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Cultivation of Innovative and Entrepreneurial Talents in Water Conservancy Majors Based on the Integration of Industry and Education

Jin Jin[1], Zhenghua Wang[1,2]*, Yongyong Ma[1], KaiQiang Geng[1]

[1]College of Hydraulic and Constructional Engineering, Shihezi University, Shihezi 832003, Xinjiang, China
[2]Xinjiang Agricultural University, Urumqi 830052, Xinjiang, China

**Author to whom correspondence should be addressed.*

Abstract: Innovation and entrepreneurship education is an important part of higher education. It adapts to the current era background of mass innovation and entrepreneurship, and is also an effective way for higher education to cultivate all-round developing talents. From the perspective of current higher education, many colleges and universities attach importance to basic education, but their cultivation of students' innovation and entrepreneurship abilities is relatively insufficient; some colleges and universities have a relatively superficial understanding of innovation and entrepreneurship, showing the characteristics of emphasizing theory over practice, and the teaching reform is indeed ineffective. The teaching concept of integration of industry and education emphasizes that enterprises are an important subject in talent cultivation, injecting new vitality into the development of the innovation and entrepreneurship curriculum system for water conservancy majors in colleges and universities. Against this background, guided by the teaching concept of integration of industry and education, this paper explores the important role of strengthening innovation and entrepreneurship education for water conservancy majors, and then deeply explores corresponding teaching strategies, aiming to improve the quality of innovation education for water conservancy students, cultivate their good innovation awareness and entrepreneurship ability, enhance their comprehensive quality, and deliver all-round developing water conservancy talents.

Keywords: Integration of industry and education; Water conservancy majors; Innovation and entrepreneurship education; Innovative and entrepreneurial talents

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1. Introduction

Water conservancy is a fundamental industry of the country, playing an important role in national construction and economic development. With the continuous development of the water conservancy industry, the demand for talent is also increasing. Having only solid basic knowledge and professional skills can no longer meet

the market's demand for comprehensively developed water conservancy talents. It also emphasizes that students should possess certain innovation and entrepreneurship capabilities to adapt to the current complex industry needs and fierce market competition. Colleges and universities play an important role in cultivating water conservancy talents. They should keep up with the pace of the times, actively explore innovation and entrepreneurship education models, cultivate all-round developed water conservancy talents, and contribute to the development of China's water conservancy industry [1]. Under the guidance of the industry-education integration model, enterprises can provide more market-oriented and timely teaching content for innovation and entrepreneurship education, as well as sufficient practical opportunities for students to improve their practical abilities. This helps students quickly adapt to the complex and changing water conservancy industry, integrate into society and the workplace, enhance their employment competitiveness and entrepreneurial success rate, and inject new vitality into the innovative development of the water conservancy industry.

2. The importance of cultivating innovative and entrepreneurial talents in water conservancy-related majors based on the integration of industry and education

2.1. It is conducive to promoting students' all-round development

Traditional education in water conservancy-related majors emphasizes theory, resulting in students having few practical opportunities and struggling to meet the needs of actual work after graduation. The implementation of the industry-education integration model has effectively changed this situation. Schools have established close cooperation with enterprises, and enterprises provide students with rich practical projects and internship positions, allowing students to personally participate in links such as the planning, design, construction, and operation management of water conservancy projects. This close integration of theoretical knowledge and practical operations has significantly improved students' practical abilities. In addition, enterprises are at the forefront of market competition and have a keen insight into new technologies and new needs in the industry. In the process of industry-education integration, enterprises bring the latest industry information and innovative concepts into campuses, combining them with school teaching and scientific research, which effectively stimulates students' innovative thinking. When guiding students in practice, enterprise mentors focus on guiding students to start from practical problems, explore innovative solutions, and cultivate students' ability to solve complex problems. At the same time, it enables students to understand the basic processes of entrepreneurship and market operation models, and feel the opportunities and challenges of entrepreneurship, which helps cultivate students' entrepreneurial awareness and lay a solid foundation for their future independent entrepreneurship [2].

2.2. It is conducive to closely aligning with industry needs

The water conservancy industry is in a phase of rapid development, with new technologies and processes emerging one after another, and standards and specifications being continuously updated. This indicates that the cultivation of water conservancy talents should keep pace with the times and possess characteristics of the era. However, due to reasons such as the slow update of teaching materials in colleges and universities and insufficient connection with the market, it is sometimes difficult to update teaching content promptly, which affects the quality of innovation and entrepreneurship education [3]. Enterprises' participation in the teaching practice of innovation and entrepreneurship education for water conservancy majors can give full play to their feature of close connection with the market, adjust and optimize the teaching system, and provide the latest knowledge and cutting-edge technologies in industry development to achieve synchronization between

innovation and entrepreneurship knowledge and industry development. In terms of talent cultivation goals, colleges and universities can refer to enterprises' actual demand for water conservancy talents, and combine enterprise employment standards and industry actual needs to guide curriculum setting, clarify teaching focuses, etc., to cultivate water conservancy talents who meet market demand. For example, in response to the water conservancy industry's demand for green development, add courses related to ecological water conservancy, covering water environment protection, ecological restoration, etc., thereby enhancing the pertinence and practicality of students' professional development [4].

