

Research Article

Research on Multimedia Teaching and Teaching Reform Innovation of Accounting Major in Higher Vocational Colleges under the Background of Big Data and Internet of Things

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Under the influence of the rapid development of the production process of computers, chips, semiconductors, and other equipment, computer software technology has also made great progress. Among them, big data and Internet of Things technologies have developed particularly rapidly, and big data and Internet of Things technologies have gradually become mainstream technologies in this era. The Internet of Everything and data prediction in its technical ideas have brought convenience to the technological innovation of various industries. Teaching innovation in colleges and universities has always pursued the integration of the latest technology into the teaching process of colleges and universities, especially higher vocational colleges that attach importance to practical application, among which are accounting majors. Because it is impossible to directly conduct experiments through equipment like engineering, but enterprises connected with higher vocational colleges have greater demand for students with a high level of practice, so the use of multimedia education teaching and teaching reform and innovation has become the focus of higher vocational colleges. On the basis of analyzing the necessity of multimedia teaching of accounting major in higher vocational colleges, this paper conducts a questionnaire survey on teachers and students in 6 higher vocational colleges and analyzes the existing problems of multimedia teaching in accounting major in higher vocational colleges according to the questionnaire data. Finally, aiming at the existing problems, combined with big data and Internet of Things technology, analyze the possible teaching innovation paths that new technology can provide for accounting majors in higher vocational colleges.

1. Introduction

In the context of an increasingly aging population, the state advocates that young people should shorten their education years, join work as soon as possible, and reduce the gap of young talents in various industries [1]. Higher vocational colleges, as experimental fields under the background of policies, have been rapidly delivering professional skills for various industries [2]. Higher vocational colleges are an important base for national talent transfer, and their education and teaching are the focus of the Ministry of Education

[3]. However, accounting majors in higher vocational colleges do not have the teaching equipment of standard university campus classrooms, so there is a problem of low teaching efficiency [4]. As financial management in various industries requires accounting, accounting major in vocational colleges has become a popular major chosen by many students [5]. How to make accounting students in vocational colleges have professional accounting skills after graduation has become a long-term concern of vocational colleges [6].

In the process of the progress of mathematics and computer theory, big data technology has gradually become a

key technology for data processing and result prediction, and researchers in various enterprises have begun to use big data technology to analyze the source of business opportunities and transaction data of their peers, and by taking business opportunities one step ahead of the peers to make key measures to promote the company's business transactions, the personnel of various scientific research institutions use the large amount of research data collected and process them through big data analysis tools to predict the possible future variables. In the past few years, the Internet of Everything was just a concept and fantasy scene in the movie. However, in the past two years, with the rapid breakthrough of sensor technology barriers, the types of IoT devices have increased rapidly, and various types of devices can also be used in different applications [7]. In the industry, most IoT devices can also switch device protocols according to different demand scenarios to adapt to actual application needs [8]. As the production base of science and technology, the campus pays more attention to the theory and practice of big data technology. Most engineering schools have set up big data majors, and the Internet of Things equipment does not only exist in the school's laboratory [9]. It has been applied to various teachings in schools. In addition to daily management equipment, some schools' teaching buildings and dormitories have begun to be equipped with devices such as smart water meters and smart whiteboards [10]. Taking into account the demand for the skills required for the employment of school graduates, higher vocational colleges have set up experimental courses for most students majoring in computer and Internet of Things. Students can understand the professional knowledge by operating experimental equipment [11]. For accounting students, it does not have practical experimental courses, so that students can deeply understand professional theoretical knowledge and can only rely on teachers to teach during class time [12]. Therefore, the learning efficiency of class time is very important for students majoring in memorization. The use of intelligent multimedia teaching equipment combining big data and Internet of Things technology can provide teaching content according to students' individual characteristics [13]. With the combination of virtual reality eye technology, students' concentration can be improved through virtual scenes [14]. To sum up, under the current background of the rapid development of science and technology, multimedia teaching and teaching reform and innovation of accounting major in vocational colleges have become an inevitable trend [15].

