Reform of Electrical and Electronic Experiment Teaching and the Cultivation of Students' Ability

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Abstract. The purpose of conducting electronic and electrical experiment teaching is to cultivate students' practical ability and promote students' all-round development. The times are constantly developing and new requirements are placed on education. The traditional teaching that only imparts knowledge to students is no longer able to meet the needs of society. Modern society needs to develop students' relevant learning ability in teaching. Therefore, it is essential to make appropriate changes to the electrical and electronic teaching and develop students' learning ability. This article discusses the reform of electrical and electronic experiment teaching and the cultivation of students' learning ability.

1. Introduction
Electronic and electrical experimental teaching includes more content, mainly related to circuit teaching, analog electronic technology teaching, digital power teaching and electrical engineering curriculum teaching system. Electronic and electrical experimental teaching is inseparable from theoretical teaching and practical teaching. Theoretical teaching can better expand the knowledge of students, and also enable students to systematically master relevant professional knowledge. Practice teaching can cultivate students' relevant learning ability and promote students' all-round development. At present, the teaching methods in China pay too much attention to the transfer of theoretical knowledge, while ignoring the cultivation of students' learning ability, which can not play the value of education and promote the all-round development of students. Therefore, the following will focus on the reform of electrical and electronic experiment teaching and the study of students' learning ability.

2. Revolution of Electric and Electronic Experiment Teaching
2.1 Transformation of Experimental Teaching Content
As we all know, the content of experimental teaching directly affects the efficiency of teaching. Therefore, it is very important to change the content of experimental teaching [1]. The main content of the change is to innovate the content of electronic and electrical teaching, and then to design the relevant teaching content based on the student's actual learning situation. The modern society is constantly developing, and science and technology are constantly improving. Innovating the content of experimental teaching can enable education to keep pace with the development of the times, and enable students to understand the latest developments in electronic and electrical engineering, which is conducive to the value of education and the expansion of students' knowledge. The traditional experimental teaching takes the teacher as the main body and carries out the related teaching content. This is not conducive to the use of students' autonomy, but also affects teaching efficiency.

The most important thing in the reform of experimental teaching is to design experimental teaching content. There are many problems that need to be paid attention to in the design of experimental
teaching content. First of all, we should pay attention to the design of relevant content according to the actual learning situation of students. Any teaching that deviates from the actual learning situation of students is not effective [2]. If the teacher designs the teaching content based on the completion of the teaching task, it will inevitably lead to a decline in teaching efficiency. The discipline of electronic and electrical engineering is more laborious to learn than other disciplines. Like digital electronics technology experiments, the main content includes circuit basics and test common sense of digital electronic technology, basic practice and comprehensive experiments. The content involved is difficult. If teachers do not pay attention to the students' learning situation and ignore the problems raised in the students' experiments, in the long run, students will lose interest in experimental teaching, which not only affects the improvement of students' learning level, but also affects teaching efficiency.

In short, teachers should innovate the content of experimental teaching. What the teacher has to do is to list the problems and processes that should be paid attention to in the experimental teaching, and then carry out the experimental summary. The specific operation and search data of the experiment must be given to the students, so that the students' autonomy can be exerted to the greatest extent, and the teachers can have time to solve the problems that students have in the experiment in time. In addition, it can also cultivate students' inquiry ability, experimental design ability and innovation ability, and can also improve teaching efficiency.

2.2 Changes in Experimental Textbooks
The experimental textbook is the main basis for guiding the experiment, which directly affects the teaching efficiency. Traditional experimental textbooks have too many confirmatory experiments and too few exploratory experiments. Students are in a stage of active thinking, and the test verification will make students feel aversion to the experiment itself, which is not conducive to promoting the overall development of students, and is not conducive to the improvement of teaching efficiency. Therefore, the relevant education department should change the experimental materials. Change needs to pay attention to the pluralism of popular education, adapting to diverse students and teaching materials. For mass education, it is to meet the needs of students with different learning levels. Adapting to a diverse source of students is to meet the demand for textbooks in different educational levels. The diversification of teaching materials is the process of characteristicization of experimental textbooks. Only when it is characterized can innovation be achieved, it can better conform to the actual situation of the country and the learning characteristics of students [3].