2.3. It is conducive to expanding employment and entrepreneurship channels

The integration of industry and education strengthens the connection between schools and enterprises and builds a broad platform for students' employment and entrepreneurship. On the one hand, in the process of participating in talent cultivation, enterprises gain a deeper understanding of students' professional abilities, innovative awareness and comprehensive quality, and are more inclined to recruit students they have inspected and know better, thus improving the success rate of students' employment [5]. In addition, enterprises' participation in innovation and entrepreneurship education can also provide students with diversified practical activities, such as innovation and entrepreneurship competitions, offering professional entrepreneurship guidance and rich entrepreneurial resources; holding simulated recruitment activities can help students quickly familiarize themselves with the recruitment process, thereby improving the success rate of interviews. Cooperative enterprises can provide students with corresponding employment positions, achieving the goal of expanding employment and entrepreneurship channels.

3. Strategies for cultivating innovative and entrepreneurial talents in water conservancy majors based on the integration of industry and education

3.1. Adjust talent orientation and improve the teaching system

Against the backdrop of industry-education integration, the market demand for water conservancy professionals has changed, and the orientation of talent cultivation should also be appropriately adjusted to meet the new-era requirements for engineering and technological talents in terms of innovative spirit and entrepreneurial ability [6]. First, regarding the positioning of talent cultivation goals. Guided by the OBE (Outcome-Based Education) philosophy, our university has formulated an education plan that adapts to the new-era demand for water conservancy professionals, with continuous optimization based on practical conditions. Since 2015, the talent cultivation plan for water conservancy majors has been revised four times, establishing a curriculum system that meets the certification standards of the times. In the 2022 talent cultivation plan, our university added a module of professional expansion courses, such as Engineering Information Modeling Technology and Network and Information Security, to the original teaching plan, aiming to enhance the comprehensive literacy of water conservancy students. Meanwhile, in the context of industry-education integration and the orientation of cultivating innovative and entrepreneurial talents, it is necessary to improve both the quality and quantity of practical courses to truly enhance students' practical abilities. To this end, universities should optimize and adjust curriculum syllabuses, teaching objectives, and teaching contents. They should also emphasize ideological education by integrating curriculum-based ideological and political elements, fostering students' good spiritual qualities, and cultivating high-quality water conservancy talents with excellent professional competence, practical skills, and moral integrity [7].

Second, improve the practical teaching system. Practical teaching is a key direction for the reform of

water conservancy education from the perspective of industry-education integration, playing a positive role in enhancing students' innovative and entrepreneurial spirit and abilities. Teachers can develop a more practical and scientific teaching system by improving practical content, teaching facilities, and evaluation mechanisms. Universities should keep abreast of the development needs and trends of the water conservancy industry, providing students with comprehensive and innovative practical projects. For example, integrating enterprise cases into classroom teaching allows students to practice their operational skills in real working environments and improve their problem-solving abilities [8]. In terms of teaching facilities, universities should introduce equipment such as virtual reality (VR) and augmented reality (AR) technologies in line with the actual needs of developing water conservancy students' innovative and entrepreneurial abilities, thereby facilitating practical teaching for students.

3.2. Launching relevant activities to enhance teachers' professional qualities

Teachers are the main implementers of education and teaching, and they have a direct and close connection in cultivating students' innovation and entrepreneurship capabilities. Colleges and universities should attach great importance to teachers as a key factor, strengthen teacher training, improve teachers' professional qualities, and build a "double-qualified" teaching team. On the one hand, a series of practical training activities for teachers should be carried out. Starting from the internal development of teachers, colleges and universities can provide systematic and comprehensive training and exchange activities for teachers majoring in water conservancy to enhance their overall qualities [9]. Our university encourages young teachers to participate in practical training in relevant enterprises and public institutions. Teachers of water conservancy majors have visited and studied more than 20 typical water conservancy projects in southern and northern Xinjiang, such as the Altash Water Conservancy Hub, Kenswat Reservoir, the water diversion project from the Ertix River to Karamay, and the Fukang Pumped Storage Project. Through practice, they have deepened their understanding of the water conservancy industry and improved their ability to guide practical teaching. In addition, our university also encourages teachers to carry out grassroots teaching organization activities during holidays to enhance their ability to guide theoretical teaching, and to achieve synchronous improvement in both theoretical and practical teaching capabilities. To boost teachers' enthusiasm for self-improvement, colleges and universities should provide policy support. By implementing the "Discipline-Supported Teacher Development Plan" and actively carrying out scientific research, teachers' scientific research and innovation capabilities can be comprehensively improved, which can then be applied in teaching practice to enhance their overall qualities. On the other hand, excellent teaching resources should be introduced. Colleges and universities can recruit outstanding talents with rich practical experience and solid professional skills from enterprises to work on campus as enterprise-appointed teachers. They can assist in-school professional teachers in practical teaching, undertake tasks such as project guidance and practical teaching guidance, help students complete innovation and entrepreneurship projects in water conservancy majors, and comprehensively improve the quality and effectiveness of teaching [10].

