

THE APPLICATION OF INFORMATION TECHNOLOGY IN MATHEMATICS TEACHING IN HIGH SCHOOL

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ABSTRACT

The wide application of information technology has effectively promoted the transformation of modern, high efficiency and high-quality teaching ideas and teaching methods. The deep integration of high school mathematics and information technology shows the advantages of reforming traditional teaching drawbacks, optimizing teaching resources, adapting to the new era of educational ideas, and laying the foundation for training modern rational thinking talents. However, at present, most senior high school mathematics teachers do not pay enough attention to the application of information technology in senior high school mathematics teaching, and the application strategy is not clear and diversified. Based on this, this paper first expounds the necessity of information technology in senior high school mathematics teaching, then analyzes the advantages of applying information technology in senior high school mathematics teaching, and finally points out the application strategies of information technology in senior high school mathematics teaching.

Keywords: Information technology; Senior high school mathematics; Applications.

I. INTRODUCTION

Introduction With the rapid development of information technology and the deepening of education reform, we find that using information technology to guide teaching can improve the traditional teaching mode, and applying it to senior middle school mathematics classroom teaching can not only broaden students' horizons, but also better mobilize students' active initiative in learning. Broaden students' Internet thinking, innovative thinking and mathematical problem-solving thinking, and achieve the improvement of teaching quality. At the same time, this new teaching method has greatly enhanced the professional ability of teachers, promoted the professional development of teachers, and benefited teachers.

II. THE NECESSITY OF INFORMATION TECHNOLOGY IN HIGH SCHOOL MATHEMATICS TEACHING

A. In Line with the Development Trend of Educational Informationization in the New Era

Since 2000, the curriculum reform in China has emphasized that efforts should be made to promote the integration of information technology and other subject teaching, and the information technology and subject teaching should be organically combined through the curriculum. The Ministry of Education issued the Education Informatization 2.0 Action Plan in 2018, pointing out that the deep integration of information technology and subject teaching is not enough.[1] Mathematics is an abstract and ideal subject. In the teaching process, traditional teaching mode is the main teaching mode, supplemented by multimedia information technology. The improvement of teaching quality under the background of the integration of the two is in line with the development trend of education informatization 2.0 plan in the new era.

B. Information Technology Meets the Social Demand of Promoting Mathematics Quality Education for Senior High School Students

The report to the 20th National Congress of the Communist Party of China pointed out that "education, science and technology, and talents are the basic and strategic support for comprehensively building a modern socialist country." Therefore, students' application ability and practical accomplishment are relatively emphasized in the process of mathematics teaching in high school. Therefore, teachers in the teaching process to innovate the way of thinking, in-depth application of information technology, for students, is to consolidate the basic knowledge at the same time to improve students' mathematical language construction ability, mathematical problem-solving thinking and innovative literacy, to form a good habit of mathematical problem-solving and moral cultivation, to promote students' moral, intellectual, physical, American and labor all-round development. It can be seen that the application of information technology in the process of senior high school mathematics teaching meets the social needs of promoting quality education.[2]

C. Meet the Requirements of the New Curriculum Standards

"General High School Mathematics Curriculum Standards (2017 edition)" (hereinafter referred to as "curriculum standards (2017)") there are 21 references to information technology in the full text, pointing out in the teaching concept that "pay attention to the deep integration of information technology and mathematics curriculum to improve the effectiveness of teaching"; In the "teaching suggestions" emphasized that we should "pay attention to the use of information technology and realize the deep integration of information technology and mathematics curriculum"; In the textbook suggestions, it is suggested that "the richness of the presentation form of textbooks can be realized through the deep integration of information technology and curriculum". It can be seen that information technology plays a very important role in high school curriculum.

III. THE SIGNIFICANCE OF APPLYING INFORMATION TECHNOLOGY TO MATHEMATICS TEACHING IN HIGH SCHOOL

A. Enhance Teachers' Professional Skills

Report of the twentieth Congress put forward many innovative ideas on education, including promoting digitization of education and building a learning-oriented society and a learning-oriented country with lifelong learning for all. Linking the digitization of education with the construction of a learning society means that the country will further develop an educational intelligence platform for the whole society. Among them, the concept of "learning power" is also clearly put forward for the first time. This requires teachers' "teaching" process is also a process of continuous learning, and the process of applying information technology to classroom teaching is a process of continuous learning.[3] In this process, teachers make full use of various software and platform resources to collect teaching materials, which can not only broaden their vision and enhance their professional knowledge, but also carry out more in-depth and comprehensive communication with counterparts all over the country through the network, so as to effectively improve their own mathematics teaching ability. At the same time, in the teachers' continuous learning of information technology, continuous reflection and summing up of experience, the teaching methods will be continuously optimized.

