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Research on the Integration Training Model of Industry, Education, and Research and the Construction of Platforms for Transportation-related Postgraduate Students

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Abstract: This article focuses on the training of transportation-related postgraduate students. It analyzes the deficiencies of the current training model, expounds on the importance and connotation of the integration training model of industry, education, and research. It also deeply explores how to construct an integration training platform of industry, education, and research, including the platform construction principles, operation mechanisms, and practical cases. Through the evaluation of practical effects, it verifies the positive role of this model in enhancing postgraduate students' professional qualities, innovation abilities, and practical abilities, providing a reference for the reform of postgraduate education in the transportation field.

Keywords: Transportation-related; Integration of industry, education, and research; Platform construction; Model connotation; Operation mechanism

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1. Introduction

With the rapid development of the transportation industry, the demand for high-quality and innovative talents is increasing day by day [1]. The traditional postgraduate training model has certain limitations in the combination of theory and practice and the transformation of scientific research achievements, and it is difficult to meet the diversified needs of the industry for talents. The integration training model of industry, education, and research provides new ideas and directions for the training of transportation-related postgraduate students [2]. It helps to integrate the resources of universities, enterprises, and scientific research institutions, and cultivate professional talents with a solid theoretical foundation, strong practical abilities, and innovative spirits [3].

2. Current situation and problems

2.1. Current situation

At present, the training of transportation-related postgraduate students mainly focuses on university course learning and scientific research projects [4]. It emphasizes the imparting of theoretical knowledge and the cultivation of academic research abilities. In terms of curriculum settings, it covers basic and professional courses in professional fields such as transportation planning and management, traffic information engineering and control, and vehicle operation engineering [5]. In scientific research, postgraduate students are encouraged to participate in their supervisors' scientific research projects, publish academic papers, and improve their academic levels.

2.2. Existing Problems

(1) Disconnection between theory and practice: In curriculum teaching, some theoretical knowledge is not closely related to the actual application scenarios of traffic engineering [6]. Postgraduate students cannot apply theoretical knowledge to solve practical problems. For example, in traffic planning courses, students' understanding of planning models remains at the theoretical level, and it is difficult for them to accurately apply these models in actual projects.

(2) Lack of practical platforms: The cooperation between universities and enterprises is not in-depth enough [7]. Postgraduate students have limited opportunities to participate in actual engineering projects and lack practical training platforms. Many universities have not established stable off-campus internship bases, making it difficult for students to access cutting-edge technologies and actual problems in the industry [8].

(3) Mismatch between training objectives and industry needs: With the intelligent and green development of the transportation industry, the industry's demand for talents with interdisciplinary knowledge and innovation abilities is increasing. However, the current training objectives have not been adjusted on time to adapt to this change, resulting in the trained postgraduate students not being able to meet the industry's needs well [9].

3. Connotation and advantages of the integration training model

3.1. Connotation of the training model

The integration training model of industry, education, and research refers to the cooperation among universities, enterprises, and scientific research institutions to integrate their respective resources and jointly participate in the postgraduate training process. Universities are responsible for providing theoretical knowledge, teaching enterprises provide practical platforms and actual problems, and scientific research institutions provide cutting-edge scientific research achievements and technical support. During the training process, postgraduate students not only receive systematic theoretical education but also participate in actual project research and development and practical operations, achieving a deep integration of theory and practice [10].

3.2. Advantages of the training model

(1) Improve practical abilities: By participating in actual enterprise projects, postgraduate students can apply the theoretical knowledge they have learned to practice and improve their ability to solve practical problems. For example, when participating in the research and development project of an intelligent transportation system, postgraduate students can gain an in-depth understanding of the latest

technologies and application requirements in the industry, and enhance their practical abilities in the field of traffic information engineering [11].

(2) Enhance innovation abilities: Under the integration training model of industry, education, and research, postgraduate students have access to the cutting-edge technologies and research achievements of enterprises and scientific research institutions, which broadens their academic horizons and stimulates their innovative thinking. In cooperation with enterprise and scientific research personnel, postgraduate students can jointly explore new methods and technologies to solve practical problems, thus enhancing their innovation abilities [12].

(3) Promote employment: Postgraduate students trained through the integration of industry, education, and research have a deeper understanding of industry needs and enterprise operations, and are more competitive in the job market. Enterprises are also more willing to recruit postgraduate students who have received practical training and are familiar with enterprise work processes, achieving a seamless connection between talent training and employment [13].

4. Construction of the integration training platform

4.1. Platform construction principles

(1) Demand-oriented principle: Determine the platform construction direction and research content according to the development needs of the transportation industry and the actual project requirements of enterprises. For example, in response to the current urban traffic congestion problem, the platform can carry out research and development and application research on intelligent traffic management systems.

