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Research on the application of the tablet computer in mathematics teaching of senior high school students in China

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Abstract
With the rapid development of Internet technology, mobile learning terminals such as tablet computers are paid more and more attention by education departments. Many schools have applied tablet computers to teaching, especially in mathematics teaching. In order to understand the application status of tablet computers in senior high school mathematics teaching and provide reference for the future application of the tablet computer teaching, this paper adopts the method of conversation survey to interview senior high school students who have received the tablet computer teaching, and obtains the following results: The time in teaching with the tablet computer is short and the tablet computer is mainly used in homework after class; the teaching method of teacher is single; most students dislike to use the tablet computer because it increases the burden of schoolwork. Therefore, this paper gives some suggestions for the teaching with the tablet computer: improve the self-control and innovation ability of learning-oriented students, and guide them to actively use the Internet for learning; pay attention to The professional training of intelligent teachers; improve the hardware and software problems of wireless networks and tablet computers; improve the education network system.

Keywords: tablet computer, high school mathematics, mathematics teaching, education information

Introduction
With the rapid development of modern information technology, the application of the tablet computer in the field of teaching is gradually launched. Many teachers believe that by using tablet computers, students can make efficient use of the time in class and out of class and improve their learning efficiency and the use of tablet computer can create a favorable teaching environment for students, let students use tablet computer to query learning materials, do virtual experiments, etc. However, some people think that the application of the tablet computer has seriously affected the daily teaching, because students often use the opportunity of searching materials to browse the content beyond learning, and teachers are also very troublesome to use. So what do people think of using the tablet computer in teaching? This paper intends to do a research on this problem. The research in this article can provide reference value for the reasonable application of the tablet computers and other modern teaching equipment in teaching in the future.

Research Summary on the Tablet Computer Teaching Advantages of the Tablet Computer in Mathematics Teaching
Rich Teaching Resources
Liu believes that tablet computers can enrich mathematical teaching resources [1]. The system of the tablet computer can provide teachers with a broad database, so that teachers can download appropriate courseware according to the situation. At the same time, for students with different learning levels, teachers can select materials suitable for different learning levels in the system with the tablet computers as the medium according to the situation and push them to students to learn, so as to achieve the purpose of teaching students in accordance with their aptitude.

Jiang mentions that in the school where he teaches, teachers can look up information on the Internet, and the school has also established its own resource system database [2]. Teachers can transfer their recorded teaching videos, courseware, and collated materials to the campus system, which can not only provide reference for other teachers to share resources, but also let students download them themselves, so as to facilitate students to watch and ponder over and over again. Teachers can also work together to greatly improve the efficiency of teaching.

Ruan affirms the advantages of tablet computers in enriching teaching resources. The system of tablet computer can provide teachers with various teaching resources, so that teachers can not only select appropriate teaching materials, but also select different levels of topics and push them to students, and they can also push courseware to students in advance to facilitate students' preview and review [3].

Portable and Easy to Use
Liu mentions that the tablet is easy to carry and is conducive to making full use of the fragmented time for math learning. In addition, tablet computers have powerful storage, reading and writing functions, and can also use the network to transmit rich picture information, video information, text information etc, so as to bring students more information perception and experience [1]. In addition, the function of collecting information on the Internet also expands the students' learning horizons.

Xu and Zou believe that due to the portability of tablet computers, students can use scattered time to study again, consolidate the contents explained by teachers in time, and improve the learning effect, and affirmed the portable and easy-to-use advantages of tablet computer [4].

Fan points out that tablet computers can extend learning time and space [5]. Students with tablet computers can study

at anytime and anywhere, no longer confined to the classroom, and make full use of every moment for efficient learning.

An summarizes the advantages of the tablet computer teaching, As mentioned in the figure, the tablet computer has the following advantages: the tablet computer is portable, students can learn anytime and anywhere; the tablet computer has mobile connectivity, it doesn't need network cables, and it's very convenient to collect data and arrange homework; the tablet computer has simple operation behavior, gets rid of the cumbersome mouse keyboard, and touch screen design of the tablet computer makes the experience better; the use of tablet computers is diverse; the use time of tablet computers is flexible [6].