In addition, the preparation of textbooks should also pay attention to maintaining the relative stability of the textbook. Learning is a long-term project. The reform of teaching materials cannot be carried out in a drastic manner. Instead, it should be gradual and cyclical so that students can continue to progress and develop on the basis of the existing learning level. The basic knowledge and typical cases of experimental textbooks should remain unchanged. The relevant content of new software tools and technologies of electronic and electrical engineering should be reformed. This will better realize the reform of teaching materials and ensure that students have basic electronic and electrical knowledge.

2.3 Changes in Experimental Teaching Methods
First, teachers should play a guiding role. In traditional experimental teaching, most teachers choose to tutor students to complete the experiment. The so-called counseling is that the teacher only tells the solution [4]. This kind of experimental teaching method will allow students to directly enjoy the experimental results, which is not conducive to the development of students' relevant learning ability. Therefore, teachers should change their coaching role and play a guiding role. The guiding role is more in line with the requirements of modern education than the guiding role. Specifically, the teacher tells the students how to experiment, the steps and the problems that need attention, and then let the students explore the experiment themselves. When students have problems in the experiment, the teacher can encourage the students to think alone or discuss with other students. The teacher makes a final summary of the experimental results of the whole class and tells the principle of solving the
problem, which can promote the students to think independently and solve the problem.

Second, teachers should pay attention to the experimental process. Many teachers make a mistake in conducting experimental teaching, which is to pay attention to the experimental results and ignore the experimental process. The reason is that some teachers think the experimental results are correct, and the experimental process is definitely correct. Under this unscientific concept, teachers began to ignore the experimental process. In fact, the experimental process can test students' ability to integrate knowledge, and can also develop students' ability to explore and practice. For students, these abilities are better able to promote their all-round development. Therefore, teachers should pay attention to the experimental process. For example, teachers can design open questions to develop students' sense of innovation and practical ability. Or you can conduct fun teaching and motivate students to experiment. In the course of experimental teaching, students also play a very important role, students need to follow a certain set of experiments, in order to maximize the value of the experiment. The specific process is to propose design requirements, find information related to the experiment, then design the experiment, and finally select the equipment to carry out experimental verification. Let students design experiments and find information, mainly to increase the fun of the experiment, so that students can integrate relevant knowledge. It can be said that this process has cultivated students' relevant learning abilities to varying degrees. Of course, teachers can also stimulate students' learning potential according to their different characteristics. For example, some students are good at the study of theoretical knowledge, teachers can let him write experimental reports, which can not only develop the writing ability, but also give play to students' own advantages. Some students have strong hands-on ability, teachers can appropriately increase the difficulty of the experiment for students, so that students can actively think about the experiment, but also develop students' thinking ability and hands-on ability.

3. The Change of Teaching Methods of Electrical and Electronic Experiments and the Cultivation of Students' Ability

3.1 Combination of Compulsory and Elective Courses
According to the general textbooks, electrical and electronic experiments are divided into compulsory experiments and elective experiments. The compulsory experiment is to ensure the number of students in the experiment, which can ensure that students have sufficient experimental skills and experimental knowledge. Elective experiments are generally selected by the teacher based on the student's learning situation, or selected by the student according to their own interests. The teacher itself can have a relatively accurate understanding of the student's learning situation, so it is reasonable and reasonable for the teacher to choose [5]. Students can choose their own strengths and develop their relevant abilities. Some teachers believe that compulsory experiments are more important, so they reduce the elective experiment or simply cancel the elective experiment directly. In fact, elective experiments are equally important. Compared with the compulsory experiment, the elective experiment can bring out the autonomy of the students and the students' learning ability. Therefore, the combination of elective experiments in compulsory experiments is crucial.

Teachers should pay attention to the combination of elective and compulsory experiment in the teaching of electrical and electronic experiments. This can not only meet the needs of students with different learning levels, but also provide students with a platform for self-development and develop students' learning ability. At the same time, teachers should instill in students the same important ideas as elective experiments and compulsory experiments. If it is only the teacher's attention, and the students do not pay attention to it, it is difficult to play the value of the elective experiment.

