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Research on the Teaching Strategy of Junior Middle School Mathematics Based on the Intelligent Learning Environment

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Abstract **– The era of knowledge economy rapid development technology is gradually affect education informatization processes. At present, our country's education informationization is gradually shifted from information technology and curriculum integration phase to phase depth fusion innovation. The changes of the perspective of learning environment in depth fusion from digital to wisdom. Smart learning environment as the high-end form of digital learning environment, Through emerging technology support and proper personalized service for teaching and learning brought new values and mission. Based on the connotation and theoretical basis of the smart learning environment, this paper carries out the teaching design of quadratic function in the smart learning environment, and puts forward the strategies for the construction of junior middle school mathematics classroom.**

Keywords **– Intelligent Learning Environment, Junior High School Mathematics, Mathematics Teaching.**

I. THE INTRODUCTION

The rapid development of the Internet revolution in the 21st century is gradually penetrating into various fields of the world and affecting different aspects of people's lives. Education as a way to cultivate talents has also been endowed with new connotation and realm. The development trend of educational informatization is also gradually shifting from digital education to intelligent education. In his congratulatory letter to the international conference on educational informatization, President xi jinping highlights that "Building a learning society in which everyone can learn, everywhere and all the time and cultivating a large number of innovative talents." [1] These are enough to show the state's emphasis on educational informatization. As a high-end form of education development, smart education includes a series of learning methods including smart learning environment, smart campus and smart classroom, which have also become one of the hot topics for scholars in the field of education technology.

Nowadays, there are a series of problems in the traditional mathematics teaching of junior high school [2] : single teaching method, failure to teach students in accordance with their aptitude, lack of personalized learning; The current inquiry-based teaching lacks the cultivation of students' thinking ability, and students are not clear about the learning purpose, so it is difficult to innovate their learning thinking ability. The teaching evaluation is unitary. The classroom assessment method of junior middle school mathematics is still based on paper test. The common test method lasts for a period of time and the final exam. Therefore, it is imperative to vigorously develop wisdom education. As an effective part of the smart education system, the smart learning environment plays an irreplaceable role in cultivating high-quality personalized learning and innovative qualities of students.

II. INTELLIGENT LEARNING ENVIRONMENT

A. *Connotation of Intelligent Learning Environment*

Wisdom learning originally came from IBM's concept of a smart earth. Smart earth refers to the application of

the Internet of things, mobile communications and intelligent analysis technology to enable human connectivity. Intelligent learning is the fourth revolutionary wave that combines the development of information technology and education. Smart learning environment is the high-end form of learning environment, the demand of students for learning environment in the digital era, and the favorable condition for effectively promoting the reform of learning and teaching methods [3], which has a positive impact on students. It is an intelligent, open and integrated space, which is student-centered, adapts to different learning styles, supports students' independent construction, provides timely guidance, and provides lifelong support for students' development. It aims to promote students' personalized and social learning.

The initial intelligent learning environment refers to the classroom environment with interactive electronic whiteboard as the main teaching equipment, which can support the information exchange and real-time interaction between teachers and students in the classroom. With the continuous development of network and information technology, the smart learning environment is no longer limited to the traditional classroom environment, but the virtual learning environment and digital learning environment which are not subject to the constraints of time and space.

B. *Theoretical Basis*

a. *Constructivism Learning Theory*

The constructivist learning theory was put forward by the famous Swiss psychologist piaget. Constructivist learning theory holds that all types of learning cannot exist independently without context and content, and emphasizes that student-centered, teachers are no longer the authority in traditional teaching in the learning process, but proper guides and inspirators, and students should conduct meaningful construction through individuals [4].

b. *Multiple Intelligence Theory*

The theory of multiple intelligences was put forward by American psychologist Gardner, which divides human intelligence into the following eight categories: language, mathematical logic, space, body-movement, music, interpersonal, introspection and natural exploration. Therefore, the key of education is to develop and develop learners' specialties and finally develop their personalities on the basis of ensuring the development of these eight categories. In under the guidance of the theory, using the technology of "wisdom", in real-time monitoring and tracking every student learning process, and through the large data analysis techniques, such as analysis and mining useful information, so as to provide dynamic feedback information for teachers and students, so they can according to feedback information, to real-time adjust their learning state[5].

c. *Quality Education Theory*

Quality-oriented education is an education with the fundamental purpose of comprehensively improving people's basic quality, respecting people's initiative and initiative spirit, and paying attention to forming people's sound personality. At the same time, the new curriculum standard points out that every student should get a good mathematics education, and different people get different development in mathematics. Therefore, the intellectual education work must change the educational idea, the reform talented person raises the pattern, implements the heuristic and the discussion teaching positively, stimulates the student independent thinking and the innovation consciousness, improves the teaching quality practically.

