Application of Information-based Education Technology to Physics Teaching in the Internet Era

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Abstract. In the big picture of educational informatization, more and more information tools have been applied to physics teaching in a certain university. Information technology has not only improved teaching quality and efficiency effectively but also placed higher requirements on teachers and students. In this paper, the impact of information-based education technology on physics teaching in the university is explored from three aspects of cloud computing, smartphone, and smart classroom in the Internet era. At the same time, the development direction of physics teaching reform and innovation is discussed to change the existing physics teaching model in the university and improve the physics teaching quality through the information-based education technology in the Internet era.

Keywords: University Physics, Cloud Computing, Smartphone, Information-based Education Technology

1. Introduction

With the continuous reform of the education system and the content of the college entrance examination, the traditional university physics teaching model has been stretched to the limit[1-2], so it is imperative to reform it. The focus of physics is that students can only train logical thinking ability and abstract thinking capacity with more hands-on operation [3-4]. How to improve the above-mentioned ability of students has also become a hot spot for teachers' teaching and research. The rapid development of modern information technology in the Internet era has provided a new solution to this problem and a new means to the reform and innovation of physics teaching in the university [5-6].

2. Significance of Applying Information-based Education Technology to Physics Teaching in the university in the Internet Era

The modern physics teaching model in the university is significantly different from traditional physics teaching. It mainly takes abstract physical models as the research object. These physical models are developed from the specific practice in daily life and production. However, compared with the specific practice content, they have more abstract and richer connotation. Hence, the primary purpose of physics teaching in the university is to strengthen the logical thinking ability of students and teach them how to establish a physical model. However, as the construction of the physical model is too abstract, it is difficult to show it in the traditional teaching experiment method, so there is often a situation where “it is tough for teachers to teach and for students to learn”. Even if students can understand the content of the teacher's classroom teaching, they often lack the ability to combine theory with practice, and can't answer the homework assigned by the teacher.

After the information-based education technology in the Internet era is applied to physics teaching in the university, the above problems can be significantly improved. Firstly, information-based education technology in the Internet era is highly abstract technology. In physics classroom teaching, with the help of information-based education technology in the Internet era, the abstract concept of physics can be easily...
transformed into a physical model. In this way, a physical model can be established for the students.
Secondly, information-based education technology in the Internet era is rapid development and different
subject. The application of information-based education technology in the Internet era to establish a physical
model is very conducive to encouraging creativity and cultivating the abstract and logical cognition of
students. Finally, the application of information-based education technology in the Internet era makes the
process of the physical experiment more precise. The free-falling experiment is taken as an example. As time
is concise, it is difficult for students to understand it in practical operation, but if it is filmed into a video and
played slowly, it can achieve an excellent educational effect.

3. Information education technology in the Internet Era
Information-based education technology in the Internet era generally includes two parts. One is the structure
of information-based education technology in the Internet era, which is DAG. Each node in the figure
represents the corresponding variable, and the connection between nodes represents the conditional
independence of information-based education technology in the Internet era. The other part is the conditional
probability table (CPT), which is a series of probability values. If the information-based education
technology in the Internet era provides enough conditional probability value, any given joint probability can
be calculated, which is called computable in this paper. Figure 1 shows an information-based education
technology with six nodes in the Internet era. It represents a series of conditional independent attributes: after
giving the state of the parent node, each variable is independent of the non-inherited node in the figure. The
graph captures the qualitative structure of probability distribution and is developed for valid reasoning and
decision-making. In the Internet era, information-based education technology can represent any probability
distribution, and they can be used to describe the distribution of simple structure. For the hypothesis of
vertex Xi, the parent node set is Pai, the conditional probability of each variable p (xi| PAi) is Xi,

\[ p(X) = \prod_{i=1}^{n} p(X_i | P_m) \]  

The simplified joint probability formula in Figure 1 of information-based education technology in the
Internet era is as follows:

\[ P(x_1, x_2, x_3, x_4, x_5, x_6) = P(x_1)P(x_2 | x_1)P(x_3 | x_1)P(x_4 | x_2)P(x_5 | x_2)P(x_6 | x_3) \]  

