Practical Teaching Methods of Oil and Gas Storage and Transportation technology in Higher Vocational Colleges under the Background of New Engineering

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Abstract: The construction of new engineering in higher education is imperative for building our country into an innovative country. In order to reflect the characteristics of vocational skills training, vocational colleges also need to reform and optimize the teaching content of related majors in this context. Based on the analysis of the challenges and background of the construction of new engineering courses in higher vocational colleges, combined with the practical teaching situation of the oil and gas storage and transportation major in higher vocational colleges, this paper explores and optimizes the innovative training scheme and teaching objectives of the major, and makes innovative design of the practical teaching mode, so as to improve the comprehensive teaching quality and teaching level of the major. This paper intends to make students interested in the theoretical courses of this major on the basis of improving the practical ability of students, training students with innovative awareness. It provides a new mode and a new countermeasure for the education and teaching reform of higher vocational colleges.

Keywords: The background of new engineering, higher vocational college, oil and gas storage and transportation technology major, practical teaching

1. Introduction

As the current financial and political pressures affect different areas of higher education, universities clearly need to clearly articulate the unique nature of their higher vocational education [1]. With the transformation of professional education in the realization of international standards, the training quality requirements for skilled workers and intermediate professionals are becoming higher and higher, so as to prepare students for successful employment in high-tech production and perfect service industry [2]. Curriculum teaching reform is the key to cultivate new engineering talents, and curriculum content system, teaching methods and curriculum evaluation are the primary factors of curriculum reform [3]. Sakhieva [4] discusses the planning and implementation of modular competence based curriculum in higher vocational colleges, especially the construction of curriculum structure based on modular competence and the formulation of its planning principles, and describes the technology of introducing modular competence based curriculum in higher vocational colleges. Kiryakova [5] determined the organization and teaching conditions of students' vocational training from the perspective of school enterprise social cooperation, demonstrated the form of school enterprise cooperation, determined the production and teaching management standards of College Students' vocational training under the condition of social partnership, and demonstrated the effectiveness of College Students' vocational training under the condition of social partnership.

Practical research and student research supervision have become an important task of higher vocational colleges including normal education department [6]. The cultivation of intrinsic

motivation is the key to the 21st century. A strong professional learning environment can enable students to develop their professional ability and professional identity. The ideal learning must be based on practice, attach personal significance to real life experience, and give students more autonomy to make choices in their school career [7]. Jabarullah[8] emphasizes active and experiential learning, so as to maximize the effectiveness of hands-on practice, rather than the application of the "ideological" theoretical method advocated by the traditional engineering scheme in teaching. Yinpeng [9] pointed out several problems in the training of petroleum engineering talents in higher vocational education, and put forward the innovative training mode of "platform + module" in theory teaching and "foundation + innovation" in practice teaching. In order to improve the students' engineering practice ability and innovation ability, Mingxing[10] has constructed the two-way practical teaching system, the reform of experimental teaching organization and management mode, the experimental teaching mode, the experimental teaching content, the evaluation method of experimental teaching, the form and content of extracurricular scientific activities of college students and other practical teaching.

This paper takes the reform and optimization of practical teaching system mode of oil and gas storage and transportation technology major in higher vocational colleges as the research object. Through strengthening the collaborative practice of schools, enterprises and their in class and extra-curricular, the final goal is to improve the students' professional innovation ability and cultivate a large number of application-oriented technical talents with certain professional background and engineering practice ability. This paper provides some thoughts and explorations on how to carry out practical teaching reform in higher vocational colleges under the background of new engineering construction.

2. Method

2.1 Analysis of Professional Construction Needs of Higher Vocational Colleges under the Background of New Engineering

The Ministry of education actively promotes the construction of new engineering and requires colleges and universities to speed up the construction and development of new engineering. This means that in the educational reform of colleges and universities, it is necessary to meet the requirements of new engineering. It is not only necessary to follow the latest industry and industry development direction to set up and develop new engineering majors, but also to promote the reform, upgrading and innovation of a large number of traditional engineering courses. According to the requirements of the ministry of education for the construction of new engineering, it is required that all disciplines should change from subject oriented to industry oriented, promote the cross compound of existing engineering, extend applied science to engineering, and improve the collaborative education mode.

