

# Research on Innovation of Mathematics Teaching under the Application of Information Technology

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**Abstract:** Information technology used in mathematics curriculum is the inevitable development trend of modern education optimization and innovation, which helps to improve the mathematics teaching environment, and promotes the effective adjustment and planning of its teaching direction, which is conducive to cultivating students' mathematical thinking ability and information literacy. However, there are still some problems in the teaching of mathematics informatization courses, which makes them less innovative. This paper gives an overview of the advantages of organic integration of information technology and mathematics curriculum, and analyzes the shortcomings of informational mathematics teaching at this stage, and then proposes an optimization strategy corresponding to it.

## 1. Introduction

The widespread use of information technology in China began in the early 1990s. During the decade of development in China, the Internet has penetrated into all areas of society and has greatly contributed to national life, work and learning. In March 2012, the Ministry of Education issued the "Development Plan for the Ten Years of Education Informationization" and the "Thirteenth Five-Year Plan for Education Informationization" in June 2016, which clearly pointed out that informationization will help promote the reform progress of China's education industry. It is of positive significance to promote the all-round development of students. Through the application of information technology, by 2020, it will basically form a development path of educational informationization with Chinese characteristics with international advanced level, information technology and education integration and innovation. The organic integration of information technology and mathematics curriculum makes it more modern and electronic. At the same time, it also puts forward higher requirements for the teaching ability of mathematics teachers, explores the reform path of mathematics curriculum under the background of informationization, and promotes the innovation of mathematics teaching. To effectively improve students' thinking ability and independent innovation ability is the inevitable development trend of modern education.

## 2. Advantages of organic integration of information technology and mathematics

### 2.1 stimulating students' interest in learning

As shown in Table 1, mathematics learning is highly Abstract, rigorously logical, and widely applicable, and its practical operation is also high. However, influenced by the traditional teaching mode, the teachers' teaching methods are not innovative enough, and the teachers are encouraged to teach students to passively accept the teaching activities, which has a negative impact on the students' enthusiasm for learning mathematics. What's more, some students also learn mathematics. There is resistance. The organic integration of information technology and mathematics makes the course more interesting, and the initiative and enthusiasm of students' learning is fully mobilized, and the learning effect will be more obvious [1]. Using information technology as a mathematical teaching aid, such as animation, image, music, video, etc., can create a pleasant teaching situation for students, Abstract mathematical knowledge to three-dimensional transformation, students are more willing to be active Participation in teaching activities helps students to learn the mathematics

they have learned to solve real-world problems.

Table 1 Mathematical learning characteristics

Characteristics	content
Highly Abstract	Establish disciplines with Abstraction and Abstract development. Open the specific content of the object, Only quantity relationships and spatial forms are retained.
Rigorous logic	The requirements of mathematics for logic are different from those of other sciences, mathematical operations, mathematical reasoning, mathematical proof, and mathematical theory, and are implemented by strict logic methods.
Widely applicable	As a tool or means, mathematics is widely used in science and technology and social fields; the “mathematicalization” of various sciences is a major trend in the development of modern science.

## 2.2 Increase knowledge reserves

Based on the extensive application characteristics of mathematics, the content of the textbook is not only fixed textbooks, but also combined with daily life materials to expand the knowledge framework of students, so that they can learn more knowledge of mathematics and broaden their knowledge. The Internet has the advantages of wide information channels, fast and convenient transmission. Through the Internet information technology, the teaching resources of mathematics courses can be enriched. Teachers can select appropriate teaching materials for students' learning ability at different stages, which can help students understand and master mathematics content, and their learning effects can be effectively improved. For example, when explaining the mathematical knowledge of “translation”, the teacher first explains the basic theoretical knowledge, that is, “direction and distance, no matter how translation, no change in the size and shape of the graphic, only the position of the change”, Then use information technology to create Flash animations, combining the scenes in daily life, such as the elevator's lifting, the bus from one intersection to another, and so on, so that students can master and understand the graphics translation. The actual meaning. Then, the teacher guides the students to further think about other translational phenomena in daily life and encourages the students to raise their hands to speak. In the form of students actively participating in the answer, enumerate more translation examples. This not only enhances students' knowledge reserves, but also their divergent thinking ability.

## 2.3 Enhance students' ability to innovate

The advent of the “Internet +” era has promoted the organic integration of mathematics curriculum and information technology. The Abstract knowledge content of mathematics has been transformed into visualization and concrete. The difficulty of learning mathematics has been reduced, which helps students to build self-confidence. When teachers carry out teaching activities, students are more willing to participate, and their ability to discover problems, ask questions, and solve problems can also be cultivated [2]. Most of the contemporary students have already started to contact electronic devices and the Internet at an early stage, correctly guide students to use information technology, and combine it with mathematics teaching. Students' intuitive thinking, image thinking and logical thinking can be effective in mathematical experiment activities. Cultivate, in the process, its ability to innovate is thus enhanced. For example, the theorems and axioms in mathematical knowledge are more difficult to understand. If the conclusions are only explained to the students, the derivation process is unclear, and the students cannot use the theorems or axioms flexibly to solve practical problems. However, under the influence of information technology, teachers can present the derivation process in a variety of forms, which is beneficial to help students master mathematics knowledge and understand how to use it.

