Discussion on Experimental Teaching Method of Electronic Technology

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Abstract. Experiment is the main way to combine theory with practice and train students' practical ability. Basic experimental teaching, what role should it play in the process of cultivating innovative talents? What kind of teaching effect can it achieve? Can we meet the needs of talent training objectives and adapt to the needs of high-quality innovative talents training? In this paper, the author summarizes the problems of how to teach and how to learn electronic technology experiments, and combines her own experience with the feedback of students' opinions.

Introduction

How to cultivate students' innovative ability is a problem that teachers are actively exploring. The cultivation of students' innovative consciousness and the improvement of their innovative ability are a gradual process of cultivation. [1] Through the basic experimental operation process, the basic practical skills of the students are constantly improved, thus laying a solid foundation for the cultivation of innovative ability. In the basic experimental teaching, what kind of ability should be cultivated to train students?

How to Teach Electronic Technology Experiment

In the process of experimental teaching, students should develop good experimental habits from the beginning of the laboratory, and require the students to strictly use the instruments in accordance with the requirements of the instrument operation, and take good care of the experimental equipment; after the experiment is completed, consciously organize the experimental equipment and tables and chairs, and fill in the resume of instruments and equipment carefully, etc., so that the laboratory always maintains a good teaching environment, is also a reflection of the basic qualities of students.

The current experimental contents are divided into: verification, comprehensive design and autonomy experiments. [2] In the implementation of these experimental contents, how should teachers teach, which skills of students should be exercised and improved, and what effect is expected to be achieved?

Exercise Basic Experimental Skills

The verification experiment is the restoration and verification of the basic theoretical knowledge. The purpose is to deepen the understanding of the basic principles. In this kind of experiment, the teacher mainly adopts the method of explanation and demonstration.

The basic experimental skills that the students should master are: how to standardize the use of instrumentation, how to identify components, and how to judge the correctness of test data. It is inevitable to encounter problems or failures in the experiment. Some students' experimental data errors lead to the failure of the experiment, which is simply attributed to the failure of the instrument and equipment, thus affecting the progress of the experiment, and repeatedly it will affect the enthusiasm of the students to do the experiment. Therefore, in the course of each experiment, students should be guided and trained to find that the problem is not flustered, analyze the problem is organized, and solve the problem in a way. First of all, students are strictly required to use instruments in a standardized way, and to teach students how to eliminate the faults of
instruments. When setting up the signal generator and oscilloscope check and eliminate the problems. Secondly, it is necessary for the students to master whether it is a circuit connection problem or whether the experimental method is incorrect.

Teach the students themselves how to check the test data, so that when the experiment is done, they will know which the correct test data is, and the efficiency of the experiment will be improved. For example, in the circuit experiment: the verification of the superposition principle, according to the test data table, the algebra of each column of data and the content that can verify the superposition principle, emphasize the importance of algebraic sum, and then emphasize that the reference direction cannot be changed in testing a set of data, otherwise the test data may be incorrect.

It is a necessary basic skill to train and exercise the students' ability to remove experimental faults. It is also a prerequisite to lay a good foundation for subsequent independent and comprehensive experimental design.

**Exercise the Ability of Circuit Design and Teamwork**

In the teaching process of autonomous experiments, a variety of teaching methods should be adopted to fully mobilize the initiative and enthusiasm of the students. In order to stimulate students’ interest in learning, it is also necessary to combine the transfer of knowledge and training ability, so that students can stimulate their potential and cultivate scientific thinking habits while mastering the basic theories.

In the autonomous experiments, the teacher provides experimental topics, and the students design experimental plans by themselves. Students can also choose topics of interest, novel content, unique creativity, or advanced technology. For the students, it is not necessarily very difficult and complicated to ask for the topic. It can be the expansion or improvement of the experiment content they usually do. It mainly enables the students to have a deeper and thorough understanding of the knowledge points included in the topic they choose.

After the students draw up their own experimental plan and the teachers examine and criticize the feasibility, the laboratory provides equipment, selects experimental instruments and components independently, builds and debugs the circuit, tests and analyses the data, and writes independent experimental report, and finally completes the acceptance of independent experiments through group defense.

