Analysis of the Relationship Between Computer DISLab Device and College Physics Experiment Teaching

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Abstract. With the continuous development of computer information technology, the DISLab system based on computer technology can effectively transform many abstract physical measurement parameters in college physics teaching into physical quantities that can be measured in real time with the help of computers, sensors and other software and hardware equipment, so it has been more and more widely studied and applied in physical experiments. Based on this, this paper first analyzes the application status and problems of DISLab device in college physics experiment teaching, then studies the necessity of DISLab in college physics experiment teaching, and finally analyzes the relationship between computer DISLab device and college physics experiment teaching.

Keywords: Computer DISLab Device, College Physics, Experiment Teaching

1. Introduction

College physics course needs not only abstract theoretical teaching, but also practical and practical experimental courses. In the process of physical experiment teaching, it is often necessary to integrate the sensing technology with the experimental teaching process, and use multimedia technology to control the physical experiment process in real time[1]. The automatic data acquisition based on the sensor can effectively process the data information and bring the physical experiment teaching function into full play. In this context, a system of data sensors, data collectors and computer processing equipment DISLab has been widely used and developed in college physics experiment teaching.

By effectively inheriting many information sensors, collectors and processors, the DISLab system can effectively measure the physical quantities in college physics experiments. The DISLab system can effectively convert many abstract physical measurement parameters in college physics teaching into real-time measured physical quantities with the help of computers, sensors and other hardware and software equipment. In addition, the system can also realize the amplification, transmission and storage of physical measurement parameters, thus showing unique application advantages and characteristics. Not only that, based on the DISLab system combined with the computer can realize the
intuitive display of university physics experiment data, and these experimental results can be displayed in various forms such as graphs and lines.

It can be seen that the application of DISLab system in college physics experiment teaching can greatly improve the efficiency and effect of experimental teaching, and its intuitive and visualized characteristics greatly simplify the cumbersome calculation process in University experiment class, and can promote students to understand the physical experiment process and the principle behind it more intuitively. In addition, DISLab can not only give full play to the function of experimental teaching, but also can promote the innovation of experimental teaching and improve the scientific literacy of teachers and students.

In short, as an effective digital information experiment system, the application of DISLab in physical experiment teaching can effectively optimize the teaching form of physical experiment, so that students can better grasp the knowledge of physical experiment\(^2\). DISLab experimental system has several typical characteristics as shown in Figure 1. Through its direct and indirect measurement, real-time data acquisition and recording, dynamic physical changes and other performance and functions, DISLab has undertaken an important teaching task in the university physics experimental center. However, in the current college physics experiment teaching practice, although many universities have invested money to equip with the DISLab system, it has not fully played the role and effect of the system in college physics experiment teaching. There are not only factors that teachers do not fully understand the function and role of DISLab, but also some factors that conflict with the application and innovation of new educational technology. Therefore, it is necessary to further strengthen the application and implementation of the system. Under this background, it is of great practical value to analyze the relationship between computer DISLab device and college physics experiment teaching.

![Figure 1. The typical characteristics of DISLab experimental system.](image)

2. Application status and problems of DISLab device in college physics experiment teaching

2.1. Application of DISLab in college physics experiment teaching

First of all, in the investigation level that the physical experiment configuration of DISLab can meet the teaching needs, the analysis of survey data shows that most of the respondents think that they can meet the teaching needs\(^3\). Secondly, in the investigation of the role of the application of DISLab in physics experiment teaching, it could get the feedback of cultivating students' ability of scientific inquiry and independent innovation, improving the accuracy and efficiency of teaching, which is conducive to cultivating students' ability of independent innovation and improving teaching efficiency.

In addition, in the process and content level of college physics experiment teaching, the current college physics experiment teaching mainly includes classroom demonstration experiment, group experiment in the laboratory, using DISLab, students complete the experiment independently, and also have classroom demonstration experiment. In the investigation of whether the experiment can be completed according to the provisions of teaching materials, it is found that some teachers can not
carry out all the experiments according to the requirements of the curriculum standards. It can be seen that the current situation of college physics experiment teaching is not optimistic.

2.2. Problems in the application of DISLab device in college physics experiment teaching
First of all, in the current college physics experiment, there are still many teachers who do not carry out teaching and research on the digital experimental equipment, and have not fully developed the functions of the digital experimental equipment represented by the DISLab device\[^6\]. Secondly, the operation of the device in DISLab is not standard enough, which leads to unsuitable operation and low success rate. In addition, some teachers still have a wrong understanding of DISLab. These teachers think that the experiment of DISLab is just a simple simulation of university physics experiment. In fact, the experiment of DISLab is a real experiment that transforms the traditional measurement tool into a sensor.

In short, there are many problems in the application of DISLab in college physics experiment teaching. Many teachers have not applied this modern educational technology to teaching. In addition, many universities have low utilization rate of DISLab due to various reasons\[^5\]. Among them, there are not only problems in teachers' understanding of the function and function of using DISLab, but also some reasons such as teachers' lack of ability to design innovative experiments, lack of enthusiasm for applying modern educational technology, and lack of scientific and effective evaluation methods of using DISLab.

