

Exploration of Multiple Integration Training Mechanisms of Electronic Information Professional Degree Postgraduates

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Abstract: With the reform of higher education and the new requirements of innovative personnel training, it is particularly important to change the mode of high-level personnel training. Graduate education plays an important role in cultivating innovative talents. Professional degree graduate education is a part and parcel of the graduate education system, which is mainly oriented to improving vocational ability and is the main way to cultivate high-level applied specialized talents. Based on the current situation and effectiveness of optoelectronic Professional degree postgraduate training in electronic information major of Chongqing University of Technology, this paper puts forward the multi-integration training mode to promote the practice and exploration of electronic information engineering master training.

1. Introduction

With the rapid development of the economy and society, it is urgent to cultivate high-level specialized talents with innovation, entrepreneurship, and practical abilities ^[1]. It is particularly important to change the talent training mode to satisfy the new requirements of innovative talent training. Postgraduate education takes responsibility for cultivating innovative talents, improving innovation ability, and serving economic and social development ^[2]. Both academic and professional degree postgraduates, with their own characteristics and of the same quality, are important channels to cultivate high-level and innovative talents. The graduate education of engineering professional degree is an important part of the graduate education system, which is mainly oriented to improving vocational ability and is the main way to cultivate high-level applied specialized talents ^[3]. With the continuous and rapid development of the regional economy, the further acceleration of enterprise transformation and upgrading, and the growing scale of engineering master students, it is necessary to further improve the training objective, training mode and evaluation system of master's degree in optoelectronics of electronic information ^[4]. Based on the current situation of professional degree postgraduate training, this paper innovates the training methods of the master degree of electronic information, so as to promote the improvement of professional degree postgraduate training quality.

2. Current Situation of Professional Degree Postgraduate Culturing of Electronic Information in Optoelectronics

2.1 Experience and Results in the Training of Professional Degree Graduate Students

On the basis of meeting the national industrial development plan and the economic construction of Chongqing and its surrounding areas, the professional degree training in electronic information of Chongqing University of Technology is mainly to face the demands of the industrial development of electronic information in optoelectronics and cultivates application-oriented high-level engineering technology and engineering management talents with outstanding technological innovation ability and practical ability in the field of optoelectronics. Through years of scientific research, application of results, and reform of talent training mode, the professional degree

postgraduate culturing of electronic information in the field of optoelectronics has obtained certain advantages and characteristics.

2.1.1 Favourable Tutor Team and Sufficient Training Platform

Focusing on the development of intelligent technology and the photoelectric information industry in Chongqing, based on the existing “Chongqing Key Laboratory of Modern Photoelectric Detection Technology and Instrument” and “Chongqing Key Laboratory of Green Energy Materials Technology and System”, different interdisciplinary research teams have been assembled. The supervisors of electronic information in optoelectronics have high comprehensive quality, strong scientific research strength, reasonable age, and educational background structure. Among them, there are 14 professors and 9 associate professors. A teaching and research platform for influential graduate students has been constructed. There are Chongqing Key Laboratory, Chongqing University Physics Experiment Demonstration Centre, Chongqing Physics Demonstration and Exploration Science Education base, and Optoelectronic Information Experiment Center in this discipline. The laboratory covers an area of more than 1500 square meters, with 1400 sets of advanced teaching and research equipment for the realization of professional degree postgraduate training.

2.1.2 Fruitful School-Enterprise Cooperation

According to the demands of discipline development and engineering research ability cultivation, we have established good cooperative relations with more than 10 optoelectronic enterprises. A talent training base has been set up to provide a good off-campus practice platform for professional degree graduate culturing in the field of optoelectronics. Some new research features such as optical fiber gas sensing technology in harsh environments, microstructure optical fiber design fusion energy containing material sensing, atomization assisted CVD optical film preparation technology, and distributed photovoltaic system technology are created. Through cooperation with enterprises, the main discipline direction have be condensed. At present, some characteristics, such as training directions of optical fiber sensing technology, micro/nano photoelectric materials and devices, photoelectric control, and instruments have been formed to adapt to the development of the national and regional optoelectronic information industry.

