Transactions on Comparative Education (2024)
Clausius Scientific Press, Canada

DOI: 10.23977/trance.2024.060518
ISSN 2523-5818 Vol. 6 Num. 5

Research on the Model of School-enterprise Collaborative Education Graduation Thesis from the Perspective of Integration of Production and Education

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Keywords: School-enterprise cooperation, Machinery, Graduation dissertation

Abstract: This study integrates the graduation design of higher vocational education with the requirements of enterprises from the perspective of the integration of production and education, investigates the school-enterprise collaborative education model for mechanism majors, adopts the dual tutorial system, and conducts reforms and explorations from the selection of graduation design topics to the assessment and other aspects. The content of students' graduation theses is derived from the actual problems of enterprises, and the quality of graduation theses is enhanced through the guidance of both internal and external tutors. It exercises students' ability to solve production problems and realizes the closed-loop connection from theory to practice. At the same time, in the process of graduation design, the requirements of enterprises and professional standards are linked, professional personnel training programs are improved, course content and teaching process are optimized, and teaching truly advances with the times, serves professional enterprises, and further enhances teachers' dual-teacher teaching ability and consolidates the construction of the dual-teacher team.

1. Research Background

Graduation design is the last comprehensive practical teaching link in the vocational education talent training plan. It is a bridge for students to move from campus learning to actual jobs, an important link for cultivating students' engineering practice ability, theoretical research ability, innovation and entrepreneurship awareness, and a concrete reflection of the education and teaching quality of schools and professional teachers. It is an important basis for students' graduation and degree qualification recognition [1-2].

The purpose of vocational education graduation design is to cultivate students' ability to combine theory and practice and improve their comprehensive quality in professional fields. The quality and ability of students' graduation thesis is the teaching yardstick to maintain the social reputation of the school. Therefore, doing a good job in graduation thesis is of great significance to training high-quality applied talents with innovative spirit and practical ability [3-4].

The major of machinery mainly cultivates talents with professional quality and basic theories in the fields of mechanical design, electrical control and fluid transmission, and cultivates high-quality applied technical talents in the field of mechanical design and manufacturing with innovative spirit, practical ability, research and development ability and production management ability. Graduation design is a very important compulsory course in the process of training mechanical professionals. Good graduation design is in line with the actual content, in line with professional characteristics, students independent research, the combination of theory and practice. However, how to achieve high-quality development of graduation design is an urgent problem for vocational colleges, which is of great significance for vocational colleges to improve teaching quality, train skilled talents adapted to the production line, and improve students' ability to analyze and solve problems [5-6].

With the development of The Times, the proposal of "Made in China 2025", the training of talents for machinery majors is also changing, at present, the traditional manufacturing industry is transforming and upgrading to intelligent manufacturing, and the demand and ability of enterprises for graduates of mechanical majors in vocational colleges are also changing, and the demand of enterprises in addition to having a certain theoretical basis, Strong analytical and problem-solving skills are also required.

2. Present situation of graduation thesis of higher vocational education

At present, in the higher vocational college graduation thesis, there are some contradictions, such as Teachers: the number of instructors and the number of students is not coordinated, the ratio of teachers to students can reach 1:10, or even more, each instructor is limited in energy, the teacher guides more students, the quality of natural graduation thesis is not high, the instructor in order to complete the task, the title or model of the graduation thesis is unchanged for many years, the content of the graduation thesis can not keep pace with The Times, close to the production line. As for the students, they are not interested in the topic of graduation thesis, but also have the pressure of internship and further study, which leads to the students struggling to cope with the serious phenomenon of plagiarism, which does not play the proper training effect, leading to the obvious landslide phenomenon in the quality of students' graduation design. Therefore, to explore the high-quality development of graduation design is an urgent problem for vocational colleges.

