Research of ‘Internet plus PAD Class’ in the University Physics Experiment

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Abstract. In this paper, based on the necessity of the reformation of university physics experiments, it is adopted as a method to reform the teaching mode assisted ‘Internet plus PAD class’ into university physics experiment. According to the teaching practice, the quality of university physics experiment teaching may be improved by ‘Internet plus PAD class’.

Introduction

Nowadays, the university physics experiment course in application-oriented university not only helps students to combine the knowledge they have learned with the practice of operation, and further deepen their understanding of the knowledge they have learned, but also makes students gradually develop their practical ability, exploratory ability, creative ability and innovative consciousness in the process of experiment. However, the teaching mode of physical experiments in many universities is an old model and a single content. Firstly, the teachers explain the theoretical knowledge of the experiment, experimental equipment, the operation of the experimental steps, and so on. After explaining all the preparations for the physical experiment, the experimental instruments are distributed, and then the students are allowed to conduct independent experiments in groups, and finally fill in the experimental report. In this stylized experiment teaching, teachers' explanations occupy more classroom time, leaving less time for students to practice independently. In addition, even in the limited time of autonomous operation, students often repeat the experiment according to the steps explained by teachers, and students' creative ability cannot be exercised. Although the traditional teaching mode is very helpful for students to master physics knowledge systematically, it is rigid and does not make full use of the Internet technology which is easy for students to accept. To some extent, it inhibits students' enthusiasm and initiative, and is not conducive to cultivating students' innovative ability and thinking ability of interdisciplinary and new era [1-2].

Teachers devote themselves to the exploration of curriculum design and teaching mode, and have made many achievements [3]. For example, PAD class is a new classroom teaching mode proposed by Professor Xuexin Zhang of Fudan University. The teaching process includes teaching, internalization, absorption and discussion. It emphasizes teaching, independent learning, student-student interaction and teacher-student interaction. It pays more attention to the differences of their learning needs, then arouses and fosters students' interest in learning, which helps to develop students' innovative thinking, learning ability and cooperative spirit.

On the other hand, with the rapid development of science and technology, internet has been deeply rooted in the hearts of the people. Physical experiments should also be innovative, combined with the development of new knowledge and new technologies and internet. Many universities do not integrate physics experiment teaching process with internet. We thoroughly studied how to promote the further development of university students' physics experiment course, and put forward the teaching mode of ‘Internet plus PAD class’, then designed the basic teaching process. The interest and autonomy of ‘Internet plus PAD class’ helps stimulate students' interest and motivation in learning new engineering experiment courses, expand their thinking and improve their practical ability[4-5].
It is of great significance to study the model of ‘Internet plus PAD class’. This paper is structured as follows: starting from construction of the teaching model in section 2, the ‘Internet plus PAD class’ is introduced. The advantages are analyzed in section 3. A brief conclusion is given in section 4.

The Model of ‘Internet Plus PAD Class’

The information technology has penetrated into all aspects of society, and the combination of internet technology and education has become a new form of education. Based on the ‘online and offline' mixed teaching mode, university physics experiment course can be designed as ‘Internet plus PAD class’ teaching mode, which is shown as Figure 1.

The construction of the ‘Internet plus PAD class’ teaching mode is mainly expounded from three stages. The first stage is mainly the preparatory stage before face-to-face teaching, in which teachers and students cooperate to complete some preparatory work. Teachers send the teaching tasks and objectives of the next lesson to the network platform in advance. At the same time, they arrange some related questions. Through reading objectives, tasks and questions, students preview the relevant knowledge of the new curriculum in advance, answer the thinking questions and submit the answers through the network platform by using network teaching platform. Teachers can check the students' answers to understand their preview and theoretical knowledge. The second stage is mainly the face-to-face teaching stage between teachers and students. This stage is the core stage of classes, which mainly includes two links: teachers' teaching and students' discussion. There is a certain time interval between the lecture and the discussion. In the experiment teaching process, teachers need to design teaching in advance according to the information feedback submitted by

Figure 1. The teaching model of ‘Internet plus PAD Class’.

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students on the network platform and the students' preview situation. During the interval between
the lecture and discussion, students are divided into groups to absorb the key and difficult points of
the lecture and prepare for the next discussion in advance. In the discussion link, students are the
main body, and the contents of the last lecture link are discussed and the experiments are completed.
If the required experiments have been finished, they can select other experiments to carry out
according to their needs. At the same time, teachers guide students to do the innovative experiments.
The third stage is mainly the summary and extension of the second stage. At this stage, students
rethink and extend the content of discussion after experimenting, use the internet platform and
related teaching resources, broaden knowledge, complete reports and submit them. Teachers correct
students' reports, and the problems are fed back to the students again, and teachers send out the
teaching objectives, teaching tasks and questions for the next experiment class again.

The Advantages of ‘Internet Plus PAD Class’

In university physics experiment classroom teaching, there are the following advantages in the
teaching mode of ‘Internet plus PAD class’.

(1) The teaching mode of ‘Internet plus PAD class’ is based on students, which helps to cultivate
their autonomous, cooperative and innovative entrepreneurial thinking and ability.

(2) Teachers are more likely to implement individualized teaching and teach students in
accordance with their aptitude with the teaching mode of ‘Internet plus PAD class’.

(3) The ‘Internet plus PAD class’ teaching mode can timely feedback the teaching effect and test
students' learning effect.

Conclusion

In summary, the ‘Internet plus PAD class’ teaching mode fully integrates the advantages of ‘Internet
plus’ and the ‘PAD class’ teaching mode, manifests the diversification and facilitation of learning
channels, and optimizes the drawbacks of traditional teaching mode that teachers are in the
dominant position. The application results show that this teaching model can widen the teaching
time and space, enhance the interaction between teachers and students, especially the interaction
between students and students, and enhance the quality of experiment class. It is a useful
supplement to university physics experiment. It provides a new method for integrating experimental
teaching resources, improving experimental teaching quality, even deepening experimental teaching
reform and cultivating high-level innovative talents.

The research results in this paper are helpful to the application and popularization of ‘Internet
plus PAD class’ teaching mode in new engineering experimental classroom teaching, and provide a
new method for solving the current predicament of new engineering teaching reformation, and
promote the reform and development of education.

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