In this type of experiment process, students can learn how to start with the analysis system requirements, select the corresponding unit circuit, and select the appropriate components to exercise the ability of circuit design. In the process of group cooperation, how to divide the work according to personal characteristics, and at the same time, it is also a good exercise and improvement process for the students' report writing ability and expression ability, and then cultivate the spirit of unity and cooperation among students.

**Exercise Students’ Subjective Initiative**

In the comprehensive design experiment, the students are mainly guided and trained to acquire knowledge independently and give full play to their subjective initiative and creativity. Let the students grasp the process steps of circuit design: For the design and comprehensive experiment, the students can first simulate the circuit through Multisim, Proteus and other software, so as to help the students improve the circuit design plan continuously, and then carry out the actual operation, using the side of virtual simulation before physical operation. The method can not only highlight the practical ability of the students, but also cultivate the students' learning of new experimental means.

When connecting the physical circuit, it is not blindly to connect the whole circuit at the beginning, which will increase the difficulty of eliminating circuit failures or make the students into a dilemma. It should be connected according to different functional modules, and then tested step by step. After each module function is realized, all levels are connected together, and a system concept should be established.

Independent experiment and comprehensive design experiment are relatively difficult. With the prior knowledge reserve and the accumulation of practical skills, students can play their subjective initiative to innovate and create.
How to Learn Electronic Technology Experiment

Good learning methods can continuously improve students' learning ability, improve students' enthusiasm for learning experiments, exercise practical ability, and improve the effect of doing experiments. Through the communication and understanding with the students, how to learn about the electronic technology experiment is summarized as following points:

Straighten out the Learning Attitude of the Experimental Class

Experimental courses are often considered to belong to theoretical courses, so they are often ignored. Unprepared before class, unskilled operation of instruments, lack of experimental methods, poor practical ability and other reasons will lead to obvious errors in data or no waveform during the experimental process, and the students cannot find the problem, causing they feel a sense of frustration and lose interest in doing experiments. It is precisely because of the weak practical ability, so when encountering difficulties, we cannot avoid it. We should adjust our mentality in time, ask teachers and classmates for help, find out ways to solve problems, seize the limited experimental classroom time, exercise and constantly improve our practical ability, and strive to improve our overall quality.

Grasp the Whole Process of the Experimental Class

Full preview before class can make students confident in the experiment, and can quickly enter the experimental state quickly; the probability of success of the experiment will be greater. When previewing, we should first mark the questions which we don't understand. If we study with questions in class, we will have unexpected results [5].

In class, listen carefully to the difficult points and precautions of the instructor. Difficulties and precautions are usually difficult to master when the students are experimenting, and it is easy to make mistakes when operating. Grasp the important and difficult points to grasp the experiment method, and remember the matters needing attention to avoid the operation mistakes. In this way, the experiment can achieve twice the result with half the effort. The record of experimental data should be true and accurate, and the experiment should be treated with a realistic and scientific attitude.

Be good at summing up the experiment report after class. After the experiment is completed, when the experiment report is compiled, the problems can be found by comparing and analyzing the various experimental data recorded. Through intuitive experimental phenomena and detailed data, the understanding of the experimental principle can be well deepened. Summarizing the successful experience and failure lessons in the experiment process will avoid making the same mistakes in future experiments or circuit design, and will make greater progress in the future.

Grasp the Communication Platform of Experimental Courses

When experimenting with difficulties, each student's attitude is different. Some students will try again and again, some students will look up books, and some students will give up. In the process of experiment, we should learn to think more, ask more, and communicate more. Look at others' actions, listen to others' experiences, learn others' methods, and do some thinking while doing. Learn to compare, do not blindly follow, so you can get more knowledge that you can't learn from textbooks. Students and teachers, students and students can find problems and solve problems together and improve themselves together.

Conclusions

Teaching and learning is an interactive process. In the experimental teaching, we should know how the teachers should teach, what skills should master by students; understand what the students think, teach the students how to learn, and improve the practical skills of the students, it is a test for teachers and is also the ultimate goal of teaching. In order to meet the needs of the development of the times and the goal of talent training, the subject of electronic technology experimental teaching still needs to be continuously explored and summarized in the future teaching process.
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