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Discussion on Teaching Materials Construction in Professional Group of Intelligent Transportation Construction in Higher Vocational Colleges Based on the Reform of "Three Education"

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Abstract: The solution to the problem of "who will teach, what to teach, and how to teach" in the reform of "three education" provides the construction idea of "who will build, what to build, and how to build" for the construction of teaching materials in the professional group of intelligent transportation construction in higher vocational colleges. Through multiple collaborations, the construction team is formed, the production is connected, the content of teaching materials is optimized, and the teaching reform is achieved. Then, select the appropriate form of teaching materials and so on to explore the construction of teaching materials for the professional group of intelligent transportation construction in higher vocational colleges.

Keywords: Textbook construction; Intelligent transportation construction major; Reform of the three education; Higher vocational school

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1. Introduction

The "three education" reform refers to the reform of teachers, teaching materials, and teaching methods, which was formally proposed by The State Council in the Implementation Plan of National Vocational Education Reform in January 2019. To carry out the reform task of "three education" in vocational education, teachers are the foundation, teaching materials are the basis, and teaching methods are the approaches to solve the problems of "who will teach, what to teach, and how to teach" in the teaching system [1]. Among them, teaching materials are the foundation and an important carrier for the implementation of the "three education" reform. In particular, the plan proposes to "build a large number of national planning teaching materials developed by school-enterprise dual cooperation, advocate the use of new loose leaf and workbook teaching materials and support the development of information resources" [2]. In September 2020, the Ministry of Education and nine other departments issued the Action Plan for Improving the Quality of Vocational Education, requiring

innovation in the form of teaching materials according to the characteristics of vocational school students. In December 2021, the Ministry of Education issued the Implementation Plan for the Construction of Teaching Materials for the "14th Five-Year Plan" for Vocational Education Planning, which requires "combining the actual reform of professional teaching with new forms of teaching materials such as loose-leaf and workbook". The Ministry of Education proposed to "continue to build a batch of modern high-quality teaching materials that are jointly developed by schools and enterprises, with obvious integration of production and education, reflecting collaborative education, and highlighting the characteristics of types" [3].

In the context of intelligent construction, intelligent transportation construction specializes in the construction of integrated transportation system engineering, taking roads and bridges as the core to serve the intelligent construction of integrated transportation infrastructure, corresponding to the traffic engineering construction post group, and serving the construction of regional civil engineering and municipal engineering projects. The construction of traffic in the country has entered a stage of development with high speed and high quality. Many new technologies, new techniques, and new standards continue to emerge. BIM, drones, data twins, and GIS are widely used. In the Outline of the National Comprehensive Three-dimensional Transportation Network Planning, it is proposed that a modern and high-quality national comprehensive three-dimensional transportation network will be built by 2035, and a large number of complex, innovative, and capable high-quality intelligent transportation construction talents are urgently needed [4]. Facing the strategic needs of the country's "transportation power", the upgrading and transformation of the engineering and construction industry, and the changes in the demand for talent in the industry, it is necessary to reform the talent training of the professional group of intelligent transportation construction in higher vocational colleges. In the cultivation of talents, teaching materials are the carrier. Students, as Internet natives, have undergone great changes in their learning style. Traditional teaching materials can no longer meet their needs, so new teaching materials relating to the industry are needed to effectively meet the actual needs of jobs.

2. The enlightenment of the "three education" reform to the construction of teaching materials

2.1. "Who teaches" decides "who builds"

"Teachers are the foundation of education and the source of education", so teacher reform is to solve the problem of "who will teach" in vocational education [5]. Through the data service platform of the National Version Data Center, the author found that the full-time transportation teachers in higher vocational colleges are the main force of the writers of transportation textbooks in higher vocational colleges, and their moral quality, professional ability, and educational philosophy directly affect the construction of textbooks.