With the rapid development of electronic components and data science and technology, IoT technology has gradually entered the lives of citizens. The concept of the Internet of Everything is no longer an empty talk. The Internet of Things is mainly based on devices such as sensors and electronic tags and uses the communication protocol arranged by the International Telecommunication Union to connect different types of objects to achieve intelligent identification, positioning, tracking, monitoring, and management. On the surface, the Internet of Things realizes the communication of all objects, but in fact, it is still inseparable from the electronic products on the

Internet of Things devices. And IoT devices must also have simple computing capabilities. The application of the Internet of Things in the logistics industry can provide key technical support for the promotion of smart logistics. In the future, the Internet of Things technology will further promote the deep integration of communications, transportation, and automobile industries and promote the rapid development of the Internet of Vehicles technology. In the long run, the Internet of Things can have a huge impact on global hardware and devices, and perhaps in the near future, hardware items around the world will be able to be interconnected.

2. In the Era of Big Data and the Internet of Things, the Necessity of Multimedia Teaching for Accounting Majors in Higher Vocational Colleges

Big data and the idea of the Internet of Everything have become popular technologies at the moment. The application of these two technologies has also promoted the development of various industries. Higher vocational colleges are always pursuing the application and practice of new technologies. Among them, there are no laboratories and experiments in Huiji major. Equipment has always been a defect in the training of students in higher vocational colleges [16]. The theory and practice of recording majors in school will have a subtle impact on their later work. The introduction of the latest big data and Internet of Things technology will be of great help to the improvement of the learning effect of students majoring in journalism in higher vocational colleges and can also increase the students' hands-on ability [17].

First of all, big data and Internet of Things technology can be combined with multimedia technology to create a situational teaching scene for accounting students [18]. Compared with the traditional blackboard teaching, accounting students are not limited to listening to lectures and Q&A but can also see more scenes of accounting theory practice from multimedia [19]. Students can perform various operations simultaneously in this mode. Under the simultaneous use of various senses and actions such as seeing, listening, speaking, and writing, students' learning and memory ability will be greatly improved, and their mastery of knowledge will be deeper [20]. Teachers of accounting majors in vocational colleges can also create different scenarios for the teaching needs of each class, constantly mobilize the enthusiasm and participation of students, let accounting students devote themselves to the classroom, and ultimately improve students' learning efficiency. According to the statistics of the Gartner institution, the use of multimedia technology in teaching has many advantages compared with the traditional blackboard teaching. In order to uniformly describe variables of the same type, the value of the traditional blackboard teaching is set to 0.1, and multimedia technology is used in reading, listening, speaking, writing, and the relative efficiency of the direction. The specific advantages are shown in Figure 1.

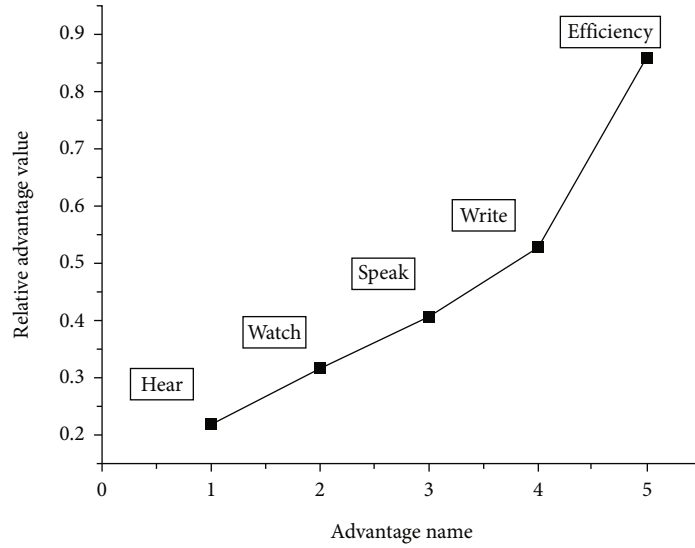


FIGURE 1: The relative advantages of using multimedia technology in various aspects.

TABLE 1: Opportunities that technologists believe multimedia technology can provide.