III. CASE DESIGN

The author chooses quadratic function, the first volume of grade 9, human education edition, as the teaching content to carry out the case design of junior middle school mathematics classroom teaching under the intelligent learning environment[6].

a. *Teaching Material Analysis*

Quadratic function plays a connecting role in the whole middle school mathematics. The image and related properties of quadratic function also reflect the idea of combining Numbers and shapes in mathematics. In addition, quadratic function is often involved in all aspects of people's life, and is widely used in business, economy, engineering technology and other aspects. Through this part of learning, can let the student further understand the mathematics function thought and the method, enhances the student's mathematics consciousness.

b. *Study Data Analysis*

Students have learned about some basic concepts and images about functions through the knowledge of plane rectangular coordinate system, function image and direct proportion function, and primary function, etc., but their understanding of mathematical function image is still one-sided, and most students still stay at the level of understanding concepts. In addition, students in grade 9 have strong learning initiative, certain learning ability and identification ability, and sense of participation. They are willing to use mathematical knowledge to explain life phenomena and practical problems, and have a strong interest in learning functions. Most students are willing to explore mathematical problems through collaborative discussion and communication.

c. *The Teaching Goal*

Knowledge and Skills:

If you understand the concept of quadratic function, you will be able to solve simple analytic expression and definition domain of quadratic function in practical problems.

Master the images of the quadratic function: $y = ax^2 + bx + c(a \neq 0)$, and will be in tracing point method to draw the picture: $y = ax^2$.

Some practical problems are solved by using the properties and images of quadratic functions.

Process and Method:

Students try to draw the picture of the quadratic function by analogy to the drawing method of the function image they have learned before.

Encourage students to draw, observe and develop scientific thinking.

Emotional Attitude and Values:

Through students' observation and thinking, students can understand the combination of numbers and shapes and feel the unique charm of mathematics.

Train students' awareness of applying mathematical knowledge to life and production practice, and understand the close relationship and important role of mathematics and modern life, social production, science and technology.

d. *Key and Difficult Points in Teaching*

Key points: definition and properties of quadratic function.

Difficult points: the students' union in tracing point method to draw the $y = ax^2$images.

e. *Teaching Process*

(i) *Independent Study before Class*

First of all, the teacher will upload the prepared micro lessons to the cloud, and package and label them so that students can find them when they learn independently. By watching the video of quadratic function, students can learn the content of quadratic function by themselves. Teachers place different task lists before and after students watch video. The first task list is what knowledge should be learned in this video and what knowledge points should be paid attention to, and mark the corresponding time points in video. The second task list is the reflection task list proposed by the teacher after watching video to strengthen students' understanding and memory of knowledge points in video.

(ii) *Classroom Activities*

Teachers give students some targeted exercises, and according to these exercises to get to know students learning situation, teachers will see the wisdom study environment automatic test results are given to design the class activities, first of all, teachers set up several different according to the result of specific exercises to explore sexual problems, cooperative learning group rely on the wisdom of the classroom teaching interaction platform to complete the task of exploring, intelligent learning environment play to the role of the perceived situation information, at this time for students to build a virtual or simulation study atmosphere and environment, in set up according to the sequence of knowledge and ease, On the concept of the quadratic function, quadratic function analytical formula of three kinds of expression and the application of the quadratic function three different levels to explore sexual knowledge ontology teaching, intelligent learning environment according to the needs of the students at this time to provide different disciplines resources and tools, through the creation of wisdom in a classroom situation, resources and tools to assist to teacher's individual instruction and the help of cooperative learning group, so as to complete the problems solution and further internalization of knowledge.

(iii) *After-class Evaluation*

Learning platform will study this chapter content displayed in the form of a list, and through reasonable analysis of related technologies, the automatic diagnosis of students' knowledge scotoma and review the proposal, by the wisdom embedded in the learning environment of technology for analysis of quality of learning, to help students find the quadratic function difficult point in the learning content, through the form of video and text reviews the whole learning process, complete the consolidation of the quadratic function.

