

# Research on “Promoting teaching by competition” in the construction of electronic majors in local colleges and universities

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**Abstract:** This paper aims at training practical electronic undergraduate talents in local ordinary undergraduate colleges and universities. Through analyzing the current situation and common construction methods of electronic major construction, this paper proposes to integrate electronic design competition into teaching design. In the practice process, the competition training and daily teaching depth integration, to achieve the purpose of promoting teaching by competition, and at the same time in practice summed up several integration models, the common planning method of promoting teaching by competition is put forward.

**Key words:** promoting teaching by competition; Electric competition; Local general undergraduate

## Introduction

In 2019, the Ministry of Education clearly pointed out that it is necessary to guide students to participate in competitions rationally, so as to achieve the effect of promoting teaching and learning through competition. At the same time, it also emphasized that competitions and other work should be strictly included in the workload of education and teaching, included in the annual assessment content, and sufficient planning has been made in guiding students and subsidizing teachers, which greatly promoted the process of integrating competition system into teaching. As a traditional competition, the National College Students Electronic Design Competition (hereinafter referred to as the Electrical competition) is one of the college students' discipline competitions with wide influence jointly initiated by the Ministry of Education and the Ministry of Industry and Information Technology. The title of the competition is not only closely related to the content involved in the course, but also closely related to the production practice. Therefore, the electronic major takes the electronic competition as the main position to explore the teaching mode of “promoting education by competition”, which can not only improve the comprehensive quality and skill level of students, but also further enhance the teaching level of teachers and enhance the cooperation between schools and enterprises.

The construction of electronic major needs a profound theoretical foundation and teaching staff, which is the most scarce resource in the construction major of local ordinary undergraduate universities, and electronic design competition is an excellent platform for training students and training professional teachers. “Promoting teaching by competition” is a dimension of the teaching reform of electronic major, and also a teaching optimization based on electronic competition. Electronic major is a major that both theory and practice need to be taken into account at the same time, emphasizing the important role of practice teaching in cultivating students' professional ability. Guided by “professional ability” and focusing on the flexible application of students' professional ability, the electronic design Competition for college students is a platform to evaluate the comprehensive ability of students majoring in electronics, and can better promote the practice process of electronics major.

By analyzing the training status quo and training mode of each course in the training process of electronic major, this paper introduces the content and mode of electronic competition into the classroom, realizes the in-depth reform of teaching mode, improves the teaching quality of teachers, and enhances the enthusiasm, initiative and innovation of students in class, and draws the teaching reform plan planning based on college students' electronic design competition. And further achieve the application of the teaching reform of “promoting teaching by competition”.

## 1. Current situation of electronic major construction

Practice is an important training link for the construction of electronic professional ability, and it is also the practical demand for the teaching of this major. As a major that takes both theory and practice into consideration, practice teaching is an important step to cultivate students' professional ability. However, in the actual implementation process, the factors that affect the quality and effect of practical teaching mainly focus on the following aspects:

(1) The professionalization of professional training is not obvious

Limited by the construction of the knowledge system of undergraduate courses and the acquisition of students' credits, it is easy for undergraduate electronic courses to deviate from the essence of e-learning -- application. Therefore, it is common for theoretical learning time to be much longer than practical time in the teaching process. At the same time, in the course teaching process, the knowledge content is not closely connected with the actual production and life, which will make students mistakenly think that the learning content is remote like “hanging garden”. This phenomenon is especially obvious in the early stage of the construction of electronic major, mainly because of limited funds and the introduction or employment of teachers without profound industry background in this field. Therefore, there is a lack of grasp of professional professionalism.

(2) Poor continuity of courses

The construction of course content is the main content of students' study, but students of different majors should pay more attention

to the course content. Especially for general colleges and universities, large-scale construction of teaching methods such as general courses may be counterproductive, because students' knowledge acceptance level is difficult to digest a large number of in-depth learning content, which also greatly reduces the class hours of professional courses, resulting in wide knowledge coverage, few class hours and relatively independent chapter content, which affects the coherence of course content.

(3) The development direction of the curriculum system is not clear

Curriculum learning is designed for the development of students, but due to the above mentioned problems, in the development of the curriculum system, if the final training purpose of the curriculum system is not well evaluated, it may be a tragic lesson for students' learning. The development direction of the curriculum system needs to be controlled by department leaders or even school leaders. However, in fact, the heads of newly established undergraduate majors in local undergraduate colleges are usually concurrently held by teachers of other interdisciplinary disciplines, and professional leaders with high research standards cannot be equipped in a short period of time. As a result, it is difficult to grasp the formulation of the curriculum system. The dilemma of changing the direction time after time, and the direction of student training is not clear.