Corporate employee promotion	School teachers reduce labor intensity	School students improve efficiency
351	620	810

Secondly, multimedia technology combined with new technologies can become more intelligent, mainly reflected in personalized customization and content interaction experience [21]. According to the survey analysis of 1,000 technical workers according to the statistics of the Institute of Technology, multimedia technology can provide more opportunities for enterprises and schools to improve in the new era. The specific situation is shown in Table 1.

In Table 1, 351 represents that 351 of the 1,000 people in the current survey sample believe that the learning of multimedia technology by corporate employees is helpful for promotion.

In the sample of 1,000 people, 620 people believed that multimedia technology could provide work convenience for school teachers, and 810 people in the sample believed that the efficiency of school students could be improved by learning multimedia technology.

Big data technology can make predictions and reasoning based on the learning experience data of accounting students in the past and obtain the best learning route for students, while IoT technology can obtain real-time information on students' physical status and learning status through some personal IoT devices. Combined with big data analysis, the display changes of multimedia teaching content are made according to students' learning effects.

And the multimedia can also be connected to the equipment worn by the students. For example, if the students wear virtual reality eyes, the multimedia can also be used to show the teacher the real-time learning situation of the students, so that the teacher can observe the learning effect of the students. Multimedia teaching can

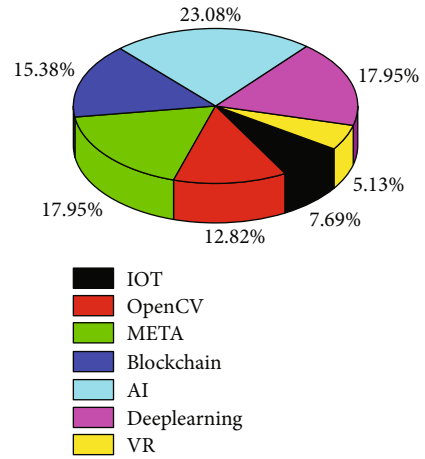


FIGURE 2: The proportion of new technology used.

TABLE 2: Teacher questionnaire collection.

	Graduates	Find challenge	Find passion	Feel worried	Feel complex
Number	11	15	8	19	16
Rate	0.35	0.5	0.26	0.62	0.52

also realize some scenarios that cannot be simulated in reality, such as allowing accounting students to enter the movie plot to experience the role of accounting in the company, stimulate students' interest in learning, and further improve students' social adaptability. In addition to big data and Internet of Things technologies, other era technologies that can be combined with multimedia technology include face recognition, artificial intelligence, deep learning, blockchain, metaverse, and virtual reality technology. Various new technologies that can be combined with multimedia technology are located. The specific display of the proportion of various industries in the current era is shown in Figure 2.

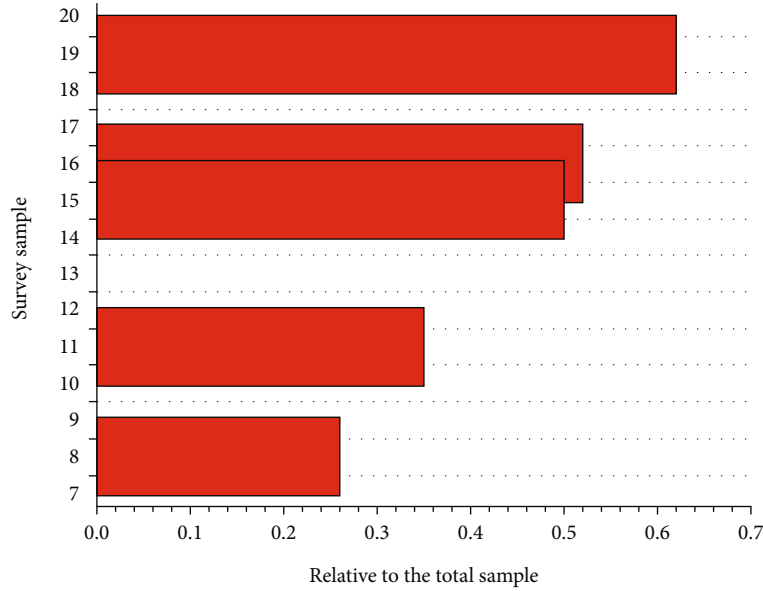


FIGURE 3: Situation of the proportion of the number of people surveyed relative to the total number of 30.