2.2 Deficiencies in Professional Degree Postgraduate Culturing

Although we have got some experience and results in the training of graduate students in the field of optoelectronics, there are still some shortcomings to be improved

2.2.1 Insufficient Diversification of the Curriculum

The theoretical curriculum system of electronic information professional degree graduate training is designed based on the classical subject curriculum view and subject teaching view, emphasizing the systematic and scientific organization of subject curriculum and content, but it rarely carries out independent and systematic planning based on the needs of engineering education and does not fully meet the real needs of enterprises. That results in a certain gap between the training of talents and the needs of enterprises^[5]. Therefore, it is difficult to realize the progressive cultivation of engineering practice ability and innovative spirit. At the same time, the course setting rarely involves the cultivation of comprehensive quality, and graduate tutors generally only focus on the cultivation of graduate students' professional knowledge and academic ability. Whereas graduate students still need to improve their communication ability, critical thinking ability, teamwork ability and other aspects. To some extent, this training mode limits the improvement of graduate students' comprehensive ability, which is not conducive to becoming high-quality compound talents with both political integrity and ability.

2.2.2 The Cultivation of Engineering Practical Ability is Not Prominent

Corporate senior technicians were hired as off-campus tutors for engineering masters. They train electronic information graduate students together with tutors in the university, to realize the “double

tutor system” of cooperation between the university and enterprises. This strategy has largely solved the problem of knowledge structure requirements for tutors in the process of cultivating engineering masters. However, in the actual training process, due to the lack of communication between enterprise mentors and university mentors, enterprise mentors do not have high participation in the training process of professional degree postgraduates. Therefore, the master of engineering majoring in electronic information lacks practical experience, and the topic selection and topic research of degree theses mostly stay at the theoretical level, which is not closely combined with the practical application of enterprises.

2.2.3 The Evaluation System is Not Perfect

The training of electronic information graduate students is affected by the training of academic masters to a certain extent. The formulation of the evaluation system, examination system, reward system, and curriculum system is affected by the traditional educational development concept. It means that the current quality evaluation system of professional degree graduate training is not perfect, and it is necessary to establish a quality evaluation standard and continuous improvement mechanism of professional degree graduate training.

3. Construction of a Diversified and Integrated Training Mechanism

3.1 Integration of Theoretical Teaching and Practical Teaching

According to the demands of the optoelectronic industry for high-level talents, it is necessary to revise the training program with the cultivation of engineering ability and innovative spirit as the core. The internal requirements of training objectives and the knowledge structure required by talent training are organically combined. Behalf of improving the professional quality of optoelectronic talents, it is necessary to highlight practicality in curriculum setting, teaching process, and dissertation requirements. At the same time, for the sake of cultivating students' engineering ability and innovation spirit, we need to establish a curriculum system that satisfies the actual demands of enterprises and career development in the field of optoelectronics. In the teaching practice, we should adopt flexible and diversified teaching methods and methods, adhere to the practice orientation of teaching mode, strengthen the construction of the case base, and strive to cultivate high-quality talents in the field of optoelectronics.

3.2 Integration of Schools, Enterprises, and Research Institutes

The professional degree graduate education of electronic information in the field of optoelectronics is oriented by the key needs of lighting and display in the optoelectronics industry and regional economy and cultivates application-oriented and compound high-level engineering talents. On the basis of the requirement of the national engineering master professional degree and developments of Chongqing area, the talents training is to promote electronic information research to meet the national needs and the local optoelectronics industry and to improve the scientific research ability of social services. Firstly, by reasonably optimizing the allocation of local character resources and taking the interests and demands of the industry as the link, the school-enterprise coordination mechanism of “sharing and win-win” needs to be constructed. Secondly, with the support of superior disciplines and common scientific research fields, we should promote collaboration between universities and universities in collaborative research and innovation. Thirdly, we should carry out interdisciplinary, cross-industry, and cross-border international cooperation guided by cutting-edge international technologies. Finally, it is necessary to create a new platform for multi-discipline collaborative training of talents, such as multi-integration training methods.

3.3 Integration of Dissertation and Engineering Application

The topic selection of electronic information professional degree graduate degree theses in the field of optoelectronics should be combined with the engineering practice and production practice of the optoelectronics industry. Depending on the demands of regional economic and social

development and the scientific and technological problems of optoelectronic-related enterprises and relying on engineering practice problems and industry-university-research cooperative enterprise topics, it is necessary to find the entry point of dissertation research from the practical problems of engineering practice. The research content is based on the research and development requirements of new materials, new products, new equipment, and new technology in photoelectric enterprises and research institutes. Graduate students participate in technical research in the form of scientific research projects to improve the engineering practice ability of master students in the optoelectronics industry.

4. Conclusion

Relying on the experience and shortcomings of the professional degree graduate training of electronic information major in Chongqing University of Technology, we put forward the exploration path of promoting the graduate training of electronic information and optoelectronics with multiple fusion methods. It is expected to improve the professional quality of electronic information master students, such as more solid basic theoretical knowledge, stronger engineering practice ability and innovation spirit, and more competitive communication and expression ability, which can well meet the actual needs of optoelectronic enterprises for high-level applied talents.

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