Through the analysis of the graduation design mode of mechanical major in recent years, the problems are summarized as follows:

1) The topic of graduation design lacks engineering application background and can not keep up with the needs of The Times. College teachers and enterprise production line is not closely connected, college teachers are difficult to dig out the practical application of the graduation thesis topic, resulting in guiding teachers of the topic of old-fashioned, mostly for machine tool failure, mechanical processing, fixture design, hydraulic system design and other directions of the topic, emphasis on theoretical calculation, the lack of practical application value, for the enterprise's new process, new norms, new concepts know little.

2) The content of the graduation thesis is inconsistent with the goal of vocational education. The contents of the papers are mostly design, research and discussion, with varying degrees of difficulty, emphasis on theory, separation from production practice, and relatively simple mode, which is inconsistent with the orientation of vocational education. Students' professional knowledge has not been applied to production practice, and the training goal of comprehensive application of knowledge cannot be achieved. Students' ability to analyze and solve problems cannot be trained. Creativity and potential cannot be shown, which cannot reflect the significance of graduation design.

3) There is a conflict between the schedule of graduation design and students' job hunting, and

students pay little attention to graduation design. In general, the graduation design of higher vocational education is carried out in the sixth semester, and students are busy with internships and job hunting, so they have little energy to devote to the graduation design and can not actively invest in the research of the graduation thesis. Therefore, the role of the graduation design has not been played.

Based on the actual situation of the school and the existing conditions, this paper explores a feasible implementation plan for the reform of the graduation design mode of the mechanical major through the school-enterprise collaborative education mechanism, so as to improve the efficiency of the transformation of the teaching and practice of graduation design and enhance the core competitiveness of students in the practice of entering the workforce. This paper constructs a set of graduation project resource base which is suitable for the typical vocational post group of mechanical major in vocational colleges, and provides a reference for revealing the practical significance of the graduation project reform of similar majors.

3. School-enterprise collaborative education model

At present, it is an indisputable fact that enterprises need to spend a long time on pre-job training for newly recruited graduates to adapt to job requirements. Under the current education mode, there is a big gap between the students cultivated and the social needs in terms of practical experience, knowledge application ability, innovation consciousness, teamwork spirit and communication ability. Among them, graduation design can further connect students and enterprises. Then, in order to introduce enterprises into the graduation design, it is necessary to establish a graduation design mode of school-enterprise cooperation to educate people.

The graduation design mode of school-enterprise collaborative education: for some students who practice in the unit in advance, it is equipped with internal and external graduation thesis dual instructors, and the external instructors can be related enterprise engineers, class leaders, technical experts and so on. In this way, the graduation design guidance work can be carried out from the fifth semester, together with the students' internship in the factory, students in the enterprise practice at the same time, dig the graduation design content, and finally, the sixth semester under the guidance of the double instructor to complete the graduation design. At the same time, I will complete the graduation design defense in the enterprise or school, and the school and the enterprise will participate in the evaluation combined with the internship situation, and complete the comprehensive evaluation of the graduation design performance. To achieve "the subject originates from production, research is used for production", and truly achieve the integration of production and education.

The topic of the student's graduation design should come from the real production line, and the design content should come from the production equipment or production transformation being applied by the enterprise. The student's graduation design should be combined with the practical problems found in the process of production technology innovation, transformation and efficiency improvement of the enterprise, and through the process of problem discovery, problem analysis, problem solving and practical evaluation. Colleges and universities improve the ability of students to directly participate in solving the practical problems of production technology in enterprises. At the same time, through the realization of their own value, improve the desire of students to further understand the production technology, enhance the practicality of graduation design. More importantly, students are directly involved in the production technology and innovative design of enterprises, which will improve the ability to enter the production line. In terms of professional guidance, the joint guidance mode of "enterprise professional technical guidance as the main + theoretical teachers in school as the auxiliary" is adopted. On the basis of meeting the production

practice of enterprises, the professionalism, theory and task of graduation design can be better grasped. Through the positive interaction between professional and technical personnel of enterprises and theoretical teachers in school, It can realize the two-way improvement of "theory to application, application to theory".