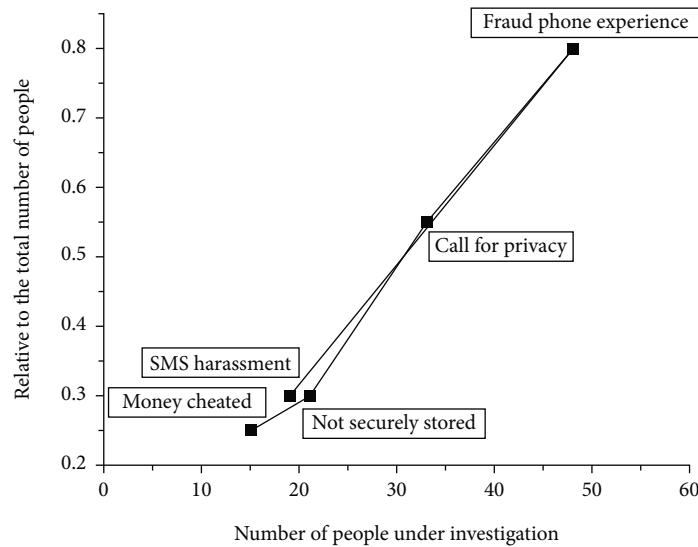


FIGURE 4: Statistics for privacy issues.

Figure 2 describes the use of new technologies. It can be seen intuitively that the current utilization rate of various technologies is relatively balanced. The highest utilization rate is artificial intelligence technology, while the lowest utilization rate is virtual reality technology. The average is metaverse technology.

3. In the Era of Big Data and the Internet of Things, the Problems Existing in Multimedia Technology Teaching

3.1. *The Teacher's Point of View.* Teachers in higher vocational colleges undertake most of the tasks in the teaching process of accounting students. The main problems in the application of multimedia technology to the teaching process of accounting students include three points:

TABLE 3: Collection of questionnaires for 60 teachers and students.

	SMS harassment	Not securely stored	Money cheated	Call for privacy	Fraud phone experience
Number	19	21	15	33	48
Rate	0.32	0.35	0.25	0.55	0.8

first, the use of multimedia technology in teaching must be used. In addition to teaching tasks, teachers in higher vocational colleges also have scientific research tasks. Doing courseware and lecturing on computers all day may affect teachers' enthusiasm for scientific research. Second, although the recruitment standards of teachers in higher vocational colleges have been improved, the recruitment standards for teachers in most vocational

TABLE 4: Average efficiency of students in higher vocational colleges under traditional teaching.

	First month	Second month	Third month	Fourth month	Fifth month
Learning efficiency	0.61	0.72	0.92	0.33	0.53

TABLE 5: Average learning efficiency of accounting students in higher vocational colleges under the condition of intelligent multimedia teaching.

	First month	Second month	Third month	Fourth month	Fifth month
Learning efficiency	0.33	0.45	0.62	0.75	0.93

colleges are still postgraduates. Without professional operation skills, a lot of knowledge and content in the accounting profession can only be acquired in practice. Therefore, most of the multimedia courseware made by accounting teachers is not professional enough, the courseware display effect is not good, and the corresponding teaching effect is relatively general. Students' concentration on courseware is not high, which eventually leads to poor learning efficiency of students. Third, there are many knowledge points for data analysis and comparison in the courses of the accounting major, which will be more complicated in the process of making the PPT corresponding to the teacher. The time for making a PPT for a certain chapter of some courses is often five times the teaching time of the whole chapter. In this case, teachers have to spend more time to produce some formal content, which affects the teachers' grasp of the actual content explanation and ultimately affects the students' learning of accounting professional knowledge. A questionnaire survey was conducted on 30 teachers in 6 higher vocational colleges, and the questionnaire collection is shown in Table 2.