(2) Resource-sharing principle: Universities, enterprises, and scientific research institutions share resources such as talents, equipment, and technologies to achieve complementary advantages. Universities can make use of enterprise equipment and practical sites, enterprises can draw on the scientific research strength and talent resources of universities, and scientific research institutions can apply their scientific research achievements to actual enterprise production.

(3) Collaborative innovation principle: Establish a collaborative innovation mechanism among universities, enterprises, and scientific research institutions to jointly carry out scientific research projects and technology research and development. Through cooperation, break through the boundaries of traditional disciplines, promote interdisciplinary integration, and enhance innovation capabilities.

4.2. Platform operation mechanisms

(1) Organizational management mechanism: Establish a platform management committee composed of representatives from universities, enterprises, and scientific research institutions, which is responsible for the planning, decision-making, and management of the platform. The management committee holds regular meetings to coordinate the interests of all parties and solve problems that arise during the platform's operation.

(2) Project cooperation mechanism: Universities, enterprises, and scientific research institutions jointly declare scientific research projects and engineering projects according to actual needs. During the project implementation process, clarify the responsibilities and tasks of each party, and establish an effective communication and coordination mechanism to ensure the smooth progress of the project.

(3) Talent training mechanism: Develop a complete postgraduate training plan, and clarify the

responsibilities and tasks of universities, enterprises, and scientific research institutions in postgraduate training. Universities are responsible for theoretical course teaching, while enterprises and scientific research institutions are responsible for practical teaching and guiding postgraduate students to participate in actual projects. Establish a joint supervisor-guidance system, where university supervisors and enterprise/scientific research institution supervisors jointly guide postgraduate students.

4.3. Practical case

Take the integration training platform of industry, education, and research jointly built by the School of Transportation of a certain university, a transportation technology enterprise, and a scientific research institution as an example. The platform carried out cooperation around the research and development and application of intelligent transportation systems, and jointly undertook several provincial and ministerial-level scientific research projects and actual enterprise engineering projects. In terms of postgraduate training, the enterprise and the scientific research institution provided practical positions and project guidance for postgraduate students. Postgraduate students participated in the research and development of actual enterprise projects and achieved a series of scientific research results. For example, when participating in the enterprise's intelligent traffic signal control system research and development project, postgraduate students proposed a new signal control algorithm, which effectively improved the traffic signal control efficiency [14]. This algorithm has been applied in actual projects and has achieved good economic and social benefits.

5. Evaluation of the practical effects of the integration training model

5.1. Evaluation index system

Establish an evaluation index system including postgraduate students' professional qualities, innovation abilities, practical abilities, and employment situations. Professional qualities are evaluated through indicators such as course grades and academic paper publications; innovation abilities are evaluated through indicators such as scientific research project achievements and patent applications; practical abilities are evaluated through indicators such as participation in actual projects and practical skills assessments; and employment situations are evaluated through indicators such as employment rates and employment qualities [15].

5.2. Evaluation methods

Use methods such as questionnaires, interviews, and data analysis to evaluate the practical effects of the integration training model of industry, education, and research. Conduct questionnaires and interviews with postgraduate students participating in the integration training of industry, education, and research, as well as enterprises and scientific research institutions, to understand their satisfaction with the training model and their opinions and suggestions. Collect data such as postgraduate students' course grades, scientific research achievements, and employment situations, and conduct statistical analysis to evaluate the implementation effect of the training model.

5.3. Analysis of practical effects

Through the evaluation and analysis of practical effects, it is found that the integration training model of industry, education, and research has achieved remarkable results in enhancing postgraduate students' professional qualities, innovation abilities, and practical abilities. Postgraduate students participating in the integration

training of industry, education, and research performed better than those under the traditional training model in terms of course grades, academic paper publications, and scientific research project achievements. In terms of employment, postgraduate students trained through the integration of industry, education, and research have higher employment rates and better employment qualities, and are widely recognized by enterprises.

6. Conclusion

Through the research on the integration training model of industry, education, and research and the construction of platforms for transportation-related postgraduate students, the following conclusions are drawn:

The integration training model of industry, education, and research is an effective way to solve the current problems in the training of transportation-related postgraduate students. It can enhance postgraduate students' professional qualities, innovation abilities, and practical abilities, and meet the industry's demand for high-quality and innovative talents in the transportation field. By building an integration training platform of industry, education, and research and establishing an effective operation mechanism, it is possible to achieve resource sharing and collaborative innovation among universities, enterprises, and scientific research institutions, providing a good practical environment and development space for postgraduate training.

In the future, it is necessary to further deepen the reform of the integration training model of industry, education, and research, strengthen the cooperation among universities, enterprises, and scientific research institutions, and continuously improve the platform construction and operation mechanisms. At the same time, attention should be paid to the development trends of the transportation industry, and the training objectives and curriculum settings should be adjusted on time to cultivate more outstanding postgraduate students who meet the industry's development needs and make greater contributions to the development of the transportation industry.

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