

Discussion on the Teaching Mode of University Physics Experiment from the Perspective of “Internet +”

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Abstract: With the rapid development of information technology, the concept of “Internet +” has gone deep into all walks of life, including the field of education. Especially in university physics experiment teaching, the introduction of “Internet +” not only changes the traditional teaching mode but also brings a lot of far-reaching significance. This paper will discuss in detail the significance of “Internet +” in college physics experiment teaching from the aspects of improving teaching efficiency, promoting personalized learning, enhancing students’ self-learning ability, improving teaching resource sharing and promoting teaching reform. Then, through the use of innovative teaching methods, updating teaching tools and other strategies, Internet technology will be fully integrated into the teaching of college physics experiments. The aim is to improve the teaching quality of college physics experiments, innovate teaching methods, provide students with high-quality teaching services, and cultivate high-quality physics experiment talents for society.

Keywords: “Internet +”; University physics experiment teaching; Teaching reform

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1. Introduction

College physics experiment is an important basic experimental subject. It involves a wide range of majors and students and covers a wide range of knowledge. It can effectively cultivate students’ scientific experiment ability, cultivate students’ innovative thinking and improve their ability to solve problems ^[1]. However, traditional physics experiment teaching has some problems, such as a single teaching method, insufficient utilization of teaching resources and backward evaluation mode ^[2]. In addition, with the changes in the era, students’ learning needs have also changed a lot and the reform of college physics experiment teaching has become imperative. Colleges and professional teachers should follow the pace of the era, deeply understand the current emerging “Internet +” teaching concept, integrate Internet technology into the teaching reform and inject new vitality into the university physics experiment teaching.

2. The significance of “Internet +” in college physics experiment teaching

2.1. Improve teaching efficiency and promote teaching reform

First of all, “Internet +” has greatly improved the efficiency of physics experiment teaching in universities. Traditional physics experiment teaching is often limited by time and space, experimental equipment and laboratory resources are limited, and students need to queue up for experimental operation, resulting in a tight arrangement of experimental courses. However, through Internet technology, the emergence of virtual laboratories enables students to carry out experimental operations anytime and anywhere, which not only saves a lot of time but also avoids the waste of laboratory resources^[3]. At the same time, teachers can monitor students’ experiment progress and operation in real time through the network platform, find and correct students’ problems in the experiment on the spot and improve the teaching effect. “Internet +” provides new ideas and methods for the reform of physics experiment teaching. The traditional experimental teaching mode often has some problems, such as outdated teaching content and a single teaching method, which makes it difficult to meet the development needs of modern education. Through Internet technology, physics experiment teaching can introduce more modern teaching means and methods, such as virtual reality (VR), augmented reality (AR), etc., to enhance the interactive and interesting experiment, and improve students’ learning interest and participation.

2.2. Enhance the sharing of teaching resources and improve the level of teaching management

“Internet +” promotes the sharing and exchange of teaching resources. Traditional experimental teaching resources are often limited to a school or a laboratory, but the Internet platform breaks this limitation and realizes the cross-regional and cross-school sharing of teaching resources. Teachers can upload their teaching experience and experimental resources to the network platform and share them with other teachers, promoting the exchange and complementarity of teaching experience^[4]. At the same time, students can also access excellent experimental resources from other schools or research institutions through the Internet to broaden their horizons and improve their learning results. Moreover, open courses and MOOCs (Massive Open Online Courses) on the Internet platform provide students with more learning options and resources and enrich the content of physics experiment teaching. Through the Internet platform, students can participate in international experimental teaching and scientific research activities, broaden their international vision, and improve their scientific research ability and comprehensive quality^[5]. “Internet +” is also of great significance in improving the level of physics experiment teaching and management. Through the Internet platform, teaching managers can monitor and manage the whole process of experimental teaching, including laboratory appointments, experimental operation records, and student performance evaluations. This not only improves management efficiency but also ensures standardization and scientific experimental teaching.

3. Discussion on the teaching mode of university physics experiment from the perspective of “Internet +”

3.1. Strengthen teacher training and improve teachers’ information literacy

The integration of Internet technology into university physics experiment teaching poses new challenges to teachers’ teaching. Some college physics teachers are used to traditional methods and cannot adapt to college physics experiment teaching in the Internet environment. Therefore, colleges and universities should strengthen teachers’ information technology training, improve teachers’ information literacy, and further improve teachers’

ability to use Internet platforms for teaching.

First of all, college physics teachers should change their teaching concept and adopt a positive attitude to meet the teaching reform under the “Internet +” vision ^[6]. Teachers should set up the concept of lifelong learning, constantly absorb new knowledge, understand the new teaching concepts and teaching methods in the educational field in real-time, actively try to adopt the attitude of advancing with the era, and constantly improve their teaching level.

Secondly, colleges and universities should strengthen teachers’ information technology training and provide training platforms and communication channels for teachers. Colleges and universities can invite their IT teachers, or invite Internet experts to campus to give lectures and other forms of training for teachers. In the selection of training programs, it is necessary to fully combine the teaching characteristics of college physics experiment courses, and teach teachers the use of online teaching platform technology, database technology, Java technology, etc., so that teachers can have a deep understanding of the application principle of relevant technology, and effectively improve their information technology operation ability ^[7]. At the same time, colleges and universities should strengthen the construction of campus information facilities, introduce virtual reality technology and equipment, improve the coverage rate of campus wireless networks, etc., to provide environmental protection for the development of college physics experiment teaching towards information technology ^[8].

