

A Literature Review of the Joint Training of Graduate Students in Mechanical Engineering

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Abstract

In recent years, with the continuous development of education in our country, aiming at the existence of graduate students in the traditional learning practical ability can not get exercise, lack of learning resources developed university-enterprise joint training mode, implement double teacher training mechanism, strengthen the practice and application of the master, to help graduate students to strengthen the exploration and practice in learning, innovation and practical ability, the application of high talent, better able to cope with complicated working condition in production practice of complex problems.

Keywords

Mechanical engineering, School-enterprise union, Professional degree graduate.

1. Introduction

University-enterprise joint training is relative to the case of a single campus school model, graduate student university-enterprise united training school and enterprise cooperation, mainly refers to the market and social needs as the guidance, most of the universities and enterprises of two different education environment and resources, and jointly establish tutor group, provide graduate education with advanced science and technology, excellent teacher team, good practice environment, according to the training goal of graduate students, colleges and enterprises to establish training plan, take an organic combination of classroom teaching and to participate in the practical work, to cultivate applied talents to satisfy the needs of the market of education training mode^[1-2].

2. Advantages of joint school and enterprise training

At present, China's increasing the scale of graduate student recruit students, the employment situation is more serious, and the continuous development of machinery industry also prompted to institutions of higher learning cultivate innovative practice ability, solid professional knowledge, can effectively solve the problem of the engineering practice, to adapt to the economic and social development needs of high-level applied talents, and in the aspect of training of graduate students in colleges and universities also pay more and more attention to practice this link, corresponding added in cultivating enterprise practice, production practice, research practice, and in graduate education and the combination of enterprise, closely connected, It makes up for the shortage of resources, lack of scientific research and practice ability caused by off-production of traditional postgraduate education, and develops the school-enterprise joint training mode, which further reflects the importance of practice for postgraduate study^[3].

For mechanical engineering, because of all sorts of complicated problems in practical production, practice becomes even more important, the specialized degree graduate student is focus on its application in practice, but over the past few years of exploration and practice also exposed some problems, such as professional degree graduate education to some extent, still keep the same as the academic graduate teaching mode, problems such as lack of necessary practice teaching link, thus creates a university-enterprise joint training modes, the mechanical engineering specialized degree graduate student is more favorable.

3. School-enterprise joint training method

There are still some problems in the current school-enterprise joint training model, such as the fact that the enterprise has not taken a substantial part in the training process, the school-enterprise joint is not deep enough, and the students' innovative and practical ability is weak. The formation of high-level application-oriented personnel training system is a long-term practical process, which needs to be constantly explored and improved. Therefore, to perfect the education system for professional degree postgraduates and ensure the quality of graduate education has become an urgent problem to be solved in the training of professional degree postgraduates. In view of these problems, the following aspects are mainly discussed^[4].

3.1 Improve the joint training mechanism and arrange the training plan reasonably

In the development of the training plan, students should not only comprehensively master the basic theoretical knowledge, but also formulate it according to the enterprise's technology and project characteristics based on the actual situation of the enterprise, so as to enable students to comprehensively master the technology. In the training plan, should increase the enterprise practice, corporate practice, is a central part of the master's degree graduate student training, this is not only the fundamental distinction between professional degree and academic degree, is also a professional degree graduate students practical ability and technical ability the important way of experience, he, well implement specialized degree graduate student practice base, is to train graduate students practice ability and innovation consciousness is the important guarantee^[5].

The cultivation of the professional degree graduate students need a solid theoretical foundation, certain aspects of the course, shall, according to the specific manufacture content related courses, needs the school teacher in students' theoretical study stage for students to develop a plan of reasonable course, complete theoretical basis for study in the school, with the enterprise practice content promote each other, promote each other, make the graduate students in the practice of the enterprise can better and faster understanding and into, also make the practice and theory can better together, make the graduate study in theory and practice, the better to master relevant knowledge, and improve the innovation ability and practice ability.

For the problem of the proportion of theory and practice in the cultivation plan, it needs to be carefully formulated. The practice of professional degree graduate students should have at least a year time, this practice does not include courses contained within the experiment content, but in the enterprise for a task or open laboratory for the specific investment of body and mind, so he training, colleges and universities in classroom teaching theoretical knowledge and practical training in the lab is engaged in the with the enterprise practice are equally important. Environment in a real engineering practice, and engineers to work together with enterprises, really get in touch with the production practice, strengthen the practice ability, realize the work of the project scene, understand the professional requirements of enterprises, cultivate team consciousness, professional quality and communication skills, can better play to the advantages of the joint between colleges cultivate, cultivate qualified high-level application-oriented talents.

3.2 Strengthen practical application guidance and explore more appropriate teaching models

The cultivation of high quality engineering talents is based on the comprehensive development of knowledge, ability and quality to construct the teaching mode, especially the cultivation of practice ability. The key to the operation of this mode is to build a team of teachers with high comprehensive quality and strong practical ability. They should not only have the basic ability of university teachers, but also have the engineering quality that should be possessed by industrial engineers. That is to say, they should have extensive professional knowledge, rich practical experience, excellent teaching ability and lofty professional ethics. Only in this way can they be qualified for the task of cultivating education for professional degree graduates^[6].

Of curriculum knowledge should be better combined with the engineering practice, the application of combined with the instance, the knowledge into practice, so that the students can better understand

the theoretical knowledge is applied to the actual situation, strengthening practice teaching and theories teaching of mutual penetration and mutual promotion, strive to promote discussion-based teaching, based on case of the inquisitive teaching based on questions, based on the project of the participatory teaching and various teaching methods. Through discussion, communication, questioning and comments, students are trained to analyze and solve problems, as well as to judge and make decisions on specific problems.

