

Exploration of Practice Bases Outside School in the Cultivation of Practical Abilities for Professional Master's Students

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Abstract

In response to the lack of practical ability among professional master's degree students, this paper explores the role of practice bases outside school in cultivating practical ability. Firstly, the principles of constructing practice bases outside school are introduced. Then, taking Z Electric Co., Ltd. as an example, the construction of practical bases and the role of practical bases in cultivating graduate students' practical abilities are introduced. Finally, some issues in the construction process of the practice base are reflected upon.

Keywords

Practice base outside school, Practical ability; Professional Master's students.

1. Introduction

The cultivation of professional degree graduate students is an important way to cultivate high-level applied talents in China. At present, the enrollment of professional master's degree students has far exceeded that of academic master's degree students. According to statistics, in 2023, China recruited 689790 professional master's degree students and 413738 academic master's degree students [1]. The cultivation of engineering literacy and practical ability for professional master's degrees has become a key focus of training units [2].

The cultivation of engineering practical ability is a long-term process. It needs to be improved through course learning, practical teaching, project training, and professional practice. In the process of cultivating professional master's degree students, the professional practice stage is particularly crucial. And practice bases outside school can play a significant role in cultivating students' practical abilities [3]. Tianen Lai proposed seven models for the construction of off campus practice bases based on the perspective of resource dependence [4]. Shihong Lai explored the cultivation of engineering practice ability using the electronic information professional degree as an example [5]. Professor Xiaochun Chen introduced a series of work, including the expansion of inside school and outside school practice bases, the construction of enterprise guidance teacher teams, etc., to enhance students' practical and innovative abilities [6]. After entering the practical base, students are exposed to practical topics and can fully unleash their potential. Exercise and improve their practical ability in concrete production practice.

2. Construction of Practice Bases Outside Schools

2.1. Selection of Practice Base

For the selection of off campus practice bases, the first consideration is the consistency of the students' major. Practical ability is a comprehensive test of students' mastery of the knowledge they have learned. It is a process of testing students' comprehensive application of various knowledge to solve practical problems. Promote the transformation of knowledge into ability through practical activities. It is also a great opportunity for college students to form a good knowledge, ability, and quality structure. Therefore, only when the practical base is in line with the students' major, can they better understand and familiarize themselves with the characteristics of their profession. Only in this way can students better apply the basic theories, knowledge, techniques, and skills they have learned to practice comprehensively. By integrating theory with practice through practical activities, students can achieve a leap from theory to practice. Therefore, when selecting a practical base, it is important to pay attention to its compatibility with the profession, so as to play the appropriate role in cultivating practical abilities.

The strength and technological capability of the enterprise are also key factors that need to be considered. Enterprises should have their own leading products, as well as a certain level of technological accumulation and market share. Such enterprises have a certain position in the industry. After entering the practice base, students can truly understand the development of the industry, master some of the current technologies in the industry, and receive training. Enterprises have a certain level of technical strength and can provide guidance to students, fulfilling the responsibility of external mentors. As an extension and supplement of classroom education in schools, practical base education requires the construction of a teacher team with reasonable structure and professional expertise. In combination with the research direction of the master of engineering, according to the practical conditions of engineering, with the goal of "cultivating excellent engineering talents", the tutors in and out of the school jointly design targeted innovation practice training, new product research and development, technological innovation and improvement. Training units are the main body of engineering master education. They shoulder the responsibility of producing excellent masters of engineering. They should actively support the scientific research and innovation of engineering master students and encourage engineering master students to carry out invention and creation activities. So as to comprehensively improve the technical innovation ability of engineering master students.

In addition, it is necessary to strengthen the standardized management of practice base. When choosing a practice base, it is also necessary to consider basic issues such as food, accommodation, study, health and safety of interns. The practice base should be able to help solve the problems of accommodation, labor protection and health for interns. Thus, the economic burden of students and colleges and universities can be reduced, so that students can effectively participate in practical activities and successfully complete practical teaching plans. Practice is not only the test of students' knowledge, but also the edification of students' thoughts. Practice base is the best training environment for students' pre-service education, such as: good atmosphere, orderly, advancing with the times and so on. In all aspects of the more standardized unit practice, students can not only improve the level of professional knowledge, master professional skills and techniques, but also receive a more profound professional ideological education, for the future to adapt to the society to lay a good ideological foundation. Practice base outside school is an extension of school education. The standardization of practice base outside school is also an important content.

2.2. Construction of Practice Base

Integrate multi-subject resources, and implement the construction of practice base from the perspective of funds, resource integration and utilization. In terms of fund investment, explore the university and the society to jointly raise funds. In terms of resource integration, cultivate practical ability training platform, establish and improve the practice base inside and outside the school. In this way, the practice base can provide sufficient practical resources, including advanced equipment, rich project cases and professional instructors, so that students have the opportunity to learn and work in a corporate environment. Enterprises transform practical engineering problems into student topics. After the completion of the basic courses, students will enter the enterprise for technical research and practice. Under the guidance of the university and the enterprise mentor, they will use the resources of both sides to complete the project, so as to improve the practical ability of engineering. Implementation of the "double tutor system" teaching mode, school tutors and enterprise tutors cooperate to compile practical teaching materials, plan course content, and jointly guide students in the practice of learning and practical operation.