### 3. Problems in mathematics teaching under the application of information technology

#### 3.1 Improper integration

It is undeniable that the organic integration of information technology and mathematics has greatly benefited the enrichment of teaching resources, and promoted the transformation of mathematics teaching to convenience. However, in the specific integration process, especially in the initial stage of integration, some teachers have to improve their information technology application capabilities, and their teaching concepts have not changed in time. One-sided thinking that information technology is applied to mathematics teaching is to use mathematical knowledge in electronic form. Presented, over-reliant on the Internet. When carrying out teaching activities, I only know how to read the course content and knowledge points to students in a mechanical way, neglecting the classroom communication and communication between teachers and students, making the teaching of informatization mathematics courses unsatisfactory [3]. Some teachers use the Internet channel to select a variety of questions to test the exercises, but because they are not sure, they add more negative learning pressure to the students, but the information technology is not effective, and the students' interest in learning can not be stimulated. It is also possible to induce students to become tired of learning.

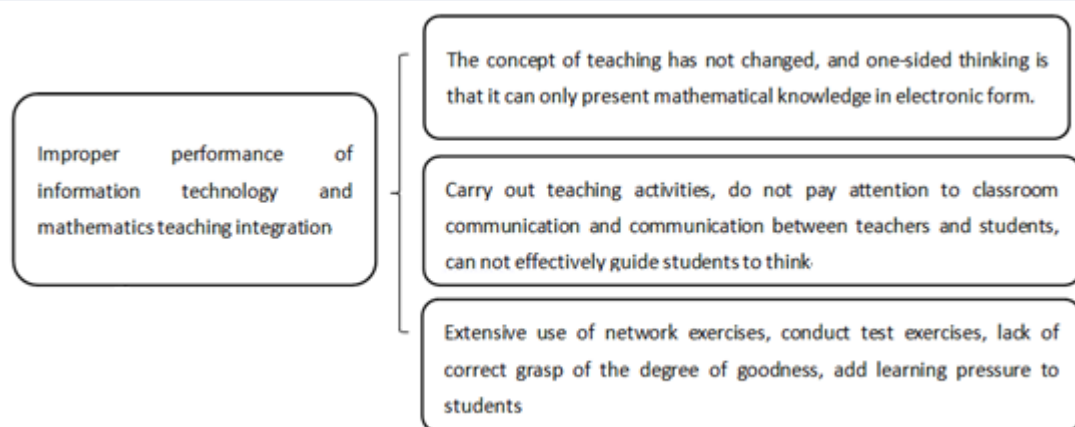


Figure 1 Improper performance of information technology and mathematics teaching integration

#### 3.2 Poor quality of teaching courseware

Information technology is applied to the subject area, which is a more innovative modern teaching method. It can effectively help teachers expand teaching resources, build a three-dimensional and visualized teaching situation, stimulate students' interest in learning, and then guide students to improve learning efficiency, but Many teachers use information technology to make courseware, which is mainly for downloading by Internet channels. Although there are indeed many good quality teaching courseware on the Internet, there are differences in the learning ability and characteristics of students in different classes, and there are various problems in teaching activities. If the courseware downloaded from the Internet is used as a fixed template, ignoring the actual learning situation and needs of the class students will have an adverse effect on the use of the courseware. At the same time, the courseware content downloaded by the Internet is not completely consistent with the actual teaching. Teachers can't flexibly adjust the courseware according to the student's learning progress. In the long run, the teaching quality will not be effectively improved.

#### 3.3 Unclear student subject status

Under the background of new curriculum standards, teachers need to pay full attention to the subjective status of students when carrying out teaching activities. This means that both the teaching content and the teaching method aim at comprehensively cultivating students' comprehensive qualities and abilities. However, although teachers try to integrate information technology with mathematics courses, they ignore the students' status as the main part of teaching

activities. The teaching form is still based on teachers' "infusion", that is, through information technology, more teaching content is introduced. Being able to passively accept course knowledge, unable to correctly understand the key points of knowledge, and not knowing how to use it to solve practical problems, is contrary to the original intention of the integration of information technology and mathematics. In addition, the application of information technology by teachers is simply to transform book knowledge into an electronic form. In the specific teaching process, because the number of teachers' books is reduced, students can not effectively think about knowledge points during the course of lectures, which ultimately leads to a smattering of subject knowledge. . The teacher's teaching focus is only on the informatization of courseware production, as well as the courseware explanation. The interaction between teachers and students is reduced, the student's subjective status is neglected, and the learning efficiency is greatly reduced.

