Practice on Graduation Design of Electronic Information Engineering Technology Major in Vocational College

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Abstract

As an important part of electronic information engineering technology teaching, graduation design is an important link for junior college students in vocational colleges. By analyzing the current situation of graduation project selection and the management of graduation design in colleges and universities , this paper discusses a teaching mode of school-enterprise joint guidance for graduation design. This teaching mode is suitable for the characteristics of higher vocational education and the orientation of the training goal of high-quality skilled talents, and it promotes the reform of the talent training mode to the direction of school-enterprise cooperation.

Keywords

Vocational education, electronic information engineering technology, graduation design, talent cultivation.

1. Introduction

The major of electronic information engineering technology in higher vocational colleges requires the talents trained to meet the needs of regional economic development. The talents should have certain learning ability, working ability, professional ability and professional ability[1] .Graduation design is a very important practical teaching link for electronic information engineering technology major in higher vocational colleges to achieve the goal of talent training. Through the graduation design, students can sort out and summarize the professional knowledge they have learned in the past three years, and apply the professional knowledge comprehensively to solve practical engineering problems. Graduation design is an effective test and summary of students' knowledge and skills, as well as a bridge connecting theoretical knowledge learning to practical work[2] .

2. Analysis of Current Situation

2.1 Graduation Project Topics

Each graduation project topic is simulated by the professional instructor, and then students choose the graduation design topics [3] . These graduation projects are often taken from the teachers of the usual scientific research topics in some decomposition point, a long time, easy to cause the following two problems.

The first problem is that graduation projects are often in a single form, and lack of enterprise links. At present, many young teachers in colleges and universities are directly engaged in teaching in colleges and universities after graduation. Although they have a high degree and a good theoretical foundation, they are obviously lack of practical experience in work. There are also some experienced teachers who have been engaged in teaching and have little contact with enterprises and cannot keep up with new knowledge. And the graduation project subjects designed by these teachers often lack the degree of connection with enterprise subjects.

Secondly, after a long time of implementation, there will be a high rate of project similarity, and even some graduation project topics have been used repeatedly in this major for many times. The graduates

of the next class can even find the graduation design of the previous class to copy, which seriously affects the graduation design.

2.2 The Management of Graduation Design

There are many problems in the management of graduation project [4] . On the one hand, due to the enrollment expansion of colleges and universities, the number of students increases, and the teachers who guide the graduation design not only guide the graduation design, but also undertake the daily classroom teaching and scientific research tasks. When guiding students, the time allocation and energy input will be significantly reduced.

On the other hand, the graduation design of higher vocational colleges is arranged in the second semester of the junior year. In this semester, all other compulsory courses have been finished, and students' task is to complete a graduation design project. However, during this time, some students will be busy looking for jobs or going to work for internship, and cannot balance the relationship between work and graduation design well. Some students are busy reviewing for the entrance examination, which leads to their limited investment and insufficient attention in graduation design. It is difficult for instructors to give unified guidance and inspection [5] . Considering the employment situation of students, most instructors tend to take a very tolerant attitude towards the problem that the graduation design cannot be completed by quality and quantity, and lower and relax the originally set high standards, although every school has strict management inspection and grading standards for the graduation design. In the long run, such management of graduation design can easily cause students' inertia, which will obviously reduce the quality of graduation design and fail to achieve the goal of talent training [6] .

3. Design of Teaching Mode

3.1 Increase the Enterprise Post Internship Link

The comprehensive practice of graduation in higher vocational education is quite different from the traditional graduation design. Higher vocational graduation design refers to the practical process in which students, under the guidance of teachers, combine the specific work requirements of a certain professional post group, and use the knowledge and technology they have learned to solve various problems in the post, so as to realize the accumulation of their own knowledge and improve their technical application ability and professional competence. For this reason, the comprehensive practice of graduation needs to focus on the combination with the position, and the training of students with the position should be in a very important position.

According to the analysis of the talent cultivation mode and current situation of higher vocational education, the comprehensive practice of graduation in the second semester of junior year is divided into two modules according to the time. In the first ten weeks, students will finish their graduation project, and in the last ten weeks, they need to finish their internship in the corresponding enterprises. The two modules are scored separately. Students should not only complete the school project and meet the corresponding scoring standards, but also complete the ten weeks in-post internship in accordance with the rules and regulations of the enterprise and reach the qualified score before completing the graduation requirements.

3.2 The Reform of Graduation Project Topics

3.2.1 The Design of Graduation Project Topic

In terms of the design of graduation project, in addition to the comprehensiveness, typicality, practicality and innovation of the project, the scale, difficulty and degree of fitting with the major should also be considered. Therefore, the following principles are formulated in this paper.

(1)The objectives of graduation design and professional training should be consistent.

(2)The design of graduation project should be combined with production practice

(3)The difficulty of the project should be graded and taught according to students' aptitude

Each subject basically contains the main course knowledge of the electronic information engineering technology major: electronic technology, electronic CAD, single-chip technology, intelligent electronic product research and development. At the same time, each subject can be set into two different design requirements, respectively suitable for students with medium or above ability and weak ability. Table 1 as follows illustrates the proposed graduation project topic information overview.