3.2 Combination of In-class and Extra-curricular
The one-semester course is limited, and the teacher's teaching tasks are limited, which means that teachers can only invest a lot of time and energy in the in-class experiments. As we all know, science and technology are constantly innovating, and electronic and electrical related technologies are
developing rapidly. Therefore, it is not enough to just let students conduct in-class experiments. In order to better expand the knowledge of students, broaden the horizons of students, and promote the better development of students, appropriate extracurricular experiments should be conducted. Therefore, teachers should pay attention to the combination of in-class experiments and extracurricular experiments. Of course, measures can also be taken to transform the experiments inside and outside the class. For example, when learning about linear resistance and nonlinear resistance, most teachers use indoor experiments. Specifically, it is to give students several sets of experimental data for students to verify. At this stage, it is possible to change the teaching methods and change the indoor experiment to an outdoor experiment. Teachers can group students to test the relationship between voltage and current across the metal at the same temperature, and then summarize and verify whether the measured linear resistance or nonlinear resistance. If the characteristic curve of the resistive element is a straight line passing through the origin at any moment, that is, its characteristic equation is homogeneous linear, and obeys Ohm's law (I=U/R), then the resistive element becomes a linear resistor. On the contrary, it is a nonlinear resistor. This will not only enable students to exercise their autonomy, but also develop students' thinking ability and practical ability, and also mobilize the enthusiasm of students, so that students fall in love with electronic and electrical experiments.

3.3 Combination of Simulation Technology and Operational Experiment

The simulation technology involved in electronic and electrical experiment teaching includes DEA software, analog circuits and so on. Simulation technology plays an important role in the teaching of electronic and electrical engineering. Simulation technology is an important achievement in the development of science and technology. It is based on computer technology and can analyze system principles and establish corresponding models or dynamic experiments. The application of simulation technology in the field of electronic and electrical teaching enables the electronic and electrical teaching content to be provided to students in a vivid and vivid way. Students can participate in the study, which can not only further understand the relevant knowledge, but also adjust the electronic parameters simply and quickly. Experimental teaching is more operative. For example, when learning the relevant knowledge of the "basic common-amplification circuit diagram", the specific figures are as follows. Teachers can use the multisim simulation technology software to apply electronic circuits. The circuit diagram is clearer, parameters can be changed, and circuit phenomena under different conditions can be analyzed.

Figure 1. Basic common-amplification circuit diagram
This will increase students' understanding of relevant knowledge, and at the same time improve students' ability to analyze relevant problems under different conditions. All in all, it has changed people's understanding of electronic and electrical teaching methods, and improved students' learning efficiency while also cultivating students' learning ability. Of course, the simulation technology itself has the disadvantages of poor security, incomplete data, and unintuitive results. The combination of simulation technology and operational experiment can complement each other, improve the experimental teaching results, and cultivate students' innovative consciousness and innovative ability. Therefore, the teaching of electronic and electrical experiments should pay attention to the combination of simulation technology and operational experiments.

3.4 Combination of Tradition and Modernity
At this stage, the Internet age has arrived, and the rapid development of computer technology has followed. Therefore, teachers should pay attention to the use of modern computer technology and experimental teaching resources to assist experimental teaching and improve the effectiveness of experimental teaching. In addition, it is to change the traditional closed experimental teaching to modern open teaching. Schools should actively create conditions for students, and open teaching according to the requirements of open experimental content, open time, and open resources at the current stage. In this way, the electronic and electrical experimental teaching can keep up with the trend of the times, and cultivate students' learning ability and promote the all-round development of students.

4. Conclusion
The cultivation of students' relevant learning ability can promote the overall development of students and enable students to better adapt to the future development of society. Therefore, teachers should start with the teaching materials, content, methods and means of electronic and electrical experiments, carry out relevant teaching changes, and cultivate students' relevant learning ability. Of course, the change can not be completed overnight, and the student's learning ability can not be cultivated in one or two classes. These require the joint efforts of teachers and students to effectively improve the efficiency of electronic and electrical experimental teaching and realize the value of education.

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