

Exploration and Practice of Innovation Education Reform of Petroleum Engineering Specialty under the Background of New Engineering Construction

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Abstract. Under the background of new engineering construction, the innovation education reform of petroleum engineering specialty must conform to the current situation of education and petroleum industry at home and abroad. In order to solve the mismatch between engineering talents and market demand, the innovation and entrepreneurship education has not formed a disciplinary system and the outstanding problems faced by practical teaching, so it is imperative to carry out innovation education reform practice and exploration. Only by carrying out the scientific and technological innovation activities of college students, facing the new technology and new business form of petroleum engineering new engineering professional training target orientation, optimizing the practice project, strengthening the construction of practice base, improving the assessment and evaluation mechanism, organically integrating general education, professional education and innovation and entrepreneurship education, and strengthening the cultivation of "double qualified" teachers of innovation and entrepreneurship can we truly solve the current problem The dilemma of oil engineering specialty in the construction of new engineering.

Keywords: Innovation education; new engineering; petroleum engineering.

1. Introduction

At present, the world's major economic powers have put forward the industrial 3.0 plan. In order to meet the requirements of talent training in the industry, the reform of international engineering education is increasing day by day. In this context, China has actively promoted the construction of "new engineering", successively formed "Fudan consensus", "Tianda action" and "Beijing Guide", and issued "notice on carrying out research and practice of new engineering" and "notice on promoting research and practice projects of new engineering" to fully explore the formation of a Chinese model to meet the needs of industrial talents.

The construction of new engineering is a strategic action to thoroughly study and implement Xi Jinping's new socialist ideology with Chinese characteristics and the nineteen spirits of the party, and take the initiative to adapt to the new round of strategic action of science and technology and industrial revolution. It will promote the transformation and upgrading of industries and the transformation of new and old energy, enhance the national hard power and international competitiveness, fully implement the "one belt road initiative", "made in China 2025" and "Internet +". A series of major national strategies are of great significance.

Oilfield development has very strong engineering characteristics and oil and gas industry characteristics, which requires a high level of knowledge system and engineering background of drilling, oil production, development and so on. In order to continue the development of new and old oilfields, hold the bottom line of 200 million tons of equivalent crude oil per year and ensure the national energy security, it is necessary to cultivate talents from undergraduate to graduate students according to the engineering characteristics and technical requirements of oilfield development, so as to meet the technical requirements in the aspects of development scheme adjustment, well drilling and completion, acid fracturing, chemical oil production, profile control and water plugging.

2. Existing Problems

2.1 Mismatch between Engineering Talents and Market Demand

"The goal orientation of engineering talents training in China is not clear, engineering teaching is scientific, there is a vague understanding of the relationship and difference between general education and engineering education, practical education and experimental teaching, there is too much gap between engineering education and industrial enterprises, engineering students have defects in comprehensive quality and knowledge structure.". At present, the contradiction between the market demand for such a large number of industrial scientific and technological talents and the largest engineering education in the world is increasingly prominent.

The construction of "new engineering" education system should take "innovation and entrepreneurship education" as the starting point. First of all, according to a series of guiding opinions issued by the state in recent years, it has become a national strategy to promote innovation and entrepreneurship, "mass entrepreneurship, 10000 kinds of innovation" has gained the consensus of the whole people; secondly, according to the new economic model, the future industrial layout and development trend will be guided by information technology such as artificial intelligence, big data, cloud computing, Internet +, etc., combined with life science, new A batch of new high-tech and innovative sunrise enterprises will be born with the interdisciplinary integration of materials, Internet of things and other new business forms. Those engineering talents who have both innovation ability and master new technology will become the darling of talent competition. Thirdly, from the perspective of talent training in recent years, in addition to mastering advanced information technology and phase represented by big data, cloud computing and artificial intelligence In addition to professional knowledge, innovation ability will become an important indicator of talent competition.

2.2 Innovation and Entrepreneurship have a Short Development Time, have Not Formed a Discipline System, have Not Accumulated and Precipitated in the Early Stage

There are three aspects, one is the lack of professional guidance teachers for innovation and entrepreneurship. At present, the teachers who are engaged in or guide innovation and entrepreneurship education are usually part-time or similar subject teachers. Most of them have not engaged in practical experience in innovation and entrepreneurship work, and doing innovation and entrepreneurship education is also on paper. The other is the lack of a scientific system consistent with market demand Innovation and Entrepreneurship Talent Training System, the existing innovation and Entrepreneurship Talent training system is the same, can not stand the long-term test of the market; third, the lack of online and offline learning resources platform, the lack of a resource sharing network platform for innovation and entrepreneurship education, the students themselves are affected by information block, and the information channels for understanding and exploring the outside innovation and entrepreneurship are limited, most of them can only go through the network Online video, online teaching and other forms of online customers improve and improve themselves, lack of practical operability, so the school should establish an online and offline interactive innovation and entrepreneurship network platform, to solve the problems of students' poor communication, information blocking, resource shortage, and further promote and help students with innovation ability, entrepreneurial dream and potential.

