Research on Teaching Reform of Electronic Technology Courses

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ABSTRACT

Electronic technology curriculum design is a comprehensive practical course. With the rapid development of electronic technology, the course also needs corresponding teaching reform. The research and practice of curriculum reform from the teaching content, teaching mode and teaching method, and finally the achievements of teaching reform are given. The result of practice shows that the reform of this course is remarkable.

KEYWORDS: Electronic Technology, Teaching Mode, Reform Research

INTRODUCTION

Electronic technology curriculum design is a comprehensive practical course, which is one of the important teaching links for students to learn electronic technology. Through the practice of electronic technology curriculum design, students can understand important significance of electronic engineering project development, development process, understanding of program demonstration, design and debugging, project reporting, etc. They can also master the design and debugging methods of electronic systems, and have the ability and quality to use the basic knowledge of electronic technology to design circuits and solve practical problems creatively [1]. From four aspects of teaching content, teaching mode, teaching method and project traction, this paper has implemented the teaching reform of electronic technology curriculum design, which can guide students to understand process of the whole project implementation, and explore the creative potential of students to realize the transformation of theoretical knowledge to practical ability.

ENRICH THE TEACHING CONTENT AND OPTIMIZE THE CURRICULUM SYSTEM

The main contents of electronic technology curriculum design include electronic technology practice, circuit design and debugging, as well as the study of PCB [2]. Students need to be exposed to a wide range of things, and there is a certain gap between the students themselves, and it is difficult to complete the corresponding design tasks with high quality. Therefore, according to different students, we can make different standards, enrich the teaching content, reform the teaching method, change students' specific class form, and build
the curriculum system which is more suitable for students' ability and quality [3,4]. At present, electronic technology curriculum design has set up three types of electronic circuit design based on general devices, digital system design based on programmable devices and design of measurement and control system based on single chip microcomputer. It not only contains the relevant content of analog and digital electronic technology, increased Circuit design project, but also contains advanced technology, such as, a programmable logic devices, AVR microcontroller, Protues simulation to make teaching content more rich and advanced. Students can choose topics according to their abilities and interests, and we also encourage students who are competent and interested in to choose more design questions. At the same time, in order to stimulate students' design initiative and creativity, students can also design their own topics, and then carry out the project design after the teacher's guidance. In fact, circuit analysis is also very important. As shown in figure 1, the circuit is based on the PT4201 off-line semiconductor lighting drive, and adopts the anti-excitation topological structure to improve the output current accuracy with the secondary feedback (i.e., optical coupling feedback). AC 85 ~ 265V AC input, connected to the rectifier bridge after L1 (equivalent to a fuse, anti-surge), C1 is a filter capacitor.

The VDD of PT4201 is powered by R4, which is supplied by the transformer auxiliary winding, and the voltage is between 9 and 27V. R1, C3 and VD2 in the circuit are RCD absorption loops that are used to absorb the peak of Q1 switch.

IMPROVE THE TEACHING METHOD TO IMPROVE THE TEACHING EFFECT

In line with the concept of cultivating students' independent design and innovative practice, the traditional way of "teacher talk, students do" is changed. The teacher does not speak or even speak the theory knowledge, but simply gives the students the direction of their design to find the information. In the process of design, students are confronted with practical problems and then teachers answer questions separately. In terms of organization, three students are assigned to each group in the form of an electronic competition. The hardware implementation, software debugging and the way of group defense are adopted in the acceptance inspection. In the group between the same topic, according to the performance, index and completion speed of the completed project, the teacher makes comments and the result of the competition has a certain proportion in the final score. This kind of teaching model requires that students should not only discuss the design project and the choice of design plan, but also implement their specific design tasks during the course to understand and be familiar with the whole process of design project.
MICRO-COURSE FEATURES

In the course design of electronic technology, the video, image and other multimedia means are used to visualize relevant content, which can enhance the interest of the course and stimulate students' interest in the subject. Through the existing experimental center portal, some materials related to students' course design topics are uploaded, and students can check them at any time. At the same time, on the Internet, we show the photos of students participating in the electronic competition of college students and the competition between different groups in the design of electronic technology courses. Students are encouraged to strive to do the best for what they have chosen through these video and photos. Students can make a free online appointment according to their needs, and then go to the laboratory to design the courses in their spare time. The laboratory provides the independent learning environment. As a result of the task, although the students are not kept under constant supervision of their teachers, they will also learn consciously. This form increases the student's experimental time and improves the flexibility of the student's schedule, which can help students develop their independent design ability, engineering ability and innovation ability. In fact, circuit simulation waveform analysis is an efficient way for students to learn. As shown in figure 2, the value of constant $T$, delay $\tau$ and amplification coefficient $K$ can be obtained by analyzing the s-curve and the unit step response rules of the Buck-Boost system. It can be seen from the analysis of the waveform curve in the graph that the dynamic response performance is superior after the PID tuning can absorb the related performance advantages.

![Figure 2. Control System PID Order Step Response.](image)

SUMMARY

In the course reform, we should highlight the cultivation of students' innovative consciousness and engineering quality, which embodies the characteristics of "comprehensive content, engineering, keeping up with The Times and stimulating innovation" and promotes the continuous improvement and sustainable development of education system of electronic technology innovation. For example, students have won various awards in China, Beijing and north China in recent years. In 2013, students won the first prize of the national college student electronic design competition, and won the first prize of the national college student "flying scard" smart car competition.

ACKNOWLEDGEMENT

This research was financially supported by Key scientific research projects of Jiangxi Provincial Department of Education (Grant NO. GJJ161218). Scientific research start-up funding (Grant NO. NGRCZX-17-01), Scientific Research Project Fund of Jiangxi Province under Grant no.GJJ151243.
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