## **4. Information Technology and Mathematics Teaching Innovation**

### **4.1 Strengthening the awareness of informational teaching**

The organic combination of information technology and mathematics curriculum has changed the traditional teaching mode and learning mode to the modern form, which has improved and optimized the teaching conditions of mathematics courses to a certain extent. In the process of teaching the informatization mathematics course, if you want to realize the student self-learning mode, it is not only necessary for the teacher to impart mathematics knowledge to the students, but also to consciously cultivate students to develop good habits of self-learning, and at the same time, know how to actively think during the learning process. Find problems and apply the knowledge points to solve practical problems, build a good teacher-student communication environment, and enable students to effectively cultivate creative thinking skills under the interactive mode. In addition, teachers should also pay attention to the cultivation of students' computer application ability, guide students to learn to use information technology, analyze and solve mathematics problems, and comprehensively cultivate students' comprehensive quality and ability. In this way, it means that modern teachers are no longer solidified and only indoctrinated, and more need to guide students' interest in learning and enhance their learning ability. Therefore, teachers need to update teaching concepts. To enhance the application of information technology and strengthen the awareness of information teaching.

### **4.2 Build Situational Teaching**

Based on the Abstract features of mathematics, students face more difficulties in learning, which brings difficulties to students' mastery of knowledge. Situational teaching can transform Abstract mathematical knowledge into vivid and vivid, which helps students to better understand and master the key points of mathematical knowledge. By using information technology to construct an informational teaching situation, the learning difficulty is greatly reduced, the learning mathematics knowledge becomes more simple and easy to understand, and the learning enthusiasm is effectively mobilized. For example, when a teacher explains a spatial quadrilateral problem, if he only draws a flat graphic on the teaching blackboard, he simply tells the students the key theoretical knowledge. When the students solve such problems after class, they may think that the space quadrilateral has two diagonal lines. In an intersecting state. However, if the teacher uses information technology means, such as the "geometric artboard" function in the computer, constructs the basic three-dimensional graphics, and intuitively displays the rotating shape of the space quadrilateral in the classroom, and adds lines at the same time, the students understand the spatial stereoscopic The definition and characteristics of the graph, through the field observation, the students understand that the two diagonal lines of the space quadrilateral do not intersect this knowledge point. In the process, students can also be guided to learn and understand the concept of a different line, laying the foundation for the subsequent phase of the "cross-face".

### 4.3 Teachers improve information teaching ability

The application of information technology to mathematics teaching does not mean changing classroom knowledge and content from books to electronic forms. The quality of mathematics courseware production has an important impact on students' actual learning effects. The improvement of teachers' informatization teaching ability can effectively improve the effectiveness of the organic integration of information technology and mathematics curriculum. This requires teachers to fully understand the characteristics of the subject and the learning needs of the students, develop a syllabus and teaching plan that suits them, and use information technology to help students develop self-directed learning in advance, and then after the teacher explains the classroom knowledge in the classroom, Strengthen interaction between teachers and students to guide students to master and understand the key points of knowledge. Finally, the teacher provides a practice platform for students through the Internet, and at the same time integrates the more error-prone questions of the students and focuses on them in the classroom. Through the teaching practice, the optimized innovative teaching mode encourages the students' self-learning ability to be cultivated, which helps to improve the teaching effect. In the production of teaching courseware, attention should be paid to the actual needs of the students. The pictures, animations and audio in the courseware are fully matched with the current teaching content. Therefore, teachers should pay attention to preparing lessons and use information technology to make the teaching content rich and vivid.

### 5. Conclusion

The organic integration of mathematics curriculum and information technology can effectively improve the learning effect of mathematics, and help to comprehensively cultivate students' thinking ability and independent innovation ability. In order to promote the course improvement process, more and more schools have applied information technology to the education field, which will help the overall quality of teaching. Teachers should strengthen the awareness of informatization teaching, construct situational teaching, and continuously improve their informatization teaching ability. Information technology will play a greater role in mathematics.

### References

- [1] Du Feifei. Practical Application of Information Technology in College Mathematics Teaching[J]. Journal of Hubei Correspondence University, 2018, 31(09): 134-136.
- [2] Chen Xiaoyan. Innovation of Mathematics Teaching Based on the New Form of “Internet +”[J]. Education Modernization, 2018, 5(26): 307-308+314.
- [3] Wu Yanguang. Research on the Innovation of Junior Middle School Mathematics Teaching Supported by Information Technology [J]. Cheng Caizhi Road, 2017(21): 75.