Intelligent Analysis and Powerful Function

Ruan imagines that the tablet computer can form the system with funtions of automatically sorting out wrong questions and rewards and punishments [3]. In high school mathematics, the set of wrong questions is an important mean to improve grades and promote the mastery of knowledge. Through the system, the usual wrong questions of students are automatically sorted into the set of wrong questions, students can add or subtract wrong questions, review repeatedly, strengthen learning, and gradually internalize in the later period according to their own situation. Setting up a reward and punishment system in the classroom, the computer automatically records the performances of students, and finally students are rewarded for their performance in the whole class in the form of a gold list to improve the enthusiasm of students.

Fan proposes that the tablet computer has the function of intelligently analyzing the learning situation of students, and then systematically recording the learning track of students according to the situation. The system can automatically analyze the completion of each assignment, and classify wrong questions into a special set of wrong questions according to the knowledge structure [5]. In this way, teachers can conduct targeted teaching according to the situation that is reflected by the tablet computer, and spend limited time on important explanations, so as to truly improve the efficiency of classroom and achieve the purpose of reducing burdens.

Li and others show that the tablet computer can effectively integrate and associate resources of teacher teaching and student learning. In addition, through the combination of tablet computers and the auxiliary teaching system, formative evaluation can be realized in time, then the teaching progress can be adjusted and the situation of mastery of knowledge of students in each stage can be recorded, which can improve the efficiency of teachers in the process of preparing lessons and giving lectures. At the same time, it also allows students to achieve hierarchical learning, meets individual differences of students, and let students learn effectively according to their own needs [7]. They also affirm the role of the tablet computer in answering timely and collection and statistics of answers. This function saves the time of teachers to correct and make statistics answers, and also allows teachers to understand the cognitive situation of students according to the result of intelligent statistics analysis of academic data, so as to adjust the teaching progress at any time while realizing personalized teaching.

Liu proposes that the tablet computer has a powerful integration function, which avoids the cumbersome procedures of rearrangement of paper books due to the change of a certain knowledge point, and the update of content is extremely fast [8]. Because of the powerful storage function of the tablet computer, it becomes a portable database, which solves the problem that students' schoolbags is overweight.

Methods of Use of the Tablet Computer in Mathematics Teaching

Stimulate the Interest of Students in Learning and Increase the Interest of Classroom

Xu and Zou propose that the explanation of some knowledge in traditional teaching is very abstract, which leads to the difficulty of concentration of attention of students and the decline of class participation of students. However, the text textbook can be transformed into dynamic textbook by using the tablet computer and the tablet computer can visualize and symbolize the abstract knowledge [4]. When students learn "Three Views" that is the more abstract lesson, the teachers give a three-dimensional diagram and allow students to switch the perspective by themselves, which deepens the impression of students of the view and cultivates hands-on ability of students.

Through the practical research, Fan concludes that the tablet computer can effectively stimulate students' interest in learning. Students are at the age with the highest receptive ability, and they are curious and playful. With the help of this psychological feature, tablet computers are introduced into the classroom, and the interest of the classroom is increased through games or animations, so as to stimulate interest in learning students [5].

Liu agrees that the tablet computer can flexibly combine words, pictures, audio and videos, increase the fun of the classroom, and fully mobilize students' sense organs of vision, hearing, and touch to learn from multiple angles. Secondly, in the process of using mathematics teaching aids, the tablet computer can avoid the limitation of insufficient teaching aids and long experimental period, and let students control by touch screen and watch according to their ideas. In order to strengthen the learning effect at the same time, the goal of making students learn in happiness can be achieved [8].

Through the practice in the classroom, Kuang sums up several ways to increase the interest of the classroom: The first is to push attachments in various formats that are not limited to text; The second is to learn in the way of games, such as 24 o'clock games; The third is to increase classroom interaction, such as discussion and rushing to answer in the form of forums and classroom projections of different students' problem-solving ideas to produce thought collisions, etc [9].

Promote the Interaction between Teachers and Students and Give Timely Feedback

Jiang proposes through teaching experience of three years that students can put forward the problems encountered in their studies through the discussion and exchange area, and teachers or students can reply to them. This promotes the communication and exchanges between teachers and students, and at the same time, enables students to progress

and grow in the discussion [2]. This method mobilizes the students' enthusiasm for learning, making students the master of the classroom and the main body of learning.

Xu and Zou encourage the use of tablet computer function of "timely feedback and self-service". Using tablet computers to answer questions can avoid the situation that students dare not answer or follow others' opinions. And teachers can have a more comprehensive understanding of students' mastery of knowledge based on the statistics of students' answers, and immediately adjust the teaching content or generate learning resources according to the learning situation of the students, such as wrong problem sets, so as to make effective use of class time and facilitate students to review [4].