The basic task of personnel training in higher vocational colleges is to train higher technical application-oriented talents with certain skills to the society, and the training must be professional skilled talents with innovative consciousness and ability. Higher vocational colleges should actively explore how to optimize the new mode of innovative personnel training in the context of new engineering under the premise of industry demand. At present, the concept of innovation and entrepreneurship education in higher vocational colleges is not clear enough, which makes some limited to the professional development in the higher vocational colleges. The requirements of the construction of new engineering for the training of engineering talents are: must build a thinking mode that meets the requirements of the new economy, and have the awareness and ability of innovation and entrepreneurship. Practice training in higher vocational colleges is an indispensable part of the construction of vocational and technical majors, and it is a basic course for students to enhance their engineering practice ability and improve their comprehensive quality. Therefore, higher vocational colleges should take the initiative to adapt to the development trend of new

technology and new engineering, constantly refine the characteristics of professional education, build some practice platforms integrating theoretical knowledge learning and project practice research and development, and realize industry-oriented technical innovation by the practice platform

2.2 Practice Teaching Status of Oil and Gas Storage and Transportation Major in Higher Vocational Colleges

In recent years, with the accelerated construction of “Gas Transmission West to East " in China, the whole oil and gas industry has developed rapidly, and the demand for oil and gas storage and transportation talents is increasingly diversified. Although the major vocational colleges are training a large number of different levels of oil and gas storage and transportation professionals, the supply of human resources for oil and gas storage and transportation enterprises is far from enough to meet the rapid development of the oil and gas industry today. The shortage of talents in the oil and gas storage and transportation industry and the mismatch between talents and social needs have not been well solved, especially in the process of carrying out the construction of oil and gas storage and transportation specialty in many higher vocational colleges, there are still many problems in practical teaching, which cannot fully meet the current requirements of personnel training in oil and gas storage and transportation enterprises.

1) The concept and objective of talent training are not suitable for the development of oil and gas industry. Higher vocational colleges lack of understanding of the characteristics of the oil and gas storage and Transportation Specialty under the background of new engineering education. Most of the practical teaching contents for the oil and gas storage and transportation specialty are discrete, and the coupling with the training objectives of the oil and gas storage and transportation specialty is not strong, which ultimately results in the limited overall effect of the practical teaching.

2) The oil and gas storage and transportation specialty urgently needs to improve college students' awareness of the importance of innovation and entrepreneurship education presently, but the application mechanism of related entrepreneurship and innovation projects is not mature. Most of the innovation and practice projects carried out in higher vocational colleges are temporary and fragmentary, and the practice effect and problems in practice are difficult to get effective feedback.

3) Due to the practice content of discrete design, the management of practice content is loose, the practice effect cannot be fed back in time, and the cultivation of innovation consciousness and ability cannot be fully carried out in the process of students' practice teaching. The enthusiasm of students for the practice project is not high, so the effect in further stimulating and cultivating students' personal ability is not good.

Due to the above problems existing in the practice teaching of oil and gas storage and transportation specialty, it is urgent to adjust and improve the current practice teaching system, and monitor the quality of practice teaching system to form a continuous improvement teaching mechanism; it is also necessary to organically combine the training of students' innovation ability and consciousness in the practice process, so that students' practice links can work effectively and realize the training of applied talents for oil and gas storage and transportation.

3. Principles of Practice Teaching Reconstruction of Oil and Gas Storage and Transportation Technology Major in Higher Vocational Colleges

In order to promote the practical teaching activities of higher vocational colleges and cultivate the innovative spirit of students, various teaching reform models emerged. With the aim of training oil and gas storage and transportation professional and technical personnel, the reform of professional curriculum system, the improvement of students' professional skills, the strengthening of the construction of "double teachers and double abilities" teaching staff, the acceleration of the construction of practice base, and the improvement of skills training and teaching methods are analyzed in this paper. In this paper, the practice teaching system of oil and gas storage and

transportation specialty has been actively explored and reformed to help students form a good learning atmosphere of independent learning and independent practical operation, and cultivate students' engineering ability and innovation ability in the process of practice. Its main contents and principles include:

1) The practice teaching of higher vocational colleges needs to take improving students' innovation spirit and ability as the core, and run innovation education through the whole teaching process, the practical teaching content and curriculum system are optimized and reformed. In addition to the skill training, the practical teaching of oil and gas storage and transportation specialty also needs the design training of technical development engineering. While teaching the theoretical knowledge to the students, the practical operation ability of the students should be trained.