3. The necessity of DISLab in college physics experiment teaching

3.1. Advantages of DISLab in college physics experiment teaching
Due to the characteristics of strong theory, high degree of abstraction and complex and changeable characteristics of college physics experiment teaching, the experimental process needs to be actively innovated, and the advantages and functions of digital experimental device represented by DISLab are fully exerted\[^6\]. Compared with the previous university physics experiments, the application of the DISLab device has obvious advantages. It can not only improve the experimental tools, but also develop the DISLab better. Moreover, it can establish a more perfect digital experimental system, which lays a more solid and favorable foundation for the development of college physics experiment teaching activities.

3.2. DISLab can effectively meet the scientific requirements of college physics experiment teaching
Due to the high logic and precision of college physics teaching, and as a professional subject based on experiments, the role of college physics experiment in the verification and assistance of its theory is constantly strengthened. In the physical experiment based on the device of DISLab, its modern science and technology has become an important form of physical research\[^5\]. College physics experiment practice is an effective way to test and understand the physical theory. Therefore, the scientific nature of the experimental setup and process determines the quality of the experiment. Only by reasonably using the DISLab to carry out the experimental design and operation, and carrying out the activities with a scientific attitude and method, can the university experiment design be completed with high standard and high quality, so that students can form a correct and scientific physical thought in the experiment, and use scientific form to solve the physical problems encountered.

3.3. DISLab can effectively meet the expansion requirements of college physics experiment teaching
For a relatively simple college physics experiment course scheme, it is mainly to construct the physical implementation of several courses as shown in Figure 2 below. Among them, for the extended curriculum, its main goal is to better cultivate students' subjective consciousness and improve students' cognitive structure, cultivate and stimulate students' interest in physics learning. In the research-oriented curriculum, it could stimulate students' potential, promote students' personalized
development, establish a characteristic physical experiment system, reflect different basic requirements and show an open teaching form.

![Figure 2](image.png)

**Figure 2.** Types of college physics experiment courses.

4. Analysis of the relationship between computer DISLab device and college physics experiment teaching

4.1. Physical experiment teaching based on DISLab

First of all, it is necessary to establish the physics teaching situation of DISLab scientifically, and construct the experimental design that conforms to the laws of physics, analyzes and understands the essence of physical phenomena, so as to better guide students from theory to practice. Secondly, it is necessary to enhance the students’ intuitive understanding of physical theory knowledge, so as to make better use of the corresponding knowledge in the experimental process. In addition, we should guide students to guess and assume thinking, cultivate students’ situational ability of combining problem situations, let students take one against three in the same physical situation, so as to realize some emphasis in the analysis of physical situation and carry out practical solution of specific problems combined with physical situation.

Experiment based on DISLab is an important part of college physics experiment teaching, which involves the selection of corresponding experimental instruments according to the experimental scheme. After installing and assembling the experimental instruments, we should carry out the experimental operation reasonably and set up the corresponding experimental software according to the experimental needs, so as to meet the requirements of data acquisition in physical experiments. In the state set based on the DISLab experimental device, attention should be paid to the standardization of operation, so as to effectively play the role of DISLab experiment in several aspects as shown in Figure 3, so as to ensure the effective development of experimental activities.

![Figure 3](image.png)

**Figure 3.** The role of DISLab in physic experiment.
4.2. Relationship between DISLab device and physics experiment teaching

The process design of physical experiment is the key link in the whole teaching of physics experiment in DISLab. The computer can process data with high speed and high efficiency, but it has the function of self operation analysis and data processing. However, all the methods and functions of the device are not designed and selected by the computer itself, so the application of the device can effectively cultivate students' ability of problem analysis and solution. Secondly, in the analysis of experimental conclusion, although the experimental error of DISLab is relatively small, the improvement of experimental design is helpful to cultivate students' spirit of scientific exploration. In addition, in the experimental summary and reflection level, we can evaluate and analyze the experiment as a whole and objectively, so as to cultivate students' analytical ability. It can be seen that the relationship between DISLab device and physical experiment teaching is mutual promotion. The former can significantly improve the effect of the latter, and the latter can promote the continuous improvement and optimization of the former.

5. Conclusion

In summary, the application of DISLab system in college physics experiment teaching can greatly improve the efficiency and effect of experimental teaching. Its intuitionistic and visualization features greatly simplify the tedious calculation process in University experiment class, promote students to understand the physical experiment process and its underlying principles more intuitively, promote teachers' innovation in experimental teaching, and improve the scientific literacy of teachers and students.

In this paper, through the analysis of the application status and problems of DISLab device in college physics experiment teaching, the application status, problems and reasons are studied. By studying the necessity of DISLab in college physics experiment teaching, this paper analyzes the advantages, functions and functions of DISLab in experimental teaching. Through the research on the relationship between computer DISLab device and college physics experiment teaching, this paper analyzes the design of physical experiment teaching link based on DISLab device and its relationship with physical experiment.

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