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Research on Strategies for Improving the Comprehensive Ability of Engineering College Students Facing the Needs of the "One Road and One Belt" Initiative

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Abstract: The "Belt and Road" has brought major opportunities for the construction of Xinjiang, accelerating the pace of modernization, technology and intelligence in Xinjiang, which will require a large number of engineering talents. However, under the current educational background, the quality of engineering talents cannot meet the current demand for scientific and technological development. Therefore, this paper takes the geology engineering major of Xinjiang College of Engineering as an example, analyzes the problems of curriculum, practice, graduation design and other aspects of the educational process, and puts forward educational reform measures such as borrowing from advanced domestic and foreign countries, and cooperation between schools and enterprises in the construction of practice bases and industry-university-research bases, which is of certain reference and significance for the development of Xinjiang's engineering education in colleges and universities and for improving the comprehensive ability of engineering students.

1. Introduction

Xinjiang is in the core area of the "Belt and Road" construction, in this context, Xinjiang will expand the scale of engineering, promote the transformation and upgrading of the core area industry, to meet the national demand for the reality of the construction of the core area, but also faces a huge shortage of technical personnel [1]. This situation brings new opportunities and challenges for Xinjiang applied engineering colleges and indirectly exposes the deficiencies in engineering education in Xinjiang institutions [2-3].

Xinjiang colleges and universities bring together excellent young students of various nationalities, and undertake the important task of educating people and talents for the national frontier, and there is an urgent need to improve the quality of education and cultivate talents of various nationalities to support the rapid development of local industries. This paper takes geological engineering as an example, combines the current situation of engineering education in Xinjiang College of Engineering, and discusses the aspect of improving the comprehensive ability of engineering of college students in Xinjiang colleges and universities.

2. Current situation and problems in training students

The training objectives of the geological engineering courses offered by Xinjiang Engineering College are to cultivate professional knowledge and skills in geological engineering, to be able to apply the learned knowledge and technology to independently engage in technical work such as engineering geological investigation, geological disaster prevention and geological environmental protection, geotechnical engineering investigation, design and construction, and geological landscape protection for tourism, and to cultivate a certain spirit of innovation, practical ability, and a certain international outlook to be able to take root as a Geological technician of the frontier. Since Xinjiang College of Engineering started to build the geological engineering major, it has cultivated a certain scale of technical talents for the frontier geological front line, and played an important role in building the frontier of the motherland. However, the research results show that the students of Xinjiang College of Engineering are relatively weak in terms of comprehensive professional ability and market competitiveness in comparison with the students of the same speciality in key colleges and universities. This is also feedback regarding the professional training mode from the perspective of the school, highlighting certain issues that will be discussed and analyzed below.

2.1. Problems with the professional theory curriculum

At present, the content of geological engineering courses constructed by Xinjiang Engineering College is still mainly based on traditional professional knowledge, and the teaching method is still lecture-based duckling education, in which students passively accept the knowledge and fail to fully stimulate the learning initiative. Most of the courses adopt the teaching materials of more than ten years ago, the teaching methods and resources are relatively backward, the contents are outdated, and the students do not have enough understanding of the cutting-edge knowledge, coupled with the lack of students' initiative and the low desire for independent exploration and learning, which leads to the lack of students' theoretical knowledge reserve.

In recent years, in response to the call of "new engineering", we have opened new courses of frontier series and innovation and entrepreneurship training, but from the name of the course, it seems to be up-to-date and closely integrated with the frontier, but in fact, the content is still the same old stuff, and even the content is repeated with the content of the basic courses, which does not play a good role in the cultivation of students' professional literacy and improvement of their innovation ability. It does not play a good role in cultivating students' professionalism and improving their innovation ability.

2.2. Problems in setting up practical sessions in professional programmes

Practical sessions include experiments, course design and internships. At present, the proportion of public courses in the course structure is getting higher and higher, leaving fewer and fewer hours for professional courses. In the face of strict teaching and assessment requirements, because of the theory of compression is not good to "deliver", can only "sacrifice" the practical courses to meet the requirements. Due to the lack of specialised laboratory technicians, most of the experimental courses are basically "incidental" to the completion of the theoretical courses by the teacher. In the absence of formal training teacher teaching, students in the laboratory basic operation is not standard, and even part of the course does not have the experimental conditions, part of the experimental class is actually still teaching theory, the basic experimental ability of students did not get enough exercise.