Table 1 Graduation Project topic information

Number	Project Title	source of subjects	Whether It Is Suitable for Hierarchical Teaching
1	Design of fog and haze detection alarm	Taken From Actual Projects	yes
2	Simple electronic organ design and manufacture	Taken From Actual Projects	yes
3	Wireless intercom doorbell design	Taken From Actual Projects	yes
4	Design of intelligent water cup	Taken From Actual Projects	yes
5	Intelligent access control system design	Taken From Actual Projects	yes
6	Mapping and principle analysis of digital program-controlled exchange principle experiment box	Taken from the enterprise project	yes

3.2.2 Assignment of Graduation Project Topics

Although the comprehensive practice of graduation every year arranges the last ten weeks of internship in the company, some students still choose to practice in the company in advance due to the company or their own reasons. Most of the students will choose to stay in school to do graduation design, but some students will choose to focus on the entrance examination review, which will affect the effect of graduation design. In order to solve these problems, the assignment of the project is adjusted as follows:

Firstly, in order to reduce the difficulty, students are divided into groups to do the graduation project, and 3-4 students are assigned as a group to complete a graduation project together. Secondly, the difficulty of the subject is taught in different levels. According to the characteristics of different students, it is reasonable to set the difficulty and requirements of the subject, and assign the subject accordingly. Thirdly, students who are employed in advance are encouraged to choose enterprise projects in close combination with enterprises, and teachers of enterprise projects are required to be assigned.

3.3 Organization of Graduation Project

Due to the difference of students' knowledge and ability, the same graduation project may be easy for some students, but difficult for others. The graduation design is a personalized teaching process. For students with poor foundation and weak ability, they should pay attention to the training of basic professional contents. While for students with solid basic knowledge, we should pay attention to cultivate and improve their independent thinking ability and innovation ability, encourage them to study deeply, design content should be deepened appropriately, difficulty should be improved appropriately. Therefore, in the whole process of graduation design guidance, students should be based on the results of the topic selection, especially they should be paid attention to the concept of hierarchical teaching. According to the principle of bidirectional selection of graduation design, 4 of the 6 proposed projects were assigned to different students.During the implementation process, the following two principles should be paid attention to.

According to the ability of the team students, the content and requirements of the graduation project are stratified, which can be implemented in accordance with table 2.

Table 2 Graduation Design Content and Requirements

Project Title	Student Ability	Design Content and Requirements
Design of fog and haze detection alarm	Above average ability, Stay at school	Complete the overall program design, circuit design, software design, physical production and debugging, appearance production.
Simple electronic organ design and manufacture	The average ability, Stay at school	Complete the overall program design, circuit design, software design, physical production and debugging.
Wireless intercom doorbell design	Below average ability,Stay at school	Complete the overall scheme design, circuit design, physical production and debugging, reduce the circuit requirements.
Mapping and principle analysis of digital program-controlled exchange principle experiment box	Below average ability, Employment in advance	Complete the theoretical design, physical production.is not required

According to the characteristics of students, teachers' guidance methods are hierarchical and personalized, which are implemented in accordance with table 3.

Table3 Teachers' Guidance Methods

Project Title	Student Ability	Teachers' Guidance Methods
Design of fog and haze detection alarm	Above average ability, stay at school	Teachers and students should coordinate to arrange the process, give appropriate hints, and require students to give full play to their subjective initiative to complete the design and production of the circuit system combining software and hardware, and ensure face-to-face guidance at least three times a week
Simple electronic organ design and manufacture	The average ability, stay at school	Teachers and students work together to arrange the process, and the overall scheme design, circuit design, production and debugging are mainly completed by students independently, but sufficient guidance should be given at each stage, or even help to solve the fault
Wireless intercom doorbell design	Below average ability, stay at school	The teacher arranged the process, and the students independently completed the overall scheme design. Each module provided the framework and the main chip, and required the students to complete the circuit design and give full help in the production and debugging stage of the physical object.
Mapping and principle analysis of digital program-controlled exchange principle experiment box	Below average ability, employment in advance.	The teacher arranges the process, the student completes the overall plan design, completes the theory design independently, does not make the material object, requests every week three times contact.

3.4 Graduation Design Assessment

3.4.1 Final Project Defense

Graduation design defense is an important part of graduation design, which assesses students' professional ability and their ability to summarize and report. Students who have completed the tasks

of graduation project are qualified to participate in the defense, and the defense method is in groups. During the defense, students first state the content and characteristics of their design work for about 5 minutes, and then teachers and other team members ask questions, and students answer for 5 to 10 minutes, and students will ask questions into the defense results. For the team with strong ability, it is required to participate in the defense of the department and strive for excellent graduation design results. For the weaker group, only clear thinking is required and complete the defense of the professional group.

3.4.2 Graduation Design Process Assessment

The whole process of the comprehensive practice of graduation is monitored in three stages: the beginning, the middle and the end. The school has established a corresponding online platform for comprehensive practice of graduation, and tracked and recorded the specific implementation process of tasks in each stage in detail, so as to serve as the basis for assessment. For example, in the initial stage of comprehensive practice of graduation, all students are required to fill in the arrangement of topic selection and progress plan of comprehensive practice of graduation. During the internship, it is required to write weekly notes, summarize and review once a week, communicate with the instructor at least twice a week, and sort out process photos and documents and upload them to the platform. At the end of this stage, students are required to summarize the whole graduation comprehensive practice, and put forward their own objective Suggestions on the curriculum setting and practical arrangement of professional construction. Only when corresponding data is completed can corresponding credits be obtained. Through this method, the students of off-campus internship are well restrained and their learning consciousness is improved.

4. Conclusion

Through the continuous exploration and innovation of practical teaching system, the graduation design of electronic information engineering technology major has formed the pattern research of school-enterprise joint guidance of graduation design. This method can effectively solve the problems existing in the current college graduation design, meet the needs of employment and market development, and is more conducive to the cultivation of application-oriented talents under the new situation, and realize the combination of production, study and research in a real sense. This mode is still in the exploration stage, and there are still many deficiencies in the design cooperation process, such as the difficulty in topic selection, strict enterprise management, the sense of responsibility of off-campus instructors, the reasonable allocation of time and other issues.However, it is an inevitable trend for the development of engineering majors to guide the graduation design jointly by universities and enterprises.

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