Observation found that 16 teachers thought the production of courseware was too complicated, 11 teachers were fresh graduates, 15 teachers thought it was challenging to produce courseware and complete scientific research tasks at the same time, 8 teachers still felt full of passion, and 19 teachers were worried about students' learning situation; the proportion of the number of each survey relative to the total number of 30 is shown in Figure 3.

3.2. The Student's Perspective. Students are the main body of training in higher vocational colleges, and they are passively accepted in multimedia teaching. Using multimedia for teaching, students mainly have the following problems: first, most students do not take notes. In middle school, many students developed the habit that good memory is not as good as bad writing, but many students changed their original intention in higher vocational schools. After having multimedia teaching equipment, they all asked teachers to copy PPT after class. In this kind of learning in fact, the method will

cause students to not have a deep memory. Only when they listen to the class and take down the course notes can they be considered effective learning. Second, some higher vocational colleges are private colleges and do not have government financial support, so the hardware conditions of multimedia teaching equipment are poor and cannot meet the learning needs of students; third, the environmental impact of listening to lectures. During the process of listening to multimedia audio playback, students may not be able to focus on understanding the content of knowledge, and some students with poor self-control may appear distracted, which is also a negative impact.

3.3. In Terms of Privacy Information Protection. Due to the background of the current era, big data technology may collect a large amount of personal data, and devices such as headphones, watches, and glasses that are worn close to the human body in the Internet of Things devices will also have a large amount of privacy data collection problems. If the data storage side does not store the relevant information securely, there will be leakage problems. Since the learning ability information and personal information of the students during the school period are included, if the information is obtained by criminals, it will have a bad impact. Seriously, in some cases, this data can be used by criminals for fraud and other criminal activities. A questionnaire survey was conducted on 30 teachers and 30 students in 6 vocational colleges and found that 19 teachers responded to the questionnaire that the student information collected in class was not stored in a secure environment, and 21 students claimed to have been texted harassment, 15 students and teachers were defrauded of money, 33 students called for privacy protection, and more than 48 surveyed samples claimed to have received fraudulent calls that could report their accurate information. The corresponding statistics are shown in Figure 4.

From Figure 4, it can be seen that nearly 50 people claimed to have encountered telephone fraud, which shows that the privacy leakage in the current big data era is quite serious. The collection of specific questionnaire statistics for 60 teachers and students of accounting majors in many vocational colleges is shown in Table 3.

From Table 3, it can be seen that more than 80% of teachers and students have experienced telephone fraud, and the frequency of other types of privacy leakage is not lower than 25% of the surveyed samples. This situation shows that the current privacy leakage in the context of big data is still relatively high and severe.

4. In the Context of Big Data and the Internet of Things, the Implementation Method of Multimedia Teaching for Accounting Majors

4.1. Teacher Method Innovation. Under the background of big data and the Internet of Things, accounting students will no longer worry about the problems of curriculum