Teachers are the foundation of education. Teachers shoulder the mission of educating people for the party and the country. They should strive to be good teachers with "ideals and beliefs, moral sentiments, solid knowledge and benevolence", and train builders and successors of the new era with their hearts [6]. China has entered the stage of high-quality development of brand creation with Chinese characteristics, and higher vocational colleges have introduced high-tech talents from enterprises to build a professional and collaborative teaching team composed of teachers and engineering and technical personnel. The teaching team should clarify the characteristics and essence of vocational education, constantly learn advanced vocational education theories, keep up with the development of the industry, integrate production and teaching, and constantly improve professional practice ability.

In the research on the reform of "three education", many researchers have proposed the construction of "double-qualified" teachers and ways to improve the quality of teachers. For example, Pi Linlin concluded

that the current teachers in higher vocational colleges have four types of teaching materials: conservative procedural, pessimistic compromise, confident generation, and optimistic and open, and proposed that the essence of vocational education must be grasped in the construction of teaching materials in higher vocational colleges. Updating the teaching concept has set a new requirement for the builders of higher vocational teaching materials [7].

"Who will teach" determines "who will build", and the "three education" reform has profound enlightenment for the formation of teaching material construction teams, ability improvement, and operation mechanism of the professional group of intelligent transportation construction in higher vocational colleges.

2.2. What to teach decides what to build

As a type of education, vocational education needs to cultivate students' vocational competency, sustainable development, and all-round development ability. The teaching team should teach students the latest knowledge, ability, and quality that can best meet the needs of enterprises, and help students move from "employment-oriented" to "industry-oriented" [8]. The teaching content should be closely related to the development of the industry, docking with the mainstream production technology, fully reflecting the "new industry, new formats, new models, new occupations", increasing the new knowledge, new technology, new methods of industry development, focusing on the integration of post-course competition certificate, the integration of curriculum ideology and politics, and focusing on practice and application.

Through investigation, the author found that at present, most higher vocational colleges have established and improved the dynamic updating and adjustment mechanism of teaching materials, requiring the use of new teaching materials in the past three years or five years, or school-based teaching materials. In the reform of "three education", each higher vocational college strictly controls the teaching standards to ensure that only high-quality teaching materials can enter the classroom [8]. The teaching of vocational courses often includes ideological and political elements, knowledge theories, skills, and technical and professional qualities. Therefore, the teaching materials of the professional group of intelligent transportation construction in higher vocational colleges should meet the professional teaching standards, be relative to the actual industrial production, keep updated, and integrate "ideology and politics" and post-class competition certificate [6].

"What to teach" determines "what to build", and the reform of "three education" has implications for the content construction, structural design, and organizational form of the construction of teaching materials for the professional group of intelligent transportation construction in higher vocational colleges.

2.3. "How to teach" decides "how to build"

The teaching method is an important means to achieve the goal of vocational education. In the era of "Internet + vocational education", student-centered information teaching has been very common. In the teaching of vocational courses, students' development, learning, and learning effect are at the center, and vocational guidance and guidance are emphasized [9]. Multimedia resources such as pictures, animations, and videos are widely used in course teaching to help students break through the difficult points in learning. According to the author's survey of several higher vocational colleges, it is found that some higher vocational colleges of transportation have built a large number of teaching resources and built a course learning platform through professional teaching resource databases, high-quality online open courses, and other projects. At the same time, under information teaching, the course teaching organization mode has also changed, from the original in-school classroom teaching gradually into online and offline mixed teaching, flipped classroom, virtual simulation teaching, and other forms. The teaching place has been transformed from the original classroom to

the enterprise workshop and construction site. Through the introduction of enterprises into the school, modern apprenticeship, and other models, the course teaching team of full-time teachers + practice teachers + enterprise tutors + ideological tutors has widely carried out on-site teaching in the teaching of practical training courses during two hours in class and after class, inside and outside the school. The information, personalized, and real-time feedback list of students' learning situation is formed in the learning monitoring system and teaching mutual evaluation area so that the "black box" of classroom teaching becomes the "white box." Teachers' teaching reflection can be more comprehensive, and teaching adjustment can be more dynamic and timely. Under the "three education reform", teaching resources, teaching methods, teaching organization, teaching evaluation, and so on, have changed. As the basis of supporting course teaching, the textbook, as the script of course teaching, needs to be adjusted and reformed accordingly.

3