2.3 Outstanding Problems in Practical Teaching

The experimental class hours are few and the content is single. The confirmatory experiment can not meet the needs of training students' practical ability, problem analysis and problem-solving ability. The limited experimental equipment and experimental content can not build a platform for students to cultivate innovation ability and design ability. In the class, the teacher explains the experiment process. The students do the experiment step by step, process the experimental data and submit the experimental report. In the whole experiment process, students did not think deeply, nor did they carry out innovative practice based on laboratory equipment.

The traditional teaching mode stresses theoretical knowledge first and then practice. The theory class focuses on the teaching of principles, concepts and calculations, which accounts for a large proportion, but the operation items involved in the practice teaching are not involved in the theory course. Because of the busy work and the limited culture of their own, the on-site guidance personnel can't speak very carefully and comprehensively, so as to make students have a little knowledge of the equipment and operation precautions, which affects the practice effect.

It is difficult to meet the needs of students because of the lack of "double qualified" teachers who can not only teach professional theoretical courses, but also have some practical experience, that is, have the social professional post experience, qualification and ability related to the major they teach.

3. Practice and Exploration of Innovation Education Reform

3.1 Carry out Scientific and Technological Innovation Activities for College Students

Under the background of "mass innovation, mass entrepreneurship", it is an important way for colleges and universities to carry out scientific and technological innovation activities. Due to the regional characteristics, funds for running schools and admission batches, local colleges and universities are obviously different from key colleges and universities in terms of management and teaching, especially in terms of study style construction, postgraduate entrance and school influence. The scientific and technological innovation activities of local colleges and universities are not only an important measure to deepen the teaching reform of higher education and cultivate "mass entrepreneurship and innovation" talents, but also an important supplement and continuation of classroom teaching in Colleges and universities, which also plays an important and positive role in local colleges and universities to do a good job in the construction of learning style, improve the rate of research and promotion, and expand the influence of schools. In addition, for local college students, actively participating in the activities of scientific and technological innovation can not only cultivate their own scientific and technological innovation awareness and ability, but also play an irreplaceable role in improving the practical ability of college students and team cooperation ability, especially for the long-term development of students after graduation.

3.2 Training Target Orientation of Petroleum Engineering New Engineering Talents for New Technology and New Business

Since 2018, the international oil price has shown a strong recovery. However, many world oil companies claim that they will not easily increase investment in oil and gas projects, instead, they will spend a lot of money on the new energy industry. New technologies (new technologies for dense / deep reservoir reconstruction, new technologies for unconventional oil and gas resource exploitation such as shale oil and gas / natural gas hydrate, geothermal, etc.) and new formats (deep, deep and unconventional) point out the direction for upgrading and reconstruction of petroleum engineering construction. The connotation of new engineering is to take morality as the guide, coping with changes and shaping the future as the construction concept, inheritance and innovation, intersection and integration, coordination and sharing as the main way to cultivate the future diversified and innovative outstanding engineering talents, with the characteristics of strategic, innovative, systematic and open. This paper studies the connotation and characteristics of new petroleum engineering talents from the aspects of knowledge, ability and quality, adheres to the OBE education concept, designs the demand-oriented education goal and system, and determines the training goal orientation and graduation requirements (students' ability requirements) of new engineering talents.

In terms of the guarantee mechanism for the construction of new engineering majors, we need to: (1) based on the forefront of international engineering education reform and development, with the goal of facing the future and leading the world, study and judge the new trends and Strategies of Engineering Education in developed countries, organize all departments and school enterprises in the school to jointly study and propose the quality standards for the training of new engineering

talents in petroleum engineering, and explore new engineering based on this standard Under the background of the construction of teaching staff requirements and ways to achieve. (2) create an atmosphere for the construction of new engineering, strengthen the training of young teachers' engineering practice ability in the field of new economic industry, and guide them to join the mainstream of new engineering. (3) reform the assessment and incentive mechanism to adapt to the new engineering major of petroleum engineering, strengthen the internal power of teachers' construction of new engineering, pay attention to the innovation of education and teaching, and encourage young teachers to explore the reform of teaching mode.

3.3 Optimize the Practice Project, Strengthen the Construction of Practice Base and Improve the Evaluation Mechanism

By revising the training plan of our college in 2018, centering on the training orientation of "application-oriented high-quality skilled talents" proposed by our college, we will modify the professional course system, increase the proportion of practice teaching, integrate the practice courses, cancel the original cognition practice and professional skill training, and integrate the corresponding contents into the oil production practice. According to the employment demand of the enterprise, optimize the design of the internship project. Through the follow-up internship and the simulation of the operation and process of the oil production equipment, the students are familiar with the work content and workflow on the site, shorten the time of the graduates' on-the-job training, and reduce the training cost of the unit.

Optimize and refine daily management methods according to professional needs and practical teaching characteristics. For the long-term graduation project, the tutor specifies a tutoring plan, holds regular meetings, tutors and checks the progress of students' papers, and gives their usual scores, which are included in the final graduation thesis scores. For the production practice with more operation items, the content of daily practice should be listed in detail and connected with the production unit, each practice content should be implemented, and the operation instructor should give the operation results. Students summarize day by day, record the work content and experience of the day, lead the teachers to random check, and give their usual performance.

