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Teaching Reform and Practice of Analog Electronic Circuit Mass Entrepreneurship and Innovation Course

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Abstract: For the current teaching problems of analog electronic circuit innovation and design curriculum under the background of mass entrepreneurship and innovation, this paper puts forward the curriculum reform ideas. The innovation and practice comprehensive ability of students can be effectively enhanced through exploring the curriculum teaching objectives, mode, teachers, evaluation system. It ultimately provides speculation for exploring and cultivating innovative and entrepreneurial quality, compound outstanding application technical talents.

1. Introduction

In 2015, the General Office of the State Council issued the Implementation Opinions on Deepening the Reform of Innovation and Entrepreneurship Education in colleges, arguing comprehensively improving the qualities of students' innovation and entrepreneurship, so that the trained engineering talents have the abilities of innovation, entrepreneurship and solving complex engineering problems[1-3]. Mass entrepreneurship and innovation education has become the main point for the construction of new engineering in colleges and the teaching of innovation and entrepreneurship courses is an important focus of mass entrepreneurship and innovation education[4-5].

The curriculum of analog electronic circuit innovation and design is an innovative and entrepreneurship course for sophomores or above majoring in electronic. The course sets up 32 hours limited to 20 students and begins once a semester with two teachers. Students have the abilities of solving complex engineering problems through experience, teaching, discussion, simulation, doing electronics systems by oneself and so on. Meanwhile the methods of simulation software (Multism) and composing the design report are introduced. It contributes to supplement, expand and optimize the curriculum architecture of professional and mass entrepreneurship and innovation, realize the integration of specialization and innovation, and cultivate outstanding engineering talents for application-oriented universities [6-7].

2. Objectives of Curriculum Reform

Since the opening of the course, the team has accumulated some teaching experiences, research and practice foundation. There are still obvious homogenizations objectives with the professional curriculum. And the teaching objectives of mass entrepreneurship and innovation are not clear. Meanwhile it is insufficient for the competition, innovation and entrepreneurship work to provide sufficient and targeted service in the height, innovation, challenges of the teaching content and frontier, epochs of subject. Finally students do not realize that the analog electronic circuit is significant in the professional and innovation curriculum system.

So the teaching objectives, the content of curriculum, teaching modes, teaching resources and evaluation system are studied and explored with the concept of mass entrepreneurship and innovation being the guiding ideology so as to accord with the requirements of mass entrepreneurship and innovation. Students can develop innovative thinking, analyzing and solving complex engineering problems through the construction, implementation and reform of this course.

3. The Content of Course Reform

The teaching process of the course is constructed, practiced, summarized, reformed and refined in order that it can be in consistent with the requirements of mass entrepreneurship and innovation. The specific reforms are as follows.

①Composing, revising the curriculum syllabus and focusing on the teaching objectives of mass entrepreneurship and innovation are accomplished in order to distinguish from the teaching objectives of professional curriculums. Firstly, students are guided to analyze typical analog electronic unit circuits and integrated chips. Secondly, students learn to the methods of designing analog electronic circuit. Eventually, the design and making of complex analog electronic circuit system are advanced to possess an ability of solving complex engineering problems.

②The curriculum is creatively constructed with adopting advanced teaching module, as shown in figure 1. The three aspects of knowledge, skills and quality of the course are fully considered. And the typical analog electronic systems are selected in the power topic of the National College Student Electronic Design Competition as the advanced teaching modules to reach up to the height of the innovation, challenges of the course and take into account the frontier, epochs of subject.

The teaching modules are divided by the knowledge, skills and quality. The four-level up teaching process is designed, as shown in figure 2. Students' practical abilities can be cultivated to realize the integration of specialization and innovation through the theoretical knowledge, design and simulation, doing electronics systems by oneself and comprehensive debugging.

