Research on Mathematics Activity Teaching in Secondary Vocational Schools from the Perspective of Literacy Improvement

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Abstract: The essence of the teaching reform is to improve students' comprehensive professional ability, so how to build an efficient classroom, enhance students' mathematics literacy has become an unavoidable problem faced by mathematics teachers in secondary vocational schools. This paper introduces the teaching of mathematics activities based on magnet small blackboard. The design of teaching links focuses on how students learn, pays attention to students' participation in learning, graphic analysis and the improvement of mathematical operation ability, helps students transform the learning experience of mathematics activities into the direction of mathematics core literacy, and truly realizes the landing and improvement of students' mathematics core literacy.

1. The importance of infiltrating core literacy in secondary vocational mathematics

Mathematics curriculum in secondary vocational schools is one of the public basic courses, one of the important components of the curriculum system in vocational schools, an important way to cultivate students' ideological and political quality, scientific literacy and so on, which is of great significance to promote students' career development [3]. In the teaching of mathematics curriculum in secondary vocational schools, students should further acquire the basic knowledge of mathematics needed for follow-up learning and the knowledge reserve, mathematical operation ability and thinking methods necessary for professional development [1]. To enable students to implement the combination of mathematical core literacy and professional skills learning, to develop the awareness of using mathematical knowledge to find and solve problems in future work, life and learning, and to use mathematical thinking, methods and tools to solve problems in career development. To enable students to develop the scientific spirit, craftsman spirit and innovative thinking consciousness of excellence, to carry out the fundamental task of cultivating people by virtue, and to become high-quality skilled personnel needed by society.

2. Mathematics activity teaching strategy based on magnet small blackboard

2.1. Everyone participates in math activities.

In the past, we could only let some students demonstrate the completion process of their

classroom exercises on the blackboard. These students often pay close attention to how they do, want to perform well in front of teachers and classmates, and learn very seriously. In order to let more people have the opportunity to demonstrate their homework, we distribute several magnetic blackboards to each study group. On the small blackboard, each member of the group can learn their own answers. The teacher walks around the classroom to supervise and let everyone do the questions by hand, instead of watching others do them as before, or thinking about an answer psychologically. During the inspection, the teacher can find the good answers or typical mistakes in time and display them on the blackboard conveniently. In this way, every student has the possibility of being shown, students no longer have an excuse not to do exercises, and the real writing process can deepen the impression of students' learning, and the writing of mathematical symbols can also be well consolidated. In the homework after class, students can also recall the learning and writing situation in class very well [2].

2.2. Real-time viewing of reserved blackboard writing

In daily teaching, we often make courseware in advance or use software to draw graphics that are difficult to demonstrate on the blackboard. This can save time and improve efficiency, but at the same time, it is often found that students are not actually hands-on learning, and knowledge teachers are teaching alone. For drawing software, it is difficult for students to have the opportunity to practice, and students generally have pen and paper. Therefore, as a teacher, we can make full use of the magnetic force to paste the small blackboard, which is close to the actual state of students' learning. On the small blackboard, you can write the courseware content or topic you want to show in advance to save time, and you can put it aside and use it repeatedly. In drawing or some complex problem solving demonstrations, we can also do it on the small blackboard. Keep the drawing process, so that students can imitate and learn, try to see if they can get the same answer as a good teacher, so that they can be closer to the actual learning of students, and also better check the writing status of students, whether they really understand the symbolic writing of formulas and theorems.

3. Record of Exponential Function Classroom Teaching Activities

3.1. Create situations and ask questions

The recent outbreak of chickenpox in schools has spread rapidly. How to explain it with mathematical principles? It is an acute infectious disease caused by the first infection of herpes zoster virus. There are many ways for pathogens to reproduce, and fission is one of them. Let's look at how the virus splits: one splits into two, two splits into four[4].We introduce two variables x Denotes the number of splits, y Indicates the number of viruses. Establish functional relationship. Through the recent chickenpox epidemic in schools, we can improve students' enthusiasm for learning, arouse students' intense discussion.

Through the recent chickenpox epidemic in schools, we can improve students' enthusiasm for learning, arouse students' intense discussion, and find out what kind of mathematical methods can solve the current problems in the discussion, thus leading to the teaching of new lessons. The small blackboard distributed by each group can quickly show the actual writing situation of students, just like in the exercise book, which can be close to the learning state of students.

3.2. Practical feelings and inductive definitions

In general, the function $f(x) = a^x, (a > 0 \ and \ a \neq 1, x \in R)$called the exponential function.

Can base number a be any number? When $a < 0$, or $a = 0$, or $a = 1$, there will be meaningless situations. In order to avoid the above situation, it is stipulated that $a > 0 \ and \ a \neq 1$. In the discussion of the function base, each study group put forward its own different opinions and exchanged and summarized its experience. In reviewing the operation of the index, the operation of each group of students can be shown on magnet small blackboard.