2) In terms of the organization of teachers, the overall planning of vocational education development in higher vocational colleges should be guided by the transformation of educational ideas and the renewal of educational concepts, with the construction of dual teachers and dual ability teachers as the main task. Teachers should combine the practical operation education with the traditional teaching mode. In the process of practical teaching, in addition to teaching the principle verification experiments of some basic courses and professional courses, they should also add some comprehensive research experiments.

3) Cultivate the ability of combining theoretical knowledge and practical operation with application ability training in the training of students. Students can have the opportunity to carry out corresponding course group project design training or semester training project design during the whole university period, participate in various professional competitions of disciplines, strengthen students' innovation awareness and improve their engineering practice ability, which can realize the training of professional applied talents with high quality and high skills.

4) The reform of curriculum system and teaching mode is the focus in the professional teaching of oil and gas storage and transportation. To achieve the reconstruction of theoretical courses and operational practice courses and build a reasonable and clear practical teaching system. The practical projects designed in the process of practical teaching need to focus on improving students' design thinking and engineering thinking, so as to realize the improvement of students' innovation awareness and engineering leadership.

In order to keep up with the pace of the new engineering reform, this paper summarizes the principles of the reconstruction of the practical teaching program of the oil and gas storage and transportation technology specialty according to the talent training objectives of higher vocational colleges. Focusing on the mode of “practice + skill competition“ and ”engineering + practical training ” system, this paper designs the practical teaching system under the background of new engineering under this principle, so as to realize the cultivation of engineering talents with compound and innovative types.

4. Design of Practical Teaching System of oil and Gas Storage and Transportation Specialty in Higher Vocational Colleges under the Background of New Engineering

According to the characteristics of the new engineering background in the higher vocational colleges currently, this paper constructs a practical teaching platform for oil and gas storage and transportation based on the collaborative cooperation of enterprises outside and inside the school, and on this platform, constructs a practical teaching system based on the joint cooperation of "inside and outside the school" and "inside and outside the class" which is shown as Figure 1.

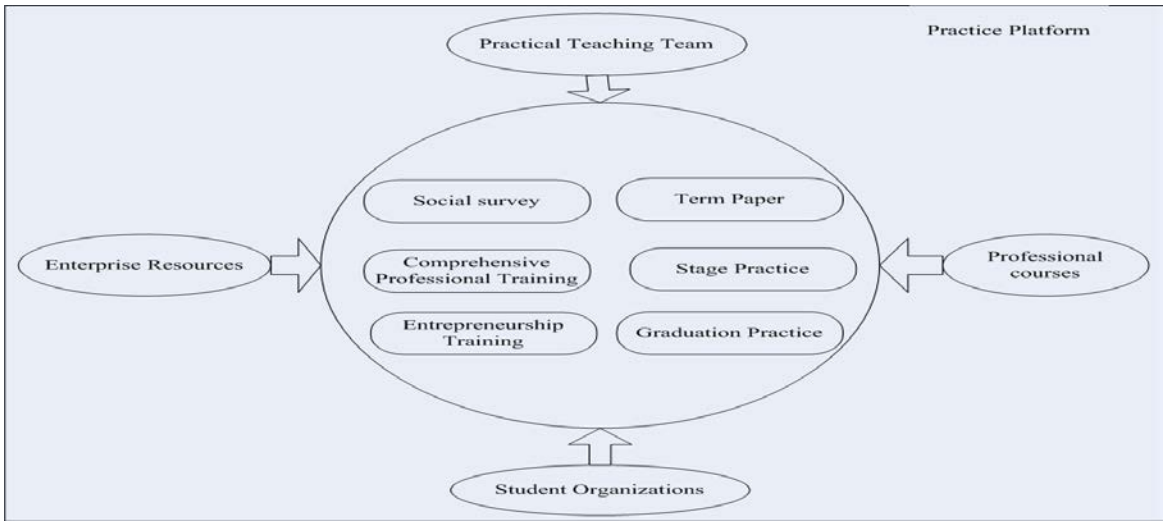

Figure 1 Practical teaching system of oil and gas storage and transportation

1) build a professional practice platform of oil and gas storage and transportation with "in school and out of school" cooperation

Centering on the whole operation process of oil and gas storage and transportation, this practice platform makes full use of the oil and gas storage and transportation cooperation practice project with the enterprise, so that students can participate in the complete business process from the initial industry research, storage and transportation scheme design to oil and gas storage and transportation service and data analysis, and it also develops the professional teachers and training courses for oil and gas storage and transportation of the institute at the same time. Different contents are provided for different grades to realize the connection between practice projects and school practice teaching contents and professional courses according to different practice projects.

