poses a severe challenge to our teachers. As teachers, we must keep a clear mind, keep up with the pace of the times, and have the responsibility to train students to apply mathematical knowledge to practice. Once, during my practice activities, I presented such an application question in combination with student activities: 38 sixth grade students went to Dongshan zoo for tourism. The zoo stipulated that each ticket was 20 yuan, and anyone who bought 40 tickets could enjoy a 20% discount. I asked sixth grade students how to buy tickets in order to save money? Why? In this way, the students get the following two ways to buy tickets after thinking and discussing. For group tickets, you only need to pay: 20 × thirty-eight × 0.8=608 yuan. Instead of buying group tickets, you need to pay: 38 × 20=760 yuan. Through comparison, the students are very clear. At the same time, I also asked the students to discuss. When the number of students is less than 40, it is cost-effective to buy group tickets from several people. Therefore, to carry out practical activities, we should meet the needs of students, adapt to the age characteristics of students, and have certain educational significance and inspiration. In this way, students can experience the process of mathematical analysis and problem solving, accumulate learning experience and enjoy the fun of success.

5. Conclusion

To sum up, creating problems, putting forward problems, and autonomous cooperative exploration can help students solve problems. In the teaching process, students should also be good at discovering and exploring teaching methods, be good at organizing students, and combine students' reality, grasp typical examples, teach students thinking methods, so that students can truly experience the fun and practicality of mathematics learning, so that students can find life mathematics, like mathematics, and achieve the purpose of learning mathematics well. In this way, it is not only conducive to teachers' organization of teaching, but also conducive to students' ability exploration. At the same time, it also allows students to experience mathematics in life, accumulate methods of learning mathematics and master laws in the process of analysis and solution. Let them really feel the success of solving practical problems.

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