B. Stimulate Students' Interest in Learning

With the growth of senior one to senior three, the mathematics teaching knowledge is more comprehensive and difficult, and the mathematical theory is abstract and complicated, lacking of interest. However, high school students are active in thinking and like to contact the teaching resources with strong sense of science and technology.[4] In this case, the application of

information technology in high school mathematics teaching, such as: using GeoGebra software to make dynamic models, using MATLAB software to draw function images, to solve linear programming problems. Under the impact of this dynamic demonstration and software algorithm to solve math problems, it is easier to attract students' attention and stimulate students' interest in learning, so that students are no longer bored with math and create a good classroom atmosphere. Moreover, the senior high school stage is the key stage for the improvement of students' comprehensive intelligence, and the mutual integration of information technology and disciplines also has positive significance for students' growth and development.

C. Improving Teaching Efficiency

Compared with the traditional classroom mode of using chalk for blackboard writing, the long time of blackboard writing leads to less explanation of exercises. Teachers use multimedia, projectors, electronic whiteboard and other equipment to teach, which can not only shorten the blackboard writing time and display more abundant exercises, but also vividly present mathematical knowledge through the use of animations, videos, images, etc., so that students can understand and memorize it more intuitively. Which greatly improves the teaching efficiency.

IV. THE APPLICATION STRATEGY OF INFORMATION TECHNOLOGY IN HIGH SCHOOL MATHEMATICS TEACHING

A. Design Classroom Practice

Classroom teaching cannot be separated from practice. Only by combining theory and practice, allowing students to learn by doing and think while doing, can students' practical ability and application ability be improved. In addition, the "General high School Mathematics Curriculum Standards (2017 edition)" pointed out that students should cultivate the core quality of mathematics, and the core quality itself is the quality of human body that can be truly and continuously expressed and acted out. Its formation is essentially a practical process, without action, creation, experience, sentiment, only memory, recitation, understanding, thinking, etc. It is impossible to form the core quality. Therefore, classroom practice is implemented through information technology in teaching, so that students can improve their character and ability.[5] For example, teachers integrate information technology into the classroom practice of statistics teaching, so that students can learn the basic knowledge of statistics, learn to use software to process data, combine statistical analysis methods, and draw corresponding statistical conclusions; Through classroom practice, students can effectively improve the level of data analysis literacy, learn to use statistical analysis software for analysis, and in the specific analysis process, encourage students to give full play to their creativity, make reasonable use of the function of software to achieve the problem they want to analyze, and improve students' ability to use information technology and data analysis literacy.

B. Contact with Social Life

Recently, Huawei broke through the technology blockade of the United States, successfully developed chips, and released the Mate60 series, which is the use of Huawei's self-developed 5G technology, a time "far ahead" on the hot search. Teenagers in high school are often attracted by these things with a strong sense of science and technology, and they are full of curiosity about these, so using this point, teachers can think about combining these scientific and technological development with teaching, showing the charm of mathematics, and appropriately showing students the mathematical algorithms and program knowledge applied behind these scientific and technological development. To make students realize that math is really a part of our lives. For example, teachers can introduce that 5G technology adopts linear

algebra and group theory knowledge in college mathematics, which is essentially matrix multiplication, and appropriately simple supplement the content of matrix multiplication.

C. Production of Micro-Lessons

With the rapid development of information technology, micro-lesson has become a very efficient teaching mode and has received wide attention. With the help of modern information technology, high school mathematics teachers can make micro-lessons for different teaching stages to meet the diversified and personalized learning needs of students. For example, in the review teaching, teachers can make short and concise micro lessons to show the important and difficult knowledge of the course and help students grasp the whole. Then, the teacher can upload the micro-lesson to the class's learning software for students to learn independently after class.[6] In this way, students can review and clarify their ideas at any time, and improve the learning effect and quality of students. In addition, before the formal teaching, the teacher can also use the micro-lesson as a starting point. First, the demonstration of the micro-lesson will attract the students' attention, and then the content of the micro-lesson will lead to the content of the lesson, so that the students can better accept the content of the lesson.