Finally, to encourage teachers to further improve their information literacy, colleges and universities can improve the teaching evaluation system, and set up an incentive system to link performance and professional title evaluation with teachers’ information teaching ability, to mobilize teachers’ enthusiasm to improve their information technology level.

3.2. Innovate teaching tools and explore the application of virtual reality technology

In the teaching reform under the “Internet +” vision, colleges and universities can try to use virtual reality technology, big data technology, cloud computing and other high-tech technologies that have developed rapidly in recent years into teaching, and make full use of modern tools to assist teaching. College physics experiment is a highly practical public basic course, which emphasizes the requirements of cultivating students’ practical ability and solving practical problems. However, due to the lack of space, limited class hours and insufficient equipment in colleges and universities, it is difficult to ensure the quantity and quality of students’ experiments. Therefore, under the vision of “Internet +,” colleges and universities can introduce virtual reality technology innovatively to create simulation virtual classrooms. Virtual reality technology is a brand-new practical technology with rapid development in the 20th century. It can use computer technology to provide students with a virtual three-dimensional space with visual, auditory and tactile sensations parallel, simulate the real physical experiment environment for students, and allow students to interact with the virtual world naturally through some hardware equipment ^[9]. College physics experiment teaching with the support of virtual reality technology can greatly improve the safety of experimental teaching, allow students to conduct experiments in a safe environment, reduce their concerns about experimental safety and consumable costs, provide students with free play space for innovative experiments, and improve their innovative thinking and creativity in continuous exploration and experiment. Mobilize students’ subjective initiative and stimulate students’ interest in learning.

In addition, some physical experiments that cannot be carried out due to site limitations can also be taught through virtual reality technology, breaking the boundaries of time and space, allowing students to watch the experiment process at close range in an immersive environment, and even conduct experiments in the virtual

world by themselves. Virtual reality technology provides students with novel learning experiences. It can also stimulate students' enthusiasm for university physics experiments, and greatly enhance the learning effect ^[10]. However, the introduction of virtual reality technology into university physics experiment teaching still has certain limitations. On the one hand, the price of virtual reality technology related equipment is high, and colleges and universities do not have enough financial support to purchase a large number of equipment to meet the teaching needs of students in related majors. On the other hand, the related teaching equipment and teaching methods are still immature, and still in the exploration stage and there are certain difficulties in teaching application ^[11].

3.3. Enrich the teaching content and integrate the network to enrich the teaching resources

Network resources have the characteristics of openness, timeliness, and sharing. Teachers can make full use of online teaching resources to enrich teaching content and expand teaching content for students when carrying out college physics experiment teaching. This also requires teachers to improve their information search skills and information integration ability, according to the teaching content, and accurate and efficient search for relevant materials, add to the teaching content. Take the experimental teaching of "measuring the density of irregular solids by static balancing method" as an example, in the teaching process, teachers can search for relevant cases in daily life and introduce them, so that students can have a basic understanding of this experiment.

Secondly, teachers can collect videos related to the static weighing method to expand it, so that students can understand the composition of the experiment from various aspects. Finally, during experimental teaching, teachers can train students to use physical scales and master detection methods and other skills according to the teaching plan and teaching objectives. When experimental teaching is not possible due to the limitations of experimental equipment, venue and teaching time, teachers can show students network experiment videos to supplement ^[12].

3.4. Innovate teaching methods and adopt mixed online and offline teaching methods

Under the influence of the concept of "Internet +," teachers can adopt a hybrid teaching method, combining online platform teaching with offline classroom teaching, providing students with novel learning experiences, dual parallel lines, and improving teaching efficiency. When teachers conduct mixed online and offline teaching, they can combine the "flipped classroom" to teach. First of all, teachers can use course recording software to record courses and upload them to online learning platforms such as MOOCs, micro-classes and cloud classes, so that students can use offline time to preview lessons. During the online preview, students can watch relevant videos repeatedly, according to their actual learning situation and weaknesses in their knowledge, and preview according to their learning pace regardless of the overall classroom teaching environment, to improve the learning level of a college physics experiment ^[13]. If you have any questions, you do not understand in the course of watching, you can ask the teacher in the comment section, bullet screen, private message and other modules. This also requires teachers to pay attention to students' learning on the online platform at any time, answer students' questions in time, or collect questions and provide unified guidance in offline teaching. Starting from students' specific problems and based on students' specific learning needs, it can effectively improve teaching efficiency and teaching effect, enhance teacher-student interaction, and narrow the distance between teachers and students to build a good teacher-student relationship ^[14].

4. Conclusion

To sum up, “Internet +” is of great significance in college physics experiment teaching, which can not only improve teaching efficiency, promote personalized learning, and enhance students’ autonomous learning ability, but also promote the sharing and exchange of teaching resources and promote teaching reform^[15]. All colleges and universities should follow the development trend of the era, actively meet the challenges brought by “Internet +” to the reform of university physics experiment teaching, strengthen teacher training, improve teachers’ information literacy and enhance teachers’ information teaching ability. It is also necessary to introduce new technology and new equipment to provide equipment support for teaching reform. Teachers should establish a sense of lifelong learning, constantly learn new knowledge and skills and provide students with high-quality teaching services. Teachers should enhance the application ability of information technology, master the search skills of teaching resources in the network platform, improve the ability of information integration, and provide students with rich teaching resources. Besides, it is important to constantly learn new teaching concepts and teaching methods, meet the wave of Internet integration into teaching reform, adopt online and offline mixed teaching methods, and improve teaching quality and teaching effect. With the continuous development and application of Internet technology, it is believed that “Internet +” will play a more important role in future physics experiment teaching and promote the development and progress of education.

Disclosure statement

The author declares no conflict of interest.

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