

# Exploration on Teaching Reform of Power Electronic Technology under the background of mass entrepreneurship and Innovation

Wenjuan Xiao <sup>1,a</sup>

<sup>1</sup>School of Electrical Engineering, Northwest Minzu University, Gansu, China

<sup>a</sup>xwj@xbmu.edu.cn

**Abstract.** The teaching task of "Power Electronics Technology" course is to learn the control method of general power electronics devices, master the working principle of four kinds of converter technology, and finally apply in the engineering field. In order to cultivate talents with the ability of innovation and entrepreneurship, curriculum reform should also keep pace with the times. This paper explores the teaching reform of "Power Electronic Technology" in detail from the aspects of curriculum teaching idea reform, teaching content reform and teaching evaluation mechanism reform, so as to provide ideas for mass innovation education.

**Key words:** innovation and entrepreneurship; power electronics technology; reform of teaching

## 1. Introduction

Science and technology are the primary productive forces. Innovation is the inexhaustible driving force for the development of science and technology. The goal of higher education is to train scientific and technological talents with innovative ability and innovative thinking to contribute to socialist modernization. The Ministry of Education has put forward a new educational idea of "building first-class undergraduate programs, strengthening first-class majors and cultivating first-class talents"[1]. This idea takes students as the center, promotes curriculum reform and teaching reform, and further improves the quality of training innovative talents. Power electronic technology is widely used in daily life and industrial production, especially in the high-voltage transmission, clean energy power generation, new energy vehicles and other fields play an important role[2]. Therefore, in order to truly enable students to meet the needs of enterprises and society and contribute to the development of the country, it is necessary to constantly input new knowledge, constantly cultivate students' awareness of innovation, and keep abreast of The Times in the cultivation of skills and thinking. Teaching reform aimed at cultivating innovative talents will be more significant.

## 2. Reform of teaching concept

Educational reform must start from renewing educational ideas. In contrast, innovative talents should have solid basic theory, rich scientific knowledge, rigorous research methods, and the courage to explore unknown areas[3]. The current education mode should be changed from the traditional "indoctrination and acceptance" education to the active "pioneering education" mode. Through teaching, we hope to stimulate students' enthusiasm for learning, let students take the initiative to discover and solve problems, and cultivate students' innovation ability in this process, so as to deeply plant active and dialectical thinking in students' minds, so as to make the whole teaching process full of vitality, thus achieving the ultimate goal of cultivating innovative talents.

The goal of classroom teaching reform of power electronic technology course is to "strengthen the foundation and emphasize the application"[4]. By strengthening the teaching of basic theory, to build a solid foundation of the subject; Strengthening practical application teaching by adding engineering case analysis; By integrating new technology, new equipment, new materials and other

information into the whole teaching process, to arouse students' interest in the school and guide students to pay attention to the development of science and technology.

### **3. Reform of teaching methods**

#### **3.1 Introduce diversified teaching methods to cultivate students' innovative thinking**

Classroom teaching is an important way for students to acquire knowledge in all aspects. To acquire more innovative knowledge and innovative thinking in class will get twice the result with half the effort to cultivate innovative talents. Therefore, the teaching and analysis of engineering cases should be strengthened in classroom teaching, and the effective combination of teaching and learning should be carried out from topic demand analysis to program selection, from principle block diagram design to concrete implementation and functional testing with the help of common engineering cases, so as to make students familiar with all aspects of engineering design and improve students' practical engineering.

We adopt the "flipped classroom" and other new ideas to cultivate innovative talents in order to achieve the purpose of cultivating students' innovative spirit. We use micro-classes, videos, self-study and other methods to help students get an idea of the course content, and prepare questions and personalized arguments in advance. In class, students' innovative consciousness is cultivated through engineering case introduction, interaction and discussion between teachers and students. At the same time, students are organized to conduct case analysis and design discussion and discrimination in groups. In this process, they can deepen their understanding and grasp of practical knowledge, encourage them to "question", enhance their understanding through debate and discrimination, improve thinking ability and independent analysis ability.