2) build the practice system of oil and gas storage and transportation specialty with "in class and out of class" cooperation

The "in class" practice content in the practice teaching system of the oil and gas storage and Transportation Specialty Based on the practice platform refers to the various practical operation activities specified in the training program of the oil and gas storage and transportation specialty, and the "extracurricular" practice content refers to the practice projects and other activities that students choose to participate in during their study in the college. Students can replace the corresponding credits in the course through long-term and continuous skills training and practice projects on the practice platform, which is shown as figure 2.

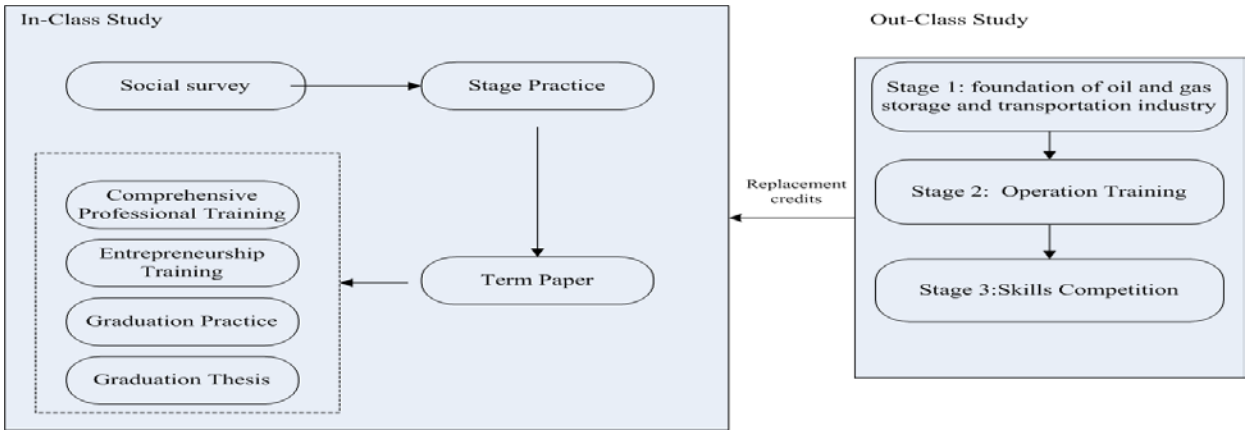

Figure 2 Practice platform of oil and gas storage and transportation

3) strengthen the evaluation and supervision of practical teaching management of oil and gas storage and Transportation Specialty

In order to implement practice management effectively, we must establish evaluation supervision and feedback mechanism. It includes the establishment of indicator elements of practice planning evaluation, which should reflect the key points and core links of practice teaching management, and also reflect the gap between the expected objectives of practice management and the actual situation, as shown in Table 1.

Table 1 Indicators of Human Resources Assessment

Practice project	**Participation level**	**Participant**	**Grade-Point**
Skills Competition	1st	students	10
Practice operation	1-3	students	5
Engineering project	1-5	students and teachers	5-10
Vocational training	-	students	3

In order to realize the talent training of scientific and technological innovation, the oil and gas storage and transportation technology specialty in higher vocational colleges must practice the optimization and reform of teaching system under the background of new engineering, strengthen the training of students' technical skills and innovation consciousness, deepen the diversified cooperation forms, and form a new and perfect engineering practice mode based on the background of new engineering.

5. Conclusion

There are many problems in the training and practical teaching of oil and gas storage and transportation technology in higher vocational colleges presently, which restrict the further development of oil and gas storage and transportation technology. This paper analyzes the practical teaching system of oil and gas storage and transportation technology in Higher Vocational Colleges Based on the current new engineering background, and further summarizes some suggestions and Countermeasures for the practical teaching system of oil and gas storage and transportation technology in higher vocational colleges based on the current practical teaching characteristics and problems. That is to strengthen the cooperation between enterprises and colleges in personnel training, increase the practical operation and skill training of students, establish and improve the corresponding practice teaching management platform and attach importance to the innovation and entrepreneurship education of students in practice teaching, so as to further improve the training program of innovative talents and improve the innovation and practice ability of students of this major. Finally, the teaching construction and optimization of oil and gas storage and transportation technology are realized.

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