Example 1 which of the following functions are exponential?

$$(1) \ f(x) = 1.7^x \ (2) \ f(x) = 0.8^x \ (3) \ f(x) = 2^x \ (4) \ f(x) = x^{1.7}$$

Each student is required to draw a function graph and observe the characteristics of the graph in preparation for summarizing the properties of the function. Each group is ready to draw an image on the small blackboard, analyze the image, and go to the stage to show, explain, exchange and learn. Improve intuitive imagination and mathematical operation literacy.

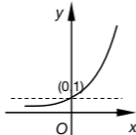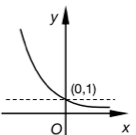### 3.3. Image analysis to explore the nature

Please make the function graph in the above example 1. Students in pairs draw pictures on the magnet blackboard. Teachers select representative students to practice and demonstrate. Teachers and students summarize the properties of exponential functions from special to general according to the characteristics of different base images. After using the small blackboard, students are more willing to draw images by hand, students are more active in learning.

Example 2 use that property of the exponential function to compare two values without compute.
$$(1) 1.7^{2.5} \ and \ 1.7^3 \ (2) 0.8^{-0.1} \ and \ 0.8^{-0.2} \ (3) 1.7^2 \ and \ 2^{1.7}$$

Students try to use the properties of exponential function to solve the problem of comparing size. Improve mathematical modeling and data analysis literacy. Based on the previous experience of function analysis, when comparing the same size, students can easily think of using the characteristics of the image to compare the size of the function value, as shown in the table 1.

Table 1: Properties of exponential function

	$a > 1$	$0 < a < 1$
Image		
domain	R	
range	$(0, \ +\infty)$	
point	$(0, \ 1)$	
monotonicity	Increasing function *When $x \geqslant 0$, then $y \geqslant 1$;* *When $x < 0$, then $0 < y < 1$*	Decreasing function *When $x \geqslant 0$, then $0 < y \leqslant 1$;* *When $x < 0$, then $y > 1$*

Example 3 Solve the function domain: $f(x) = \sqrt{3^x - \frac{1}{3}}$.

Through example 3 further deepening the understanding and application of function properties, especially the problem of how to solve exponential inequalities, is also a difficult point in future learning, which requires time to understand.

Example 4 Winter is cold, in order to keep out the cold, people often drink hot water to keep warm, but it is often impossible to estimate the water temperature, so how to estimate the

temperature of tea after a period of time? It is known that the temperature change of water satisfies Newton's law of cooling: $f(x) = a + b \cdot 2.72^{-0.05t}$, of which a is the initial temperature of the environment, b is the temperature difference between the water and the environment. Assuming that the temperature of the tea in the cup is 100 degrees at first, the temperature function of the tea is as shown in the figure. (1) The function expression of water temperature change. (2) What is the temperature of the tea after 45 minutes? Is it suitable for drinking? (To simplify the calculation a, b Integer), as is shown in figure 1.
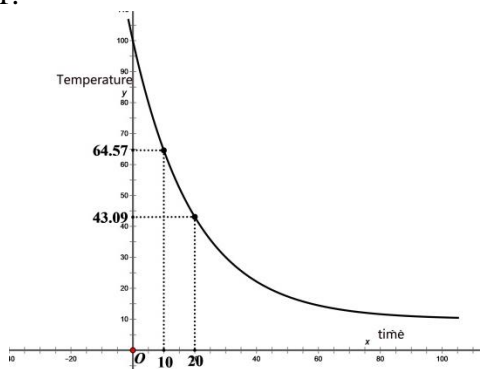

Figure 1: Temperature time curve

Take drinking tea in winter as an example, and use the knowledge learned to solve life problems. Improve mathematical modeling and data analysis literacy. The solution of practical problems makes students understand that mathematics learning is closely related to life, especially for students who need to make tea, which arouses more interest in learning and promotes the learning of professional skills in the future.

4. Reflection of mathematics activity teaching based on magnet blackboard

Through the introduction of magnet small blackboard into teaching, students can actively or passively participate in the study of mathematics courses, effectively improving students' mathematical literacy. Students with better grades can pay close attention to the details in their study， so that they have better logical reasoning ability and data analysis ability. Students with poor grades can constantly force themselves to learn in the display of the small blackboard, repeated learning can make a little progress. When magnet small blackboard is introduced into the classroom, everyone can become a teacher, show their understanding and application of knowledge, break the traditional one-way teaching idea of "teacher-student interactive learning", so that students can actively participate in the process of learning in the classroom, which fully reflects the requirements of core literacy for curriculum learning.

In addition, in carrying out the teaching activities of magnet small blackboard, we should also consider the timing of the use of small blackboard and how to distribute small blackboard scientifically and reasonably, how to correct the content of students' display, and optimize the classroom teaching process. In a word, teachers should constantly explore and carry out more scientific and reasonable mathematics activities to improve the efficiency of mathematics classroom.

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