Once the correlation between propositions is represented by a directed arc, the conditional probability is
represented by the weight of the arc. It expresses the knowledge about the relationship between propositional
static structures. When obtaining new evidence, the possible value of each proposition should be
comprehensively checked, and then the trust degree of each node should be defined as B (x), specifically:

\[ B(x) = P(X = x | E) \]

It suggests that under the current e condition, all facts and evidence are provided, proposition x is the trust
degree of Xi, and then B (x) trust degree is calculated according to the evidence and facts. By using formula
(2) and type joint probability formula, the calculation of $B(x)$ is greatly simplified.

4. Physics teaching in the university under the environment of information technology in the Internet Era

The teaching model of “Internet + exploration” aims at improving students' desire for knowledge and improving the ability of comprehensive information processing by means of Internet technology. This mode can lay a better foundation for team cooperation and research in the course of teaching. Based on the interconnected inquiry physics teaching model, its main procedure is shown in figure 2 below:

![Figure 2. Basic procedure of “Internet + inquiry” teaching model](image)

According to the learning situation of students at different levels, teachers can set up multiple personalized teaching programs, and then use the cloud platform to share teaching resources. At the same time, they can prepare various sets of exercises of different difficulty, so that students at different levels can choose to use them according to their actual ability. While teachers teach, they can also establish some interest groups, which is convenient for the exchange of learning methods among students, allowing teachers to understand the learning situation and attitude of students and answer their questions in time. The cloud platform enables teachers to contact more students and have a deeper understanding of their learning situations. Different plans can be prepared for various situations of students, and more attention is paid to their personality factors in teaching to suit the teaching to their abilities. For example, when teaching the law of conservation of momentum, students with poor grasp of basic knowledge can adopt the method of combination of theoretical prompt and dynamic demonstration to teach, mainly to help them master theoretical knowledge and operation formula; for students with good grasp of basic knowledge, students can simply use the method of dynamic demonstration to teach, and prompt them to move the law of conservation of quantity and the rule of conservation of kinetic energy are connected to achieve better teaching effect.

Whether Internet technology enhances learning interest: only 1.35% of the students choose to reduce their learning interest; 27.48% of the students decide not to improve their learning interest, which indicates that these students are more adaptive to the use of cloud platform technology in the classroom; 69.82% of the students choose to enhance their learning interest, which indicates that most of the students are still very recognized for the way of media teaching, and the proportion Most of all, it can be seen that many students are willing to use cloud platform for physics classroom teaching.

Use the cloud platform to create a teaching interaction situation. According to the cloud platform, teaching resources and teaching situations can be fed back to the cloud for the first time. Because the requirements of cloud computing on the terminal are very low, whether it is smartphones, laptops, or desktops, they can access the cloud and obtain data, which makes the interaction between teachers and students significantly increased. In teaching, teachers can not only In order to show the excellent physical work and test paper, so as to achieve the role of encouraging the excellent and encouraging the backward; you can also use the learning group to exchange learning methods; or you can directly communicate with students, listen to students' opinions, and understand students' learning attitude and ideological status. The formation of teaching interaction between teachers and students will make the original boring physical learning exciting and practical Now we study independently, with interest and students together

5. Conclusion

With the large-scale application of information-based education technology in the Internet era, the physics teaching model in the university will gradually transform from knowledge indoctrination to practical operation. The logical and abstract thinking abilities of the students will be set free. Their independent learning capability and active learning consciousness will be significantly improved. However, it should be noted that the information-based teaching approach cannot totally replace the traditional education method. In the era of information-based teaching, more attention should be paid to the combination of information-based education technology and traditional teaching methods in the Internet era. The classroom education approach should be optimized, and the information-based education technology in the Internet era
should be used as a catalyst to improve the teaching quality and open a new chapter of physics teaching in the university.

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