Internship is an indispensable and important component of engineering courses, which can be primarily categorized into two types: professional basic internship and engineering internship. The professional basic internship is supervised by the school and guided by teachers who provide

students with geological understanding and mapping internship opportunities. This type of internship serves as a critical foundation for students in their professional development. However, some teachers fail to provide continuous follow-up support once students transition from indoor training to fieldwork. Consequently, students may encounter difficulties during their field internships without proper guidance, leaving them with no one to explain or assist them. Furthermore, the assessment of these internships tends to focus solely on the format of the internship report. During the assessment, students focus on the format of the internship report, and in order to cope with the assessment, students focus on writing the internship report, ignoring the practice itself, and failing to realise the importance of the practical ability to the engineering.

Production internship is to cultivate students' hands-on ability and help them establish correct professional outlook and qualification. However, in order to fulfill the internship requirement, the school assigns students to internship units in a random manner. Unfortunately, some students end up being assigned to units that have little relevance to their majors. As a result, it becomes challenging to effectively integrate theoretical knowledge with practical experience. In some cases, students may even choose not to participate in the internship in order to prioritize exam preparation. This leads to a lack of proper comprehension of their profession and the inability to apply acquired skills. Consequently, the overall professional competence and comprehensive quality of the students remain low.

2.3. Problems of students doing graduation tasks

Graduation design (thesis) is an important assessment index to feedback students' comprehensive ability, and also an important project to cultivate students' ability to connect theory with practice and innovation and practice. At present, students of this major complete their graduation design (thesis) by bringing back the internship data from the internship unit and completing the relevant design and thesis under the guidance of the teacher. However, due to data copyright and confidentiality requirements, most of the internship units do not allow students to use the relevant information of the engineering projects they are involved in, and provide students with the complete production report completed by the unit, so that the students do not have much free play in the whole graduation design (thesis), but only in the modification of the format and order. Despite receiving "sufficient" information support, students have not been able to fulfill the goal of "nurturing theoretical and practical skills as well as fostering innovation and practical abilities" while completing graduation assessment tasks with "high quality."

In general, the weak competitiveness of college students with the degree of geological engineering in Xinjiang Engineering College is due to some problems in the cultivation mode of geological engineering in this college, which leads to the problems of weak professionalism, practice and innovation ability of students, and insufficient reserves of interdisciplinary theoretical knowledge and cutting-edge knowledge.

3. Objectives of educational reform

In order to enhance engineering education in Xinjiang colleges and universities, the focus of educational reform should be aligned with the actual market demands. This entails precise self-positioning, establishing personnel training objectives and specifications that reflect regional characteristics. Moreover, the teaching content should closely align with the forefront of Xinjiang's economic construction and social development. It is essential to develop a more scientifically and logically structured curriculum that caters to the actual context, aiming to improve students' comprehensive abilities and competitiveness. The goal is to cultivate professionals who meet the market demand and contribute to the economic and social development of Xinjiang.

4. Exploration of teaching reform methods

The purpose of this educational reform is to take "cooperative education" as a new breakthrough in the cultivation of geological engineering degree students, and to actively explore the curriculum reform and discipline construction of geological engineering degree. Facing the demand of "One Belt and One Road" construction, we will build the speciality according to the local engineering demand and construct a new structure of engineering speciality. By integrating the demands of the new era and technological innovation, it is necessary to innovate the methods and approaches of engineering education. This can be achieved by leveraging all available resources both within and outside the university to create optimal learning conditions. It is crucial to proactively adapt to market demands and enhance students' comprehensive competitiveness. The following are specific methods for implementing educational reforms.

1) Learning from higher engineering education with good teaching results at home and abroad. Through the study of geological engineering education in representative colleges and universities at home and abroad in terms of educational ideology, talent cultivation objectives, cultivation mode, professional orientation, curriculum system, teaching methods, etc., it will provide a theoretical basis for the teaching reform of the applied geological engineering speciality (class) talents.