#### **3.2 Introduce project-based teaching content to improve students' innovation ability**

By increasing the proportion of designing questions in practice, we encourage students to make full use of practice. In practical teaching, it is not only necessary to actively combine engineering practice with comprehensive topic selection, but also to evaluate students' ability to apply theoretical knowledge in combination with practice. More importantly, it is necessary to cultivate and assess students' ability to apply comprehensive knowledge in combination with knowledge of multiple disciplines, so that students can organically combine their existing knowledge and truly apply what they have learned. By building open practice content, we promote students' innovative spirit. Encourage students to go further than the original project; A bold attempt at a related new project. Encourage students to choose their own challenging projects and give them certain flexibility in time. Encourage students to use different methods to complete the design and development of the same topic. Develop "open" laboratories and encourage students to experiment boldly.

#### **3.3 Set up comprehensive practical training to improve students' comprehensive application ability**

Power electronics technology is not a separate subject, it is a bridge connecting strong and weak current, so only in the integrated curriculum design, can play its effectiveness. Through the practical training of comprehensive courses, students can have an overall understanding of the courses they have learned, understand the differences of each course and grasp the knowledge points accurately. At the same time, through the complete training, let the students participate in the whole process of design, simulation, device selection, circuit board drawing, circuit welding. In this way, students can strengthen their practical ability, find and solve problems in practice, and finally cultivate students' innovative thinking and consciousness.

#### 4. Reform of curriculum assessment method

Curriculum assessment is an effective method to test the effect of curriculum teaching, which reflects the ideas and objectives of curriculum teaching. Curriculum assessment reform should fully reflect the importance of innovative thinking. In terms of the examination content, it is not limited to the basic knowledge, and the proportion of the analysis and design questions and the innovative questions should be increased. The purpose of the examination is to examine the students' ability to solve practical problems and innovate, and test the effect of teaching reform, so as to make timely optimization and improvement. In terms of assessment methods, in addition to the traditional written test, course assessment can also be conducted by subject design, defense and other ways, so as to improve students' innovative thinking and awareness and achieve the purpose of cultivating innovative talents.

Assessment is the test of students' learning effect and the standard to determine whether the teaching goal has been achieved. The scientific examination method can guide and motivate the students' study. In terms of the proportion of grades, we can increase the proportion of experimental courses in the total grades of power electronic technology courses to improve students' attention to experimental courses. Experimental design tests students' mastery and application of knowledge points. Teachers can design test questions in combination with scientific research projects. Students can write out experimental principles and experimental schemes through literature review. Through a variety of assessment methods, help students master standardized operational skills and solid basic knowledge, improve students' innovation ability.

#### 5. Summary

In the era of mass innovation and entrepreneurship, the teaching of power electronic technology courses should also firmly grasp the cultivation of students' innovative thinking and innovative consciousness. In the course of teaching, it is necessary to update the educational concept in real time, reform the teaching method and optimize the assessment mechanism. Only in this way can the core objectives of power electronic technology teaching be realized and innovative and entrepreneurial talents adapted to the development of The Times be cultivated.

#### Acknowledgment

2021 Employment and Entrepreneurship Ability Improvement Project of College Students in Gansu Province. 2022 Northwest Minzu university Talent Training Quality Improvement Project (Project No.: 2022XJJG-02). 2021 Northwest Minzu university First-Class Undergraduate Courses (Project No.: YLKC-151)

#### References

- [1] Shi Rongliang, Zhang Liping, Yu Yinnan. Exploration and Practice of Curriculum Reform of Power Electronics Technology under the background of Mass Entrepreneurship and Innovation [J]. Journal of Popular Science and Technology, 201,23(04):118-120.
- [2] He Guofeng, Fan Xiaohong. Exploration on the Reform of Specialized Electrical Automation Courses under the Background of "Mass Entrepreneurship and Innovation" [J]. Journal of Higher Education, 2016, (22):144-145.
- [3] Li Xin, Li Ruoqiong, Zhang Ruiping, Li Shuaibing, Zhen Xiaofei, Li Mingche. Teaching Reform and Exploration of New Energy Major "Power Electronic Technology" Based on Innovation and Entrepreneurship education Concept [J]. China Electric Power Education, 2021, (04):62-63.
- [4] Zhu Yongsheng, Dong Yan, Xiao Junming. Teaching Reform Practice of Power Electronic Technology Course for Electrical Major under Excellence Plan [J]. China Educational Technology and Equipment, 2016, (12):78-79.