Liu agrees with the timely feedback function of tablet computers [8]. She propose that real-time communication and interaction can be achieved through the tablet computer, giving feedback while understanding the needs of students, so as to achieve the purpose of teaching students in accordance with their aptitude. Moreover, teachers can selectively answer students' questions or push them to students for research and discussion through the interactive platform, which greatly reflects the idea of students as the main body.

Chen agrees that tablet computers can allow teachers and students to interact with each other and provide timely feedback of information [10]. The teacher can distribute the test questions through the tablet computer, and the students will pass them back after they finish. For objective questions, the system will form a statistical chart by itself so that teachers can understand the situation intuitively. In addition, the tablet computers allows teachers to call and monitor at any time to grasp the learning trends of students, which is convenient for giving targeted teaching suggestions and realizing personalized teaching.

Xia affirms the role of tablet computers [11]. In the preview stage, teachers can monitor the preview situation of students through the tablet computers to avoid students becoming mere formality; In the classroom, teachers and students can interact with each other through the tablet computers to improve the classroom activity, cultivate students' inquiry ability and improve their comprehensive quality; After class, students can consolidate through tablet computers, and huge resources can meet the needs of students at different levels.

Realize Hierarchical Teaching and Guidance

Ruan believes that due to the different level of knowledge mastered by students, hierarchical push homework can be implemented. In this way, the teaching goals can be completed without dividing the excellent class and the ordinary class according to the grades. And the learning ability of all students can be taken into account, and teaching in accordance with their aptitude can be achieved [3].

When analyzing the psychology of students with difficulties in mathematics, Wu believes that the tablet computer has the function of "resource push function, making mathematics teaching activities more in line with students' reality" [12]. Teachers can release preview content in advance on the learning platform with the help of tablet computer to guide students to preview. For the feedback of students, the system can automatically carry out corresponding evaluation for different students, thus encouraging students and improving their enthusiasm and confidence in learning. This not only reduces the burden of teachers' guidance one by one, but also gives different evaluation and guidance to students of different levels.

Jiao propose that the use of tablet computer teaching can provide targeted guidance for students. Through the test or upload homework, the teacher can understand the students' deficiencies, and provide targeted guidance according to the students' answering situation, so as to realize the goal of taking into account the individual problems while solving the common problems, and achieve the purpose of layered teaching and guidance[13].

Investigation Process and Results

This paper mainly adopts the method of interview survey. The contents of the interview mainly include the time and method of daily application of tablet computers, application experience, learning effect, etc.

The interviewees are 30 students from two classes in a high school in Jinan City, Shandong Province. Among them, there are 12 boys and 18 girls. These students are all students who have used tablet computers to learn. The interview is conducted after class. During the interview, the contents of the interview are recorded and then converted into text for statistics and analysis. The results are as follows:

Usage Time of the Tablet Computer

The use of tablet computers does not run through the whole semester. The most frequently used time period in a semester is the mid-term and final exam preparation period. Secondly, the application period of the day is the self-study period in the evening. Most of them spend 10 minutes watching videos to preview the content of the next class and 10-20 minutes to do exercises on the tablet computer.

The Way Teachers Use the Tablet Computer

Teachers often use the resource push function of the tablet computer. Every night there are about 10 minutes of preview videos for students to study, and exercises of varying difficulty are given to detect students' learning. Tablet computers are used almost throughout the semester. The most frequently used way is to push questions through tablet computers, let students write the answers in the book, take photos and send them to teachers. Then teachers sometimes selects the typical mistakes or correct answers and displays them in the classroom through the whiteboard. Teachers push the courseware and materials to each student through tablet computers, which is convenient for the students to have a deep understanding of some knowledge. On the basis of meeting the knowledge needs of most students, the knowledge of high-level students is expanded, and both are taken into account.

The Feeling of Using the Tablet Computer of Students

The extra homework of tablet computers in the evening increases their burden. Students finish online homework in a hurry and can't calm down to watch videos. There are too many written assignments, and students barely finish or even can't finish them. Because there are too many homework, students are impatient, all the homework is not really done well, which leads to the lack of consolidation of

the learned, the lack of mastery of preview, and half the effort.