IV. Strategies for Classroom Construction of Junior Middle School Mathematics in an Intelligent Learning Environment

A. *Hardware Support of Smart Learning Environment*

In the smart learning environment, network technology, especially 5G network technology, is the basis to ensure that students can learn anytime, anywhere and on demand. Therefore, the first condition of the smart learning

environment is to ensure the full coverage of network technology, so that students can collect materials in real time, communicate and discuss, and exchange ideas. Second, ensure that classrooms are equipped with intelligent interactive terminals (such as electronic whiteboards). In this way, teaching and learning can be real-time tracking, real-time collection, real-time feedback. Third, electronic schoolbag is one of the resources of students needs, it is a mobile terminal as the carrier, cloud platform management system, teaching resources, interactive teaching cloud platform for the integration of network learning environment, can provide a variety of disciplines tools and rich resources, is the powerful guarantee of personalized learning students quality[7].

B. *Design of Intelligent Learning Environment in School*

According to the characteristics of junior middle school mathematics knowledge and subject characteristics, the teaching is divided into the following four stages based on the intelligent learning environment:

The specific teaching mode is as follows:

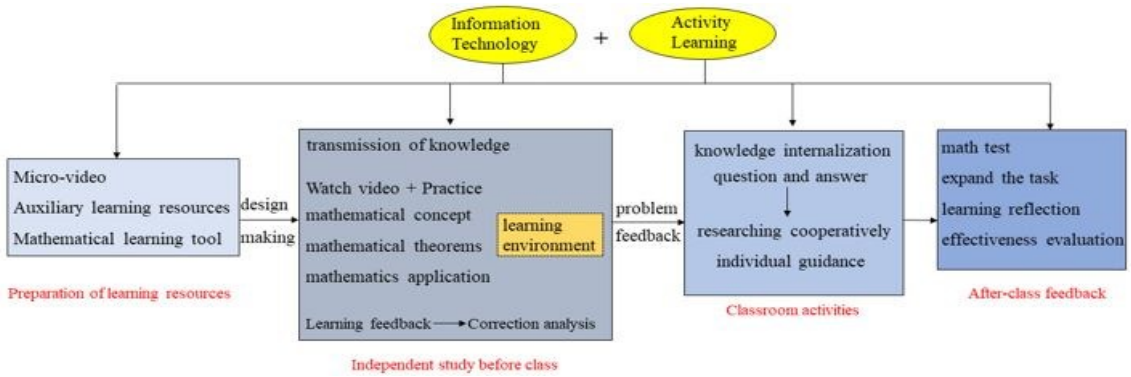

Table IV-1. Teaching process

a. *Preparation Stage of Learning Resources*

Before the knowledge transfer, the teacher should be made according to the needs of teaching and learning situation analysis is given priority to with micro video learning resources, because mathematics course has its own symbol, regular inquiry experiment, etc., so the form of a video for students understand mathematical problems alone has the certain difficulty, so the learning resources to make or choose the auxiliary learning resources and mathematics learning tools, such as simulation and virtual laboratory etc. Let the students, for students' autonomous learning to lay the good foundation[8].

b. *Pre-class Knowledge Transfer Stage*

Class knowledge transfer is one of the most core part of classroom teaching, the students with the support of information technology and network learning environment as the backing, by watching video on the basis of the knowledge learning, and after the complete self-study to contact, teacher feedback issues of specific exercises to set classroom learning activities.

c. *Internalization Stage of Classroom Knowledge*

Classroom teachers set up corresponding collaborative inquiry or individual guidance according to the information feedback in the knowledge transfer stage to carry out activities and exercises. Students communicate and discuss with teachers and students in the form of brainstorm about various puzzles caused by independent learning before class. In this process, teachers offer lectures and seminars to answer questions for students.

d. *After-class Feedback and Evaluation Stage*

After class feedback evaluation needs the support of network learning environment or corresponding teaching platform, teachers can pass under the information technology to support learning environment after class reflection guidance, consolidate the testing environment, and through the intelligent technology to analysis and evaluation of the results, on the whole process of teaching and learning effect, so as to continuously optimize the teaching strategy, achieve the classroom teaching of technical support.

V. Summary and Reflection

The smart learning environment is the place to develop smart learning in the smart era, the necessary platform for education, the inevitable product of the future school development, and brings great changes to teachers' teaching and students' learning. The future learning will be learner-centered, an intelligent, open and independent learning environment constructed under the elements of technical equipment, environment, teachers and students. The learning mode brought to learners may be a subversive and innovative one. It is believed that in the future teaching, the intelligent teaching environment will certainly inject new vitality into the junior middle school mathematics teaching.

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