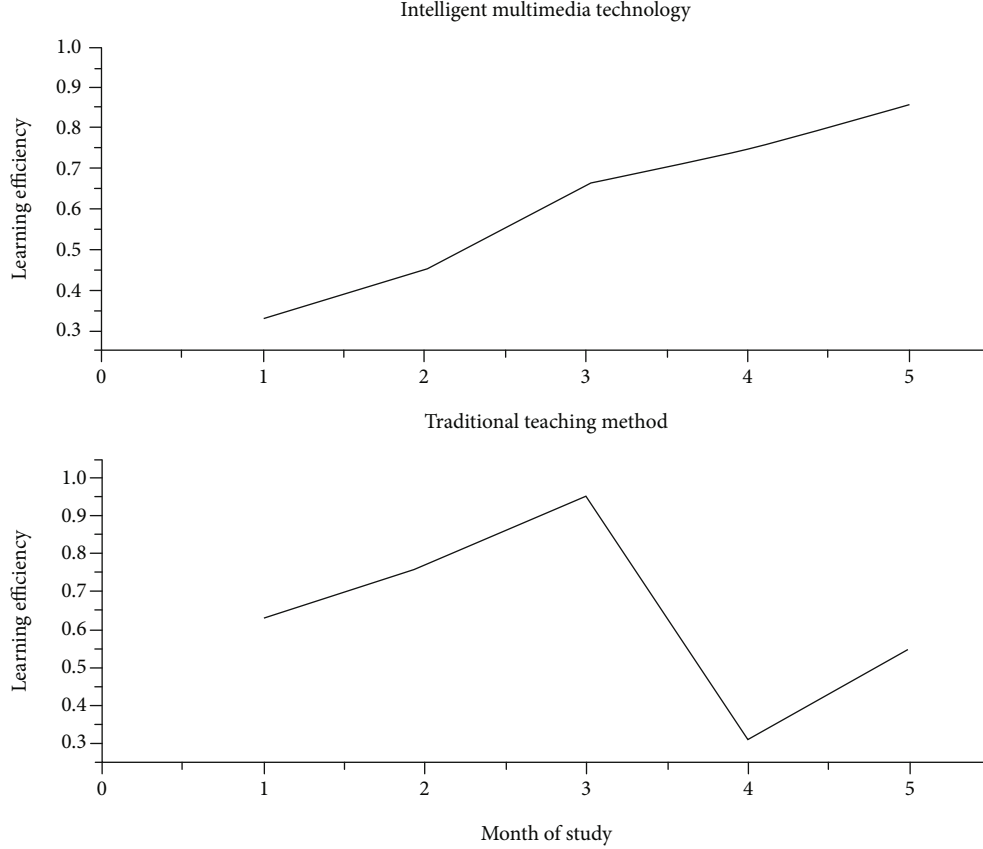


FIGURE 5: Comparison of student learning efficiency improvement under new multimedia technology.

practice, and at the same time, teachers' methods must be innovated. They cannot be limited to the previous teaching mode of pure black and white chalk lectures. Teachers can continue to pay attention to them and use new technologies to provide teaching support for students. For example, teachers can try to combine multimedia technology with corresponding technologies after researching technologies such as face recognition and big data to realize real-time multimedia recognition of students' faces and make historical data. Analyze and predict the best learning route for students, so as to guide teachers to make changes and ultimately improve students' learning effect. The teacher's teaching is set as r , and the multimedia teaching assistance is set as r_n . The specific implementation method is shown in the following formula:

$$d(r, r_n) = \sqrt{\sum_{k=1}^n (r - r_n)^2}. \quad (1)$$

4.2. Combined with the Actual Course Teaching of Accounting Students. Students may take note-taking, distracted and dissatisfied with the hardware conditions, which can be solved by the actual courses of accounting students under the condition of the advancement of multimedia technology. For example, some accounting courses attach importance to practice, which can be com-

bined with the Internet of Things and VR technology. Direct practice in the classroom allows students to reduce the need for taking notes. This method can improve students' skills, reduce the burden on students, and improve students' concentration in class. The problem of hardware conditions can also be solved for the course. For some less complex courses, simple multimedia equipment can be used, and some more difficult courses can use new multimedia equipment combined with big data and Internet of Things technology for targeted teaching and ultimately improve the learning effect of students. Set the student's note-taking problem to A_i , the distraction problem in class to M_i , dissatisfaction with hardware conditions to A , and the new technology to M ; it can be concluded that the learning effect of accounting students is improved as follows:

$$r = \frac{\sum_{i=1}^n (A_i - \bar{A})(M_i - \bar{M})}{\sqrt{\sum_{i=1}^n (A_i - \bar{A})^2} \sqrt{\sum_{i=1}^n (M_i - \bar{M})^2}}. \quad (2)$$