Opinions and Reasons for the Reservation and Abandon of the Tablet Computer

Most students don't like to use the tablet computer to study for the following reasons: Students also have online homework except for the general homework, which increases their learning burden; there are many restrictions when students use tablet computers. For example, tablet computers often run slowly, and students are unable to access the Internet due to model or function limitations; To prevent students from using tablet computers for entertainment, many families will confiscate tablet computers after class or finishing the homework, so the students have little extracurricular time of using tablets and hardly play an important role in it; Many teachers use tablets to teach with formalism. Once there are no class-evaluation activities for teachers, almost no teachers use it as a learning guidance tool; the teaching videos pushed by the teacher through the tablet computer have problems such as narrow content, shallow knowledge, and lack of problem-solving skills, which prevent students from grasping the key points. Students think the teaching model wastes time and energy, which leads to boredom.

The Situation of Knowledge Understanding in Learning with the Tablet Computer

Although the students have different opinions about the use of the tablet computer, they all agree that watching preview videos carefully helps them learn in class, which can help them purposely search textbooks for answers and look directly at the key contents of textbooks, thereby reducing the time for turning over the text. Besides, knowing the key points of knowledge in advance is also helpful to improve students' listening efficiency, grasp the key points more accurately and help them understand the learning content better. However, some students reflect that the promotion of learning using the tablet computer is not great, the main reasons are that the depth of the video content is not enough, they can only grasp the key points roughly; Although the contents of videos are simple and easy to understand, the problem-solving ideas provided are not much, finally, students still rely on the teacher's explanation in class. In this way, tablets learning wastes tense learning time to a certain extent.

The Situation of Mastery of Knowledge in Learning with the Tablet Computer

All the students hold a negative attitude on whether the use of the tablet computer can promote students' mastery of knowledge. The reason they gave is that they rarely use tablet computers in their daily time, and they still always rely on notes to memorize as the same as traditional learning, so they don't feel the effect of tablet computers on mastering knowledge.

Conclusions

1. Due to the limitation of teachers' ability to accept new technology and open idea, the teacher's use time of tablet computers is very little, the use mode is single, and there is no flexible application in teaching, which makes the teaching get half the results with double the effort.
2. Students don't not feel the charm of teaching with the tablet computer because of the not concise explanations, the inflexible contents, and the fuzzy emphasis of teaching videos.
3. The problem of students' hard learning burden needs to be solved. Due to the heavy learning burden of students, they have to finish online homework while completing the written homework of the same level students. Therefore, students can't finish their homework quietly, they will feel irritable, and even think that teaching with the tablet computer is just another kind of burden and get bored with it.
4. The auxiliary functions of tablet computers are not perfect, the network permission settings are not fine enough, and the school equipment is not complete, so teachers or parents can only help students resist the temptation of online entertainment by limiting the time of using tablets or cutting off the network.
5. Tablet computers indeed can increase students' interest in learning under reasonable utilization, and students can also recognize the charm and problems of tablet computers. Therefore, there is still a lot of room for improvement of teaching with tablet computers.

Suggestions

1. Improve the self-control and innovation ability of learning-oriented students, and guide them to actively use the Internet for learning. The problem will never be completely solved relying on external forces. So teachers also need to help students establish a correct outlook on life and values gradually so that they can use tablet computers properly and improve their ability to resist temptations.
2. Pay attention to the professional training of intelligent teachers. Teaching with tablet computers requires teachers to master higher information technology, so teachers need to improve the application ability of teaching software. Also, students' attention is easily distracted by wide and complicated learning materials, which puts forward higher requirements for teachers' classroom management ability. Teachers need to spend more time preparing lessons and find suitable resources from the Internet with complicated information to enable students to preview before class, study in class, and practice after class, which undoubtedly increases the workload of teachers.
3. Improve the hardware and software problems of wireless networks and tablet computers [2]. According to the contents of the survey, there are many obstacles in the process of learning because the network is not smooth, which interrupt the teaching process, distract students' attention, and reduce learning efficiency. Secondly, most of the existing education and teaching resources are only used in computers, and many teaching course wares cannot be used on tablets. Many teachers simply integrate videos and pictures, which do not play the role of teaching with tablets. Therefore, the development of corresponding teaching resources is also a priority [5].
4. Improve the education network system. Teachers should communicate more with professional technicians for advice and design software that helps

students to query relevant learning information on the Internet, but also does not allow them to browse irrelevant learning contents. Although it is better to demand on others than self-control, we have to say that we cannot guarantee whether children's learning and growth will be affected and go astray before children form good learning habits and strong self-control ability, so we must use external forces to guide their healthy growth of learning.

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