3.4 Organic Integration of General Education, Professional Education and Innovation and Entrepreneurship Education

To do a good job in innovation and entrepreneurship education, general education and professional education, we should start from the following points. First of all, the professional course module must constantly update and learn the new progress, new knowledge and new trends in the professional field, strive to let students understand the current situation, shortcomings and future development prospects of the most cutting-edge professional development at home and abroad, and always keep the professional core courses connected with the industry development cutting-edge; second, innovate teaching methods, through micro courses, flipped classroom, online teaching and other modern new Based on the teaching methods of case, problem and heuristic, we can stimulate the students' enthusiasm and desire for knowledge, try to change the traditional teaching method centered on "classroom, textbook and teacher", enhance the students' initiative in the teaching process, and train them to learn, cooperate, think and learn in the process of knowledge acquisition Innovation, give full play to the leading role of teachers in the teaching process and the main role of students in the learning process; thirdly, promote the integration of disciplines, break the barriers of disciplines. In the new engineering talent training program, some elective courses that can produce cross application with the discipline, or some innovative knowledge points of professional frontier cross application are added in the teaching process of professional courses, so as to train students to use multi-disciplinary multi-dimensional to solve analysis problems and train students' innovative thinking; finally, the platform of off campus practical training base is established Set up, according to the characteristics and development direction of the major, sign a long-term and stable school enterprise cooperation training platform with enterprises in related industries, encourage students to enter the enterprise without affecting their study for the

enterprise's on-the-job training, and guide students to understand the society and connect with the society by visiting entrepreneurs, visiting enterprises and social talent demand survey, etc., so as not to let students go out of the school, It is too far away from the reality of the industry, resulting in all kinds of discomfort. Through in-depth cooperation between schools and enterprises, students can learn, practice and start their own businesses at the internship base or innovation and entrepreneurship education practice base inside and outside the school.

3.5 Strengthen the Cultivation of "Double Teacher" Teachers for Innovation and Entrepreneurship

Teachers play a leading role in the whole process of talent training. The comprehensive quality of teachers directly affects the quality of innovation and Entrepreneurship Talent Training in Colleges and universities. Innovation and entrepreneurship education started late and did not establish corresponding disciplines. There are not only rich practical experience and entrepreneurial experience, but also few teachers with solid and excellent academic background of innovation and entrepreneurship theory. Most of the teachers have just finished their study career from the school, they directly step into the platform of the school, without any accumulation of entrepreneurial experience. Most entrepreneurial teachers are formed by transforming from similar disciplines or by strengthening training and short-term intensive training. As the saying goes: "as a competent teacher, to give students a bowl of water, you have to have a bucket of water.". However, with the rapid development of modern high technology, teachers should have a pool of living water, which is endless, only a bucket of water is not enough. As the background of the new engineering era, college teachers should not only have high theoretical teaching literacy, but also have strong professional practice and innovation ability, which is often referred to as "dual teacher and dual ability teacher". Specifically, "please come in and go out" can be adopted to improve the comprehensive level of teachers. On the one hand, successful alumni, entrepreneurs or social elites with entrepreneurial experience and innovation ability are invited as part-time teachers and entrepreneurial mentors for innovation and entrepreneurship to share experience and project guidance for students from time to time. On the other hand, cooperation between schools and enterprises in production, learning and research can be strengthened to encourage teachers to go deep into In order to improve the deficiency of teachers' emphasis on theory but less on practice, the first-line suspended post training should be carried out in enterprises. Only in this way can teachers cultivate new talents with modern technology application ability and development and innovation ability.

4. Summary

The construction of new engineering is an important measure for the reform and development of higher education, the innovation of talent training mechanism, and the promotion of high-quality development of talent training. It has far-reaching significance in promoting the upgrading and transformation of colleges and universities, deepening the reform of excellent engineering talent training mode, and promoting the all-round development of students The new economy characterized by new technology, new industry, new business form and new mode is developing rapidly, so the construction of new engineering is imperative Under the background of new engineering construction, explore a new mode of cooperation and joint training of talents between the University and relevant scientific research institutes and petroleum and petrochemical enterprises, realize the effective promotion and win-win cooperation of the mechanism of cooperation and cooperation, and cultivate high-quality engineering talents with strong innovation ability and adapting to the development of petroleum and petrochemical industry The university will take the construction of new engineering and Industrial College as the starting point and breakthrough, meet the needs of industrial restructuring and industrial transformation and upgrading in Guangdong Province, deepen reform, strengthen innovation, strive to improve the ability of University Service Innovation and development and regional economic and social development,

focus on the construction of five advantageous disciplines with distinctive petrochemical characteristics, and move forward to a high-level university of science and engineering We will better serve the innovation driven development of petrochemical industry along the South China coast, support the west of Guangdong to become an important petrochemical industry base in Guangdong, and contribute to the construction of Guangdong Hong Kong Macao Bay area.

Acknowledgments

This work is supported by National new engineering construction project "construction of engineering practice education system and practice platform of petroleum engineering specialty for new engineering"

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