D. Accurately Grasp Students' Learning Situation

Through information technology, teachers can dynamically mine, collect and analyze students' learning data, and present students' learning effects in a digital way, so as to provide students with targeted teaching services. For example, in the senior three stage, students may fluctuate greatly due to study tension and pressure, and may also fall into the misunderstanding of eager to get into the sea of questions, blindly brushing and doing questions, and making efforts but not improving at all. Then, teachers can sort out the situation of students' each math test through information technology, and form the data analysis report of students' math test. This report can include information such as the type and frequency of students' mistakes each time and the fluctuation of students' scores. By analyzing the types of questions with low score rate of students, teachers can help students to study and train in a targeted way, remove the obstacles of students' study, and improve the efficiency and effect of learning. At the same time, when students' scores fluctuate greatly, teachers can communicate with students in time to understand students' learning status and analyze the reasons. While helping students rebuild their confidence and adjust their status, teachers can summarize and reflect on stage teaching and appropriately improve teaching methods and strategies.[7]

E. Improve Teaching Evaluation

In the context of the new curriculum reform, classroom evaluation requires a change from result-oriented to a process - and development-focused evaluation standard. High school mathematics teachers should observe and evaluate students' learning process dynamically under the guidance of the new curriculum standards. At the same time, it is suggested to use multiple evaluation subjects instead of single evaluation subjects, so that both teachers and students should participate in it, and form an interactive mode of teacher evaluation, student self-evaluation and student mutual evaluation to make the evaluation more comprehensive. In this case, teachers can use information teaching tools to design online evaluation questionnaires or assignments, collect students' feedback and self-evaluation, and understand students' learning attitude and willingness to learn.[8] In addition, teachers can also use some software to record students' thinking and reasoning process in the process of problem solving, so as to evaluate students' thinking ability and problem-solving strategies. In addition, students can also evaluate each other, and through the process of mutual evaluation, students can promote their thinking about their own learning process, and promote the formation of a good atmosphere between students to encourage each other and learn from each other.

F. Animation Video to Restore Knowledge Reasoning

In high school mathematics teaching often involves some knowledge reasoning process, and some of these reasoning processes are very tedious, but the exam will not examine the reasoning process of these knowledge. This will appear in the teaching teachers will pass over, students only know to remember the conclusion, and in the application of the conclusion there is no way to start the situation. The reform of education and teaching in the new era emphasizes that today's mathematics teaching should pursue more the process of obtaining knowledge, rather than the rigid knowledge according to the set, and lead students to really dig and explore the key of knowledge, so that students can feel the connection between knowledge and knowledge in the process of reasoning and appreciate the charm of mathematics itself. The advantage of using the animation video area to restore knowledge reasoning through information technology is that each step of it can be saved and modified, that is, it has the function of "snapshot". Take the Functions and Equations of the third chapter of Compulsory Mathematics for A version of high School Mathematics as an example. In this chapter, students will learn to use dichotomy to find the approximate solution of the equation.[9] The teacher can use the animation video to restore the steps of dichotomy to approximate the zero of the function, including determining the interval on the coordinate system, judging the accuracy, obtaining the center of the interval, calculating $f(a) \cdot f(c) < 0, f(c) \cdot f(b) < 0, f(c) = 0$ three situations, and finally, restoring the judgment of the accuracy. Students can feel the process of obtaining knowledge and solving problems more intuitively, so as to deepen the impression and promote the further deepening understanding of the knowledge content.

V. CONCLUSION

To sum up, information technology provides abundant teaching resources and tools for mathematics teaching in high school, eliminates various problems existing in traditional teaching mode, and improves students' information technology literacy and mathematical thinking ability. For senior high school mathematics teachers, senior high school mathematics teaching is facing new opportunities and challenges. High school mathematics teachers should combine modern means to enhance their professional knowledge and skills, build a diverse classroom, and improve the teaching effect and students' learning quality.

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