

Thoughts on the Construction of Vacuum Technology Specialty for Non-normal Majors in Local Normal Universities

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Abstract: In recent years, with the continuous expansion of the scale of non-normal majors in local normal universities, in the construction process of non-normal majors, on the one hand, normal universities pay attention to the education of students' basic theoretical knowledge, on the other hand, they ignore the practical teaching link or pay less attention to it. Taking vacuum technology specialty as an example, this paper continuously deepens the reform from several aspects, such as optimizing the personnel training program, scientifically planning the teaching content, and highlighting the practical teaching links, so as to improve the construction level of vacuum technology specialty and continuously improve the quality of vacuum technology personnel training.

Keywords: Local Normal University; Non-normal Major; Major Construction; Vacuum Technology Major

In recent years, in order to enhance their competitiveness, local normal universities have set up many non-normal majors^[1]. However, after all, non-normal majors are different from normal majors, with weak foundation and poor foundation. A large part of them start from scratch, and the phenomenon of three or five people running majors is very common^[2]. Compared with normal majors, the quality of talent training of non-normal majors is obviously insufficient. This results in low social recognition of non-normal majors and weak core competitiveness of non-normal graduates^[3]. How to solve the common problems existing in the development of non-normal majors in local normal universities, overcome the geographical disadvantages, and improve the level of serving local social development, is the urgent need for the development of local normal universities. Strengthening the construction of non-normal majors and improving the quality of personnel training is the only way for the development of local normal universities. Taking vacuum technology specialty of Z normal university as an example, this paper discusses the construction ideas and measures of non-normal specialty in local normal universities.

1. Current situation of vacuum technology specialty

With the development of modern science and technology, vacuum technology, as an independent discipline, plays an increasingly important role in the field of science and technology, and is applied more and more widely. It is one of the indispensable technologies in industry, agriculture, military, civil, especially in the field of modern cutting-edge science^[4]. Vacuum technology as a commonly used basic knowledge and skills in graduate education, especially in materials graduate education, as a course is more common^[5]. As an undergraduate major, there are only a few universities offering vacuum technology major. The universities directly under the ministry level are mainly Northeastern University and Hefei University

of Technology. In the process of professional development and integration, the name of vacuum technology major of the two universities directly under the ministry level has been changed to process equipment and control engineering, and the curriculum system mainly involves basic courses, professional education courses and practice courses. First, the basic course of process equipment and control theory is studied, then the professional education courses of vacuum technology, vacuum design, vacuum measurement and application are studied, and finally the practical operation and practice are carried out. The two universities have trained a large number of professional and technical personnel for the domestic vacuum technology industry, and have a decisive influence and good reputation in the domestic vacuum field. At present, there is only one university in Z normal university offering vacuum technology major, which is mainly based on physics courses to train vacuum coating technology talents. Compared with the two universities directly under the ministry level, the history of running a school is short, the experience of running a school is insufficient, and there is still a big gap.

2. Problems in the construction of vacuum technology specialty in Z college

Influenced by the history of normal education, there are still some problems in the development of vacuum technology specialty, which restrict the improvement of the construction quality of vacuum technology specialty.

2.1 The enrollment situation is not optimistic

The first is the shortage of students. In terms of the current enrollment of several students, the first voluntary enrollment rate is less than 50%, most of them are transferred from other majors, and the registration rate of the first four is only 85.26%. Among the registered students, especially the freshmen of grade 2020, the application rate for changing majors is as high as 26.32%. Second, the students' enthusiasm for vacuum technology is not high. Most of the students are transferred to vacuum technology major, lack of professional cognition and professional identity, resulting in low enthusiasm for daily learning. In addition, influenced by the normal major, although many students are majoring in vacuum technology, they always want to be a teacher after graduation, and they lack of professional knowledge, which affects the quality of professional training to a certain extent.

2.2 The construction of supporting teaching facilities is insufficient

As a practical major, vacuum technology specialty needs the combination of theory and practice, and practical training is very important in teaching. Through bold operation and frequent dismantling of vacuum equipment, we can have a more intuitive and profound understanding of vacuum system and vacuum theory knowledge. The price of vacuum coating equipment is expensive. The absolute quantity of vacuum coating equipment in colleges and universities is insufficient, and most of them are used for teachers' scientific research. The vacuum equipment used for teaching is extremely scarce. In order to meet the teaching needs, we can only equip desktop type simplified vacuum equipment for teaching, in order to solve the urgent need. It is difficult to meet the needs of economic and social development of vacuum technology personnel training.