Strengthen the training and training of students' project system and implement the project-driven teaching method. This allows students to learn and apply knowledge in the process of completing specific engineering projects. In terms of teaching methods, students are guided by experienced teachers to set up exploratory practice topics. Students engage in research-based practice through problem-based projects. In terms of teaching management, we should strengthen the support of professional education teams, pay attention to the role of student groups, and cultivate students' problem-solving ability and innovative thinking. In terms of communication mechanism, make use of alumni resources. After graduation, alumni also have the needs of continuing education and career development, so they can gather resources to achieve a win-win situation for both students and alumni.

3. Construction of Zhizhen Company Practice Base

3.1. Introduction of Zhizhen Company

Zhizhen Electric Co., Ltd. is a high-tech enterprise specializing in the development, production, consulting and installation services of monitoring products in the field of power and has independent intellectual property rights. It provides the best products and technical services in the field of operation condition monitoring, fault detection and location, online monitoring (control), complete SCADA system and distribution network automation for power system distribution network and power equipment and power supply lines of user power supply departments such as railway, petroleum, coal, metallurgy and chemical industry. Zhizhen company cooperates with many well-known scientific research institutes in China, is committed to technological innovation, and always regards technological innovation as the lifeline of enterprise development. Zhizhen company team has many years of experience in enterprise management, marketing, research and development production, engineering design and construction in the field of fault line selection, data collection, fault location and online monitoring (control), distribution network automation. In addition, Zhizhen company also rented houses for students who came to practice, which solved the worries of students.

3.2. Professional Master's Students Who Entered Zhizhen Company

W Senior engineer of Zhizhen company, master graduate, with more than 20 years of work experience, is a well-known expert in electrical engineering. W serves as an outside tutor for graduate students in D University, J University, Qxxx University and many other universities. W has trained a number of professional degree and master's students for D University and Qxxx University. Take student Z as an example. Z enrolled in 2018 and studied cultural courses in the

school in the first year. In July 2019, he entered the Zhizhen company and W senior engineer served as his outside mentor. During this period, according to Z's research topic, under the guidance of W, Z participated in a number of projects of Z Company. Student Z not only participated in the product development process in Zhizhen Company, but also went to the user site and participated in the installation and commissioning of the product. After more than one year, Z has a deep understanding of the engineering site and the industry situation, can deal with the general problems in the process of product installation and commissioning, has a certain work experience, and has accumulated engineering practical ability. In 2021, student Z graduated. Due to his rich practical ability, he won the interview of State Grid Corporation and successfully entered State Grid Xinjiang Company. Like student Z, there are 4~5 students who practice in Zhizhen Company every year, participate in the project, and have been trained in practical ability and achieved good results.

4. Thinking on the construction of practice base outside school

4.1. Mutual benefit between the school and the enterprise

Qxxx University has established many practical bases outside the school during graduate education. Some of them run well and can accept students for practical activities every year. But there are also some practice bases that only started accepting a few students and basically had no further activities afterwards. On the one hand, it has a certain relationship with the enterprise itself. And on the other hand, it is also related to the lack of positive interaction between off campus practice bases and universities. The construction of off campus practice bases should be a mutually beneficial process, where enterprises can make progress in research and development through cooperation and receive support from universities. Universities can convert some of their scientific research achievements to enhance the competitiveness of enterprises, thereby obtaining necessary benefits. The whole process is a mutually reinforcing process, so that it can develop healthily. Once separated from the mutually beneficial model, it is destined to not go far.

4.2. Evaluation mechanism for graduate thesis

At present, the evaluation of graduate thesis mainly relies on publishing papers as a way of verifying results, but lacks specific requirements for practical content. This evaluation mechanism hinders the investment of professional master's degree students in practical ability cultivation and training. The graduation thesis of graduate students needs to undergo blind review, and the experts involved in blind review are mostly experts and scholars from universities. There are many experts and scholars with rich engineering experience among them. But more of them are experts who enter universities directly after graduating from universities. Most of these experts are skilled in theoretical analysis, but lack understanding of practical engineering problems. This has resulted in blind review experts scoring master's theses that are biased towards engineering practice relatively low, and even failing to pass blind review. This greatly undermines the enthusiasm of students and teachers to engage in engineering practice. In the future, a reasonable graduate thesis evaluation mechanism should be established to evaluate papers from both innovative and engineering perspectives, so that a group of practical papers can also stand out.

5. Conclusion

The construction of practice base is of great help to the training of professional master's degree students. Students can get in touch with the actual industrial production, understand the development of the industry, and accumulate their practical ability. The construction of practice

base should be mutual benefit and common development between enterprises and universities, so as to truly build a good practice base.

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References

- [1] Information on http://www.moe.gov.cn/jyb_sjzl/moe_560/2022/quanguo/202401/t20240110_1099524.html
- [2] Zhang Xuemin, Hou Fogang: How far is it from theory to practice? ---A discussion on the knowledge transformation mechanism of case teaching for professional degree postgraduates, *Modern university education*, (2020) no.1, p.103-109. (In Chinese)
- [3] Tian-en. Lai: Research on Construction of off-campus practice Base for full-time Master of Engineering (Master., South China University of Technology, China 2018), p.50.
- [4] Altbach, Philip G, The emergence of a field: research and training in higher education, *Studies in Higher Education*, 39(2014), No.8, p.1306-1320.
- [5] Shihong Lai, Research on Cultivating Engineering Practice Ability for Full time Master of Engineering --Taking Electronic and Information Engineering Professional degree category as an Example, (Master., Hebei University, China 2024), p.70.
- [6] Xiaochun Chen, Qing Xu, Jiajin Zhang, Improving the Practice and Innovation Ability of Full-time Master of Engineering by Constructing Practice Bases Outside School, (2018), No.3, p.5-7. (In Chinese).