Engineering majors are characterized by strong practicality. If only theoretical knowledge is taught in class, instead of contacting production practice in the construction site, the teaching content will be empty and boring, making it difficult for students to digest and understand professional knowledge. Therefore, it is necessary to popularize the on-site teaching method, especially to arrange the on-site teaching of certain class hours for professional courses, so that students can have access to engineering practice. At the same time, experienced engineers from enterprises can be invited to make on-site explanation and analysis for students to cultivate students' engineering awareness. It turns out that students are much more impressed by the knowledge they acquire directly at the production site than by the book knowledge they listen to in class. Therefore, the knowledge with strong practicality should be taught on the production site, so that students can strengthen their engineering practice ability and enhance their employment competitiveness and position adaptability through their personal experience of practical engineering problems.

3.3 Corporate tutors and instructors in the school are in close contact

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Business mentor general selection experience, can in technology, the industrial quality, management has certain experience, keen to personnel training, can also be set at the same time the enterprise practice common for graduate students guidance, enterprise practice teachers mainly on a line with high technical level, strong ability in site operation management level of people. In the cultivation of graduate students, the sense of mission of on-campus and enterprise tutors should be improved, and the communication between the two tutors should be promoted. The cultivation plan and implementation plan with individual characteristics should be formulated for each professional degree graduate student.

In terms of specific ways of cooperation, the two parties should be able to perform their respective duties according to the objectives of the talent cultivation program. The academic tasks completed by the on-campus mentor are under the guidance of the on-campus mentor, and the technical, product and practical operation are under the guidance of the off-campus business mentor. At the university level, enterprise practice should be regarded as an important part of graduate training program, and graduate enterprise practice, engineering experience, skill training and comprehensive training should be incorporated into the school training program to form a comprehensive training system;

In terms of enterprise, we should start from the overall situation and the perspective of national talent cultivation. In the practice of graduate students, we should be able to give practical guidance, learn the quality, management and technology of enterprises, and promote the combination of theory and practice of students.

At the same time, we should strengthen the cooperation and communication between teachers inside and outside the school, learn from each other's strengths and make up for each other's weaknesses, constantly summarize experience, and jointly improve the guidance level. We should establish a management mechanism for school-enterprise cooperation. In terms of strategy, university leaders should exchange views with the top management of enterprises, and both sides should exchange views on talent cultivation and enterprise development to achieve the goal of win-win; in terms of mentor guidance, enterprise and on-campus mentor should be able to exchange views on the specific training mode of postgraduates, and reach consensus on the training mode through theoretical guidance, technical communication and practice improvement; In terms of operation management, universities and enterprises should establish professional management institutions to be responsible

for the management of school-enterprise cooperation bases and bring the operation management of practice bases into their respective responsibilities. In the construction of practice base for professional degree postgraduates, we should be able to adopt a strategic perspective, take mutual benefit and win-win as the objective, take the improvement of professional degree postgraduates' professional ability as the core, and carry out the whole process of talent cultivation with quality awareness.

In the guidance of graduate students, we should give full play to the teacher practice strength thick, experience the full advantage of the enterprise engineer rich practical experience and college teachers profound knowledge, joint teaching, complementary advantages, to effectively solve the problem of university talents cultivation irrelevant to the actual needs of the businesses, break down barriers between university and society. The graduate student's thesis should draw on the practical engineering problems of the enterprise, enable the students to truly participate in the actual engineering research and development projects, focus on cultivating the students' ability to solve practical problems creatively, realize the linkage of learning, practice, development and other links, and achieve the effect of mutual promotion of theory and practice.

3.4 Schools and companies jointly evaluate graduate studies

The quality of training has always been the key consideration of postgraduate education. The teaching quality, students' academic performance, students' ability assessment, and the quality of dissertation, etc. are all the quality standards for professional postgraduate education. In the process of cultivating graduate students, the assessment of practical ability should be carried out regularly, the existing practical ability should be assessed, the potential practical ability should be explored, the learning plan should be adjusted appropriately, and the training quality should be improved. The school and the enterprise jointly carry out the examination of the postgraduate study status, help the graduate students to discover the problems existing in study and practice, and further improve, constantly adjust and progress, so that the school and enterprise can be more familiar with the school-enterprise joint training mode, and the graduate students get continuous improvement.

4. Conclusion

Generally speaking, the goal of graduate students majoring in master's degree is to cultivate high-level application-oriented talents. In practice, it has been proved that the school-enterprise cooperative training mode is able to cultivate the application ability of technology, management and innovation of graduate students. Of course, there are still many difficulties and problems to be solved in the school-enterprise cooperation training of professional masters: How to better deal with the relationship and proportion between theory and practice in the training plan, how to deal with the problem of broad theoretical knowledge and professional depth, how to evaluate the research and development practice of professional master, how to find a good cooperative enterprise to establish a cooperative training base or graduate work station, etc. The university-enterprise joint training of mechanical engineering degree graduate students has innovated the teaching system and teaching methods, integrated the resource advantages of the university and the enterprise, built an effective school-enterprise joint training mechanism, and made the talent training of the university and the talent demand of the enterprise form a positive interaction, making the university and the enterprise win-win and common development. As a result, the innovative practice ability and comprehensive quality of professional degree graduate students are constantly improved, and a large number of high-level applied talents with strong innovation ability and meeting the needs of economic and social development are cultivated.

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