2) To conscientiously implement the new requirements for the teaching and training mode of geological engineering in the "new engineering discipline". First of all, we should pay attention to the quality cultivation of students, while cultivating students' sense of responsibility and professionalism, we should also pay attention to the cultivation of interdisciplinary and cross-platform cooperation spirit of students, and the cultivation of professional ethics of geologists, and integrate professional ethics, norms, and engineering ethics of geological field into daily teaching, so as to make students cultivate the national sentiment based on the solid professional skills, and set up the correct values and good qualifications for practice. Attaining strong professional qualifications is essential. Secondly, we pay attention to the cultivation of students' scientific methodology. In accordance with the requirements of the core course syllabus formulated by the Geological Resources and Geological Engineering Discipline Review Group of the State Council, we will firmly establish the materialistic and dialectical view, and guide the students' work with the theory of geological history and evolution, the view of human-earth coordination, and the view of sustainable development. Again, the construction of teaching resources for the cultivation of new engineering students, such as the curriculum teaching, supporting teaching materials and practical links of Introduction to Engineering Geology, Geological Hazards, etc., should be student-centred, attracting production and research units to participate in the cultivation and practical training of students, and forming a systematic and complete geological engineering internship base [4].

3) To align professional development with the advancements in science and technology, it is crucial to reinforce the transformation of geological engineering from a resource-based approach to an engineering-based approach. This shift necessitates a transition from traditional professions to the establishment of "information-based" and "intelligent" professions. Theoretical studies should be conducted to explore the underlying significance of societal and economic requirements for "composite and innovative talents." Additionally, research should be undertaken to understand the patterns of talent development in accordance with cultivation objectives and the inherent relationship within the training system. This will help to further clarify the theoretical framework and central focus of the engineering education system's construction.

4) Establishing internship bases with enterprises and scientific research institutions to jointly cultivate talents. This is the most commonly used mode of cultivation in colleges and universities all over the world, the specific practice is to establish internship and practice bases with relevant enterprises, with the college as the leading unit, with the department as the linkage, with the counterpart speciality as the support, with the first-line teachers as the responsible person, with hands-on practice as the main content, and the two parties or more parties according to the real

needs of their own co-operation. This kind of internship base should be based on improving the quality of teaching and practical ability, so that students in the experiments, internships and practice bases can have access to a variety of physical objects, participate in the actual work, theories linked to practice, expanding the practical and innovative knowledge, and in the specific problems of specific analyses at the same time, the shortcomings of teaching and learning work in a timely manner to get feedback and modification [5].

Through collaboration with enterprises and the establishment of practice bases, a cooperative model can be formed. In this collaborative arrangement, enterprises provide internship sites and related training services, while colleges offer talented individuals and practical internship services. Students can then develop their hands-on abilities within the practice bases. This mutually beneficial and win-win partnership allows enterprises to obtain economic benefits while colleges enhance their teaching capabilities. Long-term cooperation facilitates the exchange of technology, processes, and methods, ensuring that teaching remains connected to real-world realities. Moreover, this collaboration aims to cultivate "just-needed" talents that align with the specific requirements of enterprises. When enterprises encounter problems in production, enterprise experts and college teachers can cooperate to set up research and development centres to study scientific problems, promote industrial development and scientific development, promote teachers to grasp the frontier of their profession and update their knowledge in time, and also allow students to participate in the work and cultivate their scientific thinking and innovation ability.

5. Conclusion

Higher engineering education is an important way to transform science and technology into productive forces. Under the current demand of rapid development of the society, Xinjiang applied undergraduate colleges and universities can only actively carry out theoretical research and reform practice in line with the actual situation, boldly reform the talent cultivation mode, and form the teaching resources of geological engineering professional degree degree which is oriented to the demand of "One Belt, One Road" and in line with the requirements of applied undergraduate colleges and the new engineering disciplines. Efforts should be directed towards developing teaching resources for the Geological Engineering program and constructing an education system that supports the curriculum. This system should prioritize the integration of theoretical knowledge with practical application. The construction of student training system integrating theory and practice, focusing on training students, attracting production units to participate in the training and practice of geological engineering degree, combining with local characteristics, forming related practice bases, in order to cultivate local talents, meet the needs of Xinjiang's social construction and economic development, and promote the rapid development of the regional economy.

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