4.3. Using Traditional Methods and New Technologies at the Same Time. Students majoring in accounting in higher vocational colleges need to combine new multimedia technology to learn, and at the same time, they cannot abandon traditional teaching methods. Speaking and speaking are also a reflection of the teacher's value. If the entire course is taught

using multimedia technology, the teacher may lose teaching. It gives a sense of achievement; even if this process reduces the burden on teachers but completely abandons traditional teaching methods, there may be a lot of unemployment in the teaching profession. The use of traditional methods such as blackboard can also increase the learning efficiency of students. The specific efficiency increase follows a normal distribution. Let the efficiency be x , and the specific calculation method is as follows:

$$f(x) = \frac{1}{\sqrt{2\pi}\sigma} e^{-(x-\mu)^2/2\sigma^2},$$

$$F(x) = \int_{-\infty}^{\infty} f(x) dx = \int_{-\infty}^{\infty} \frac{1}{\sqrt{2\pi}\sigma} e^{-(x-\mu)^2/2\sigma^2} dx. \quad (3)$$

Under the traditional multimedia teaching method without new technology, taking 1 as the peak value of learning efficiency, the average statistics of the learning efficiency of several surveyed accounting students in higher vocational colleges are shown in Table 4.

However, after combining the teaching method of intelligent multimedia technology, assume that the learning efficiency of accounting students in higher vocational colleges ranges from [0,1]; the average learning efficiency of several same samples was selected to record and count the monthly changes, as shown in Table 5.

It can be seen from Table 5 that under the intelligent multimedia teaching, the learning efficiency of accounting students has improved month by month. Finally, after the new technology improves the use of multimedia, assume that the learning efficiency of accounting students in higher vocational colleges ranges from [0,1]; the students' learning efficiency is tested and recorded on a monthly basis. The specific situation is shown in Figure 5.

4.4. Increase Privacy Protection Measures. In order to prevent the leakage of private information of accounting students in the process of using big data and Internet of Things technology, it is necessary to increase privacy protection measures from the perspectives of teachers and students. From the teacher's point of view, the teacher needs to save the student information collected during or after class on the computer in an encrypted form. The safest method is to have a class network disk, and the student information is encrypted and stored in the network disk. In addition, from the perspective of students, students need to enhance their awareness of self-protection. They need to understand the characteristics of the various personal IoT devices they wear, pay attention to protecting their own key privacy information, and not leak data to other nonteacher personnel and the process of practice to protect the security of their own private data.

5. Conclusion

With the advancement of information technology and the Internet of Everything technology, big data technology and Internet of Things technology have gradually penetrated

into the lives of ordinary people. Among them, higher vocational colleges always give priority to promoting new technologies into classroom teaching, and accounting major is a higher vocational college. The school's popular major and the diversity of its classroom teaching have become the key direction of higher vocational curriculum reform. Multimedia teaching can change the display content according to the different teaching contents. It is widely used in the teaching process of accounting majors that cannot carry out experiments and is widely used in big data. Before the popularization of the Internet of Things technology, the multimedia teaching of accounting majors in higher vocational colleges used projectors, computers, and screens to complete the display of teaching content. Today, with the gradual popularization of big data and Internet of Things technologies, the multimedia teaching methods of accounting majors in higher vocational colleges can be used. Combining more new equipment to innovate, such as that equipped with the latest intelligent multimedia teaching equipment and virtual reality equipment, Huiji students can enter the experimental scene through VR glasses, observe the process of the experiment, and immensely learn the Huiji major Theoretical knowledge and, in addition, by configuring big data analysis software on intelligent multimedia teaching equipment, through face recognition hardware facilities, real-time recognition of students' learning status in class, rapid and comprehensive analysis of students' learning effects, and combined with history course teaching experience, display teaching content according to the interests of most students, or more directly use VR equipment and big data technology to provide one-on-one learning content to accounting students. On the whole, higher vocational colleges also need to pay more attention to the development of science and technology in the era and use new technologies to improve the learning efficiency of students in various majors in a timely manner, so as to ensure the supply of more qualified accounting talents for the society.

On the basis of analyzing the necessity of multimedia teaching of accounting major in higher vocational colleges, this paper conducts a questionnaire survey on teachers and students in 6 higher vocational colleges and analyzes the current problems existing in multimedia teaching of accounting major in higher vocational colleges according to the questionnaire data. Finally, in view of the existing problems, combined with big data and Internet of Things technology, analyze the possible teaching innovation paths that new technology can provide for accounting majors in higher vocational colleges.

Data Availability

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Conflicts of Interest

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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