Through the graduation project, which is a very important part of student training, this topic will establish connections between students and enterprises, achieve school-enterprise collaborative education, enable students to apply theory to practice, realize knowledge integration, improve students' professional quality, and create conditions for students' employment.

First of all, 30 graduates majoring in machinery manufacturing and automation were selected for 2-3 years to pilot the school-enterprise collaborative education graduation design mode, and the graduation design effects and shortcomings were feed-back through the pilot. Then, the school-enterprise collaborative education graduation design mode was revised in view of relevant problems. Finally, a set of school-enterprise collaborative education graduation design mode suitable for machinery majors in private colleges and universities was established.

Specific implementation steps of school-enterprise collaborative education graduation design mode:

1) Graduation project selection and preparation stage:

Graduation design time: Implement the school-enterprise collaborative education graduation design model. Students who practice in enterprises should apply for graduation design in the second semester of the second year of junior college, and the college should sign the "school-enterprise cooperation cooperative education agreement" with the internship unit, and students should complete the graduation design within the specified schedule.

Topic selection: The topic selection includes both teachers and students. For teachers, the graduation design topic is determined jointly by enterprise engineers or experienced workers and teachers in the school, so as to ensure that the graduation design topic, content and workload meet the requirements of professional personnel training and enterprise needs. Students choose topics according to their personal interests and employment situation, and do one problem per person. After the project is selected, the teacher puts forward the design requirements to the students to assign the design task, so that the students can carry out the design preparation work in a targeted way.

2) Project guidance process:

After the completion of the topic selection and preparation work, students can carry out the design work in various stages under the guidance of the enterprise instructor and the school teacher. The overall process of graduation design guidance is as follows: In the first stage, plan design or specific implementation is carried out according to the research content; The second stage, mid-term inspection; The third stage, the overall preparation of the design specification. In the school-enterprise cooperative education graduation design mode, the double tutorial system is implemented, and students complete the entire graduation design stage in the enterprise. In order to facilitate the guidance of teachers on campus, a remote guidance mechanism should be established to facilitate the communication between students and teachers on campus, and students can also complete the graduation project proposal and mid-term inspection remotely. In addition, the college should establish a quality control mechanism, formulate the "school-enterprise Collaborative Education graduate design Management Measures", in order to establish a graduation design process of school-enterprise joint guidance, joint evaluation of the operation management mechanism. So as to standardize the management of graduation design and ensure the quality of graduation design.

3) Defense process and score assessment:

The on-campus defense shall be adopted, and a performance evaluation committee composed of

professional teachers, industry experts, enterprise engineers, technical craftsmen and human resources management departments shall be set up to comprehensively evaluate and demonstrate the research data, exploration plans and physical results of students' graduation design and production technology innovation. Under feasible conditions, it is necessary to conduct experimental demonstration directly in the field production equipment, change the traditional "pedantic interrogation defense" mode of written results, and conduct comprehensive evaluation from the practicability, practicality and direct efficiency. At the same time, colleges and universities are exploring a new mode of graduation defense with the guidance of "direct employment, direct entry and direct start-up" and the participation of tutors, enterprise leaders and industry associations in "graduation design defense - production practice results display - employment recruitment and enrollment", so that students' graduation design results can be directly tested by society, enterprises and the market. Universities make graduation design a bridge between "school graduation and enterprise employment".

4. Conclusion

Graduation design is an important practical teaching link in vocational education. Traditional graduation design mode lacks flexibility and novelty, and teachers and students lack enthusiasm. The school-enterprise collaborative education graduation design mode described in this paper has been reformed and explored in aspects from graduation design selection to assessment, so as to meet the needs of enterprises and professional standards in the process of graduation design. To improve the professional talent training program, optimize the course content and teaching process, is really to keep pace with The Times in teaching, professional service enterprises, further enhance the teacher's double-teacher teaching ability, and consolidate the construction of double-teacher teachers. It not only improves the quality of graduation project, enhances the core competitiveness of graduates' employment, but also provides reference for the reform of graduation project of other related majors.

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