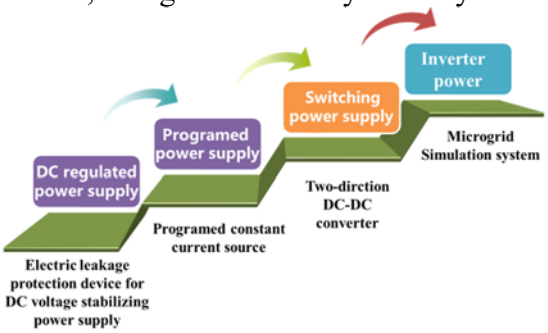

Fig.1 Ed Teaching Module

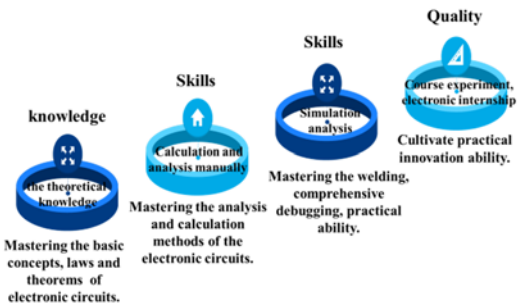

Fig.2 The Four-Level Up Teaching Process

③According to the characteristics of the advanced modules, the task-driven teaching mode is adopted. All kinds of teaching methods are utilized to directly service, support for professional

competition, entrepreneurship and innovation work, e.g. experience, teaching, discussion, simulation, doing electronics systems by oneself, as shown in figure 3.

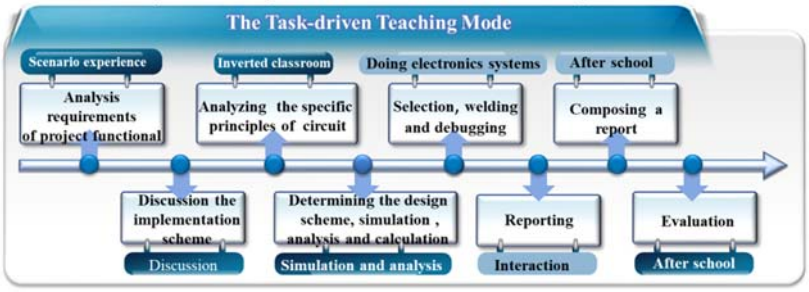

Fig.3 The Task-Driven Teaching Mode

④Building a teaching team for mass entrepreneurship and innovation is a powerful guarantee for cultivating students' ability of mass entrepreneurship and innovation. With the help of the school and the department an innovative and entrepreneurial teaching team is built in a step-by-step and planned way. Ultimately the creative abilities of the teaching team are improves through further training, advanced education, online education, group discussion, guiding competition and others.

⑤Concentrating on the objectives of the course, students' knowledge, attitude, quality and ability are comprehensively viewed. Simultaneously a multi-evaluation system is established combining with formative evaluation, phased evaluation, multi-type evaluation and final evaluation, as shown in figure 4. In order to fully grasp the students' learning dynamics, track and evaluate the degree of students' learning in an all-round and whole process.

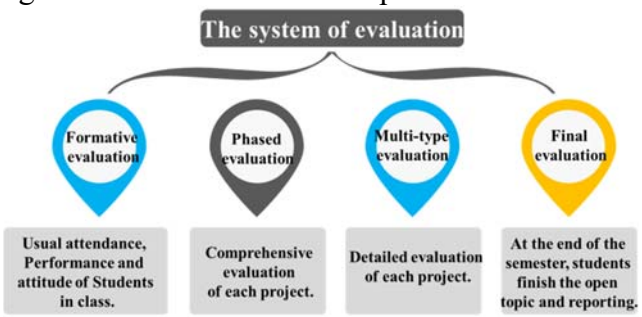

Fig.4 Multi-Evaluation System

⑥The teaching plans, courseware, project cases and other teaching resources are made and improved. At the same time online teaching is based on the APP of the cloud.

⑦The ideological and political elements of the course are deeply excavated to enhance students' understanding for the basic status of analog electronic technology in the professional and innovation curriculums system based on the ideological and political courses of analog electronic technology.

4. Conclusions

With the concept of mass entrepreneurship and innovation education, the teaching process of the course is constructed, practiced, summarized, reformed and refined in order to directly service, support for professional competition, entrepreneurship and innovation work and realize the integration of specialization and innovation. It ultimately provides speculation for exploring and cultivating innovative and entrepreneurial quality, compound outstanding application technical talents.

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2) 2021 Gansu Province college students' employment and entrepreneurship improvement domestic engineering project “Internet + Subject Competition Team” helps applied undergraduate college students to improve their employment and entrepreneurship ability’(Project Number: 10)

3) “Circuit Analysis”, a first-class undergraduate course construction project of Lanzhou Institute of Technology in 2021 (project number: 17)

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