2.3 The final employment rate of counterpart is not optimistic

The employment rate is the test of professional construction level and school running quality^[6]. From the demand of vacuum enterprises for vacuum technical talents, enterprises prefer comprehensive talents who not only have solid theoretical knowledge of vacuum technology, but also have strong practical operation ability, can operate equipment, understand equipment maintenance, repair and maintenance, understand technology, understand customers, and understand the market. According to the survey on the employment situation of the graduates of the 20th vacuum technology major, the results show that most of the students are not firm enough in the belief of engaging in vacuum technology for a long time after graduation, and the final employment rate of the corresponding major is less than 20%. On the one hand, a large number of vacuum technology professionals are needed in the development of vacuum technology enterprises; on the other hand, vacuum technology students generally change jobs after employment, resulting in unsatisfactory employment.

3. Measures to strengthen the construction of vacuum technology specialty

The construction of non-normal majors in local normal universities should get rid of the shackles of normal majors, follow the development law of non-normal majors, meet the needs of talents according to the needs of social economy and market

development, strengthen the integration of production and teaching in the aspects of talent training program, teaching content, teaching staff and practical teaching, and take the road of production, teaching and research development, so as to improve the quality of professional talents training.

3.1 Optimize the professional training program

In accordance with the law of higher education and talent growth, based on the catalogue and introduction of undergraduate majors in colleges and universities (2012) and the national standard for teaching quality of majors in colleges and universities^[7], with the purpose of adapting to the needs of social and economic development and the main line of cultivating professional and technical ability, we design students' ideological, quality and professional skills objectives, and formulate vacuum technology professionals the training plan of talents. First, full investigation and demonstration. The non-normal majors in local normal universities should transport professional and technical talents for the local, and take on the service function of local economic and social development. They should go to the front-line jobs of local enterprises for on-the-spot investigation, clarify the job requirements, and explore the knowledge, ability and quality requirements of the front-line professional and technical jobs for technical talents. Second, we should set up professional goals and cultivate students' professional pride of becoming a powerful country with skills. Encourage students to work and love, take vacuum technology as their lifelong career, and realize their professional value. Third, build a professional curriculum system of vacuum technology professional training and taking into account the promotion of academic qualifications. Combined with the actual requirements of vacuum enterprise technical post on the knowledge structure and skills of practitioners, decompose the post ability requirements, integrate the corresponding courses supporting basic theoretical knowledge, practical skills and personal quality, pay attention to the cultivation of students' professional ability and learning ability, and form a vacuum equipment structure design and manufacturing, which is supported by typical vacuum technology, materials and physics basic theoretical knowledge. The course system mainly includes the application and maintenance of vacuum equipment, vacuum material analysis and process design, vacuum technology research and development, production and management.

3.2 Scientific planning of teaching content

Non-normal majors in local normal universities should comply with the requirements of social development for technical talents in the new era, focus on the job market and the needs of some students' academic upgrading, scientifically and reasonably plan the professional teaching content, and improve the core competitiveness of vacuum technology professionals. First, basic knowledge of physics, materials and vacuum. Vacuum technology is an interdisciplinary technology for process operation, physical measurement and scientific experiment in a physical environment below one atmospheric pressure. Students need to understand the basic theoretical knowledge of physics, materials and vacuum, such as the mathematical theory of rarefied gas, vacuum materials, vacuum acquisition, vacuum measurement and vacuum coating, and finally guide the practical application through learning the basic theoretical knowledge, and on this basis, meet the needs of some students. The second is the operation, maintenance and repair of vacuum equipment. In the course of students' practical training, teachers should explain the composition of vacuum equipment: vacuum chamber, vacuum acquisition, vacuum measurement, heating and cooling, gas system and main functions of each part in combination with production practice; understand the routine maintenance process and methods of vacuum equipment, especially the ability to detect leakage of vacuum equipment. The third is the application of vacuum technology. Especially the application of vacuum coating technology in decoration, tooling, parts and medical devices and the development of related technologies.

3.3 Highlight the practical teaching link

First, the construction of school training base, give full play to the role of school scientific research platform in teaching. In the teaching process of traditional teaching methods, it provides hands-on operation opportunities, enhances the understanding of theoretical knowledge, strengthens students' hands-on ability, and cultivates creative application ability, so as to make the training content in the school consistent with the enterprise production scene to the greatest extent, and prepare for the enterprise production internship and practice. The second is to build off campus training base, strengthen school enterprise cooperation, implement the talent training mode of "theoretical teaching — on campus training — enterprise internship", effectively connect

theoretical teaching and practical teaching, and timely understand the latest development and market demand of vacuum technology, so as to make school teaching more targeted^[8]. Third, we should actively expand practical teaching activities such as innovation and entrepreneurship for college students. We should organize students to participate in teachers' research projects, actively carry out competitions at all levels, and encourage students to take the initiative to understand problems and solve problems by taking the activities of school research assistants, physical experiment design competition, youth and Internet plus as the starting point. To cultivate students' innovative consciousness and ability, and lay the foundation for students to quickly integrate into enterprises and adapt to professional and technical work after graduation.

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