3.3. Deepen school-enterprise cooperation and build an education platform

From the perspective of industry-education integration, enterprises have become important subjects in talent cultivation. Colleges and universities should make full use of enterprises' high-quality resources in cultivating innovative and entrepreneurial talents in water conservancy-related majors, build a multi-dimensional practical education platform, and realize a dual-subject education mechanism where schools and enterprises work together to provide students with a full-chain and scientific education system [11]. Starting with the selection of

high-quality enterprises, colleges and universities should choose several enterprises and institutions with high qualifications, promising development prospects, strong sense of responsibility, and reliable safety guarantee measures as off-campus practical teaching bases to ensure practical teaching and students' internship work. Up to now, our university has achieved good results in the construction of off-campus internship bases, with the number reaching 20. These bases can ensure that students participate in on-site practical learning of classic projects, and engage in the design, construction, and management of actual projects in Xinjiang, achieving a 100% coverage rate. Among them, our university has fully utilized the high-quality teaching resources of enterprises by appointing 36 off-campus instructors to participate in practical teaching. Together with on-campus teachers, they form a joint force in education, establishing an interactive education mechanism between on-campus and off-campus, comprehensively improving students' comprehensive literacy, enhancing their innovative and entrepreneurial abilities, and promoting their all-round development [12]. Focusing on the summer internships of junior students, our university, through in-depth integration with enterprises, provides students with diversified and multi-level practical platforms and types. Specifically, the school and enterprises jointly assign students to multiple on-site project departments of water conservancy and hydropower projects in cooperative enterprises, allowing students to personally participate in real enterprise projects, experience front-line construction management, quality inspection, and other work. In practice, students can gain an understanding of the development of the water conservancy industry, enhance their professional identity, and achieve all-round development [13]. Meanwhile, in the teaching management process, schools and enterprises can establish a communication and coordination mechanism and formulate special management regulations. For example, our university has formulated the Internship Task Manual for closed-loop management, requiring students to write logs, submit summaries, and participate in joint assessments. Through production internships, students' understanding of their major is strengthened, their career direction is clarified, and they can make more targeted choices during the autumn recruitment season in September.

3.4. Improve the evaluation mechanism and enhance teaching effectiveness

In the process of carrying out innovation and entrepreneurship education for water conservancy majors, the evaluation system should also be appropriately adjusted to improve teaching effectiveness. The internship evaluation can adopt a three-dimensional system of "process-ability-achievement" to realize the collaborative management between schools and enterprises. Among them, the process evaluation accounts for 40%: on the one hand, enterprise mentors score according to the Internship Task Manual (25%); on the other hand, school mentors can conduct a comprehensive assessment of students' practical learning progress through remote inspections and on-site defenses (15%). The ability growth evaluation accounts for 35%, covering professional skills (20%) and problem-solving ability (15%). Finally, the achievement output evaluation accounts for 25%, which focuses on testing students' practical achievements. Students write practice reports (15%) and summarize achievements for defense (10%), to conduct a comprehensive assessment of students and improve the comprehensiveness and scientificity of evaluation results. The evaluation results can be used as a reference for enterprise recruitment, as well as for adjusting teaching plans and optimizing teaching schemes, to realize the development of professional education, innovation, and entrepreneurship education, and employment promotion [14].

4. Conclusion

Under the guidance of the integration of industry and education, innovation and entrepreneurship education in

water conservancy majors has ushered in new development opportunities. Relevant colleges and universities should keep up with the times, rely closely on the background of mass entrepreneurship and innovation, make full use of enterprise advantages, optimize innovation and entrepreneurship education, and cultivate students' good sense of innovation and entrepreneurial ability [15]. Colleges and universities, as well as teachers of water conservancy majors, should correctly and deeply understand the concept and characteristics of the industry-education integration teaching model, and clarify the important role of innovation and entrepreneurship education, under the guidance of this model, in promoting students' all-round development, driving professional development, and expanding channels for innovation and entrepreneurship. Subsequently, through means such as innovating teaching methods, enriching teaching content, and building platforms for innovation and entrepreneurship, a scientific, comprehensive, and three-dimensional mechanism for cultivating innovation and entrepreneurship talents should be established. This will improve the quality of innovation and entrepreneurship teaching, cultivate water conservancy professionals with a sense of innovation and entrepreneurship, contribute to the development of higher education, and continuously supply interdisciplinary talents for the development of the water conservancy industry.

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