## **2.The common professional construction methods and analysis**

There are many difficulties in professional construction. According to the professional training directions of different schools and in line with the regional advantages and connections of colleges and universities, colleges and universities generally adopt the following ways to develop the talents training of electronic majors:

(1) The development direction based on factory production

Most of the training direction of electronics major is to train applied talents for the society, so many colleges and universities maintain deep cooperation with electronics factories in professional construction, and even the courses taught are closely related to the practice of factories. At the same time, factories are also willing to cooperate with colleges and universities. On the one hand, they can solve some basic factory tasks, and on the other hand, they can properly absorb excellent students to become employees. Some companies will promote their products to colleges and universities and encourage teachers to teach relevant courses. This model can well solve the problem of students' skills and employment.

(2) The research-based development mode

In fact, the factory-oriented development mode is the way to encourage students to go out, while schools hope to strongly encourage teachers to go out, which is the direction of professional construction based on scientific research. After all, compared with students, the number of teachers is smaller, which is convenient for school management, and the object of management is more mature, so many colleges and universities hope that the scientific research of teachers will drive the construction of disciplines and majors. However, this way of development first requires discipline leaders with deep professional background, second, it takes a long time to build a team to form a large teaching scale, and finally, due to the long time span, the construction process may have a certain impact on teaching.

(3) The mode of taking part in competitions

The form of competition is a common form of competition, through a certain period of training, to obtain a strong purpose of the competition results. Taking college students' electronic design competition as an example, this form can improve participants' interest and participation in a short period of time, and at the same time has an important role in promoting the construction of participants' knowledge and ability system. For the participants, students are the main participants, but the participation of the instructor in the competition, compared with the previous two ways, the coverage of the participants is wider, and can greatly improve the application of knowledge in the training process, which has an important role in promoting the improvement of team cohesion.

From the above analysis of several professional construction directions, compared with factory cooperation and scientific research and creation, the competition-oriented construction direction is the way with the lowest cost and the broadest scope, and its influence has the same effect on students and teachers.

## **3. Several planning ways to promote teaching through competition**

To integrate the content of electronic design competition in the process of participating in teaching, it is necessary to start construction through the following ways:

(1) project-oriented course content

The requirements of electric competition are from simple to complex, so in the course design can be the basic knowledge content, integrated into the corresponding course. For example, in the design of the common intelligent tracking car, the principle of tracking is based on the bidirectional transmission of infrared sensors. If the single chip microcomputer is used as the core control device, it needs to be well integrated into the memory call and timing design of the single chip microcomputer to complete the design content. Therefore, around this project, the course design to achieve tracking through the infrared sensor and through the PWM drive motor as the project goal, can teach students to use the use of storage and timing counter, so that the teaching goal is more clear, more project-oriented.

(2) Productization of curriculum objectives

Many questions in the electrical competition are based on the practical application of product design, in the course design, can be based on the product design to teach students the basic knowledge at the same time, teach the basic principles of product design, so that students know "learn to use, learn to apply" the truth. For example, the design and production of time frequency measuring instruments, the purpose

of the contest is to let students make a set of measuring instruments that can complete the physical parameters of frequency, period, time interval and phase, among which the measurement of time and frequency is highly compatible with the “using gate position to measure pulse width” in the teaching content of the single chip computer. The contest can be used to introduce the course content in the teaching process. And use the learned content to make a simple product. This can not only stimulate students’ interest in learning, but also productize the learned content, so that the learned content is realistic and has teaching effect.

### (3) Coherence of knowledge system

The ultimate goal of learning is to learn a set of theories, not scattered knowledge points, so the coherence of knowledge system is an extremely important link in the teaching process, but also the most difficult to achieve. The introduction of electrical competition courses can help this part well. Due to the comprehensive design of electrical competition questions, the whole question is constructed by a multi-dimensional knowledge system such as principle analysis, case design, achievement evaluation and integration summary. A certain period of training can train students to reshape and integrate engineering knowledge. For example, the design of the intelligent obstacle avoidance car includes the motor drive, the use of gray sensor, the evaluation of the obstacle avoidance effect and the algorithm optimization of the obstacle avoidance process, which includes all the contents of the basic single-chip microcomputer control hardware, so the integration into the course will greatly improve the enthusiasm of students and the richness of the course content.

## Summary

Many local ordinary undergraduate colleges and universities have not changed from specialty to undergraduate for a long time, and are in a critical period of development and transformation to application-oriented colleges. Electronic control courses, as a highly practical course, need to cultivate students’ independent learning ability and innovative consciousness through various courses. Timely integration into the topic of electrical competition can greatly improve students’ hands-on ability and ability to analyze and solve problems. At the same time, this kind of integration mode can also be used as a course design course, so that students can improve their thesis writing and promote the development of undergraduate thesis quality. With the continuous development of science and technology, students’ ability to accept new knowledge also needs to be updated. Application-oriented colleges and universities should not expect the education of students by the society to promote the improvement of students’ professional skills. Instead, they should let students master a learning method of scientific and technological knowledge and summarize a set of development rules for their own ability improvement. In order to meet the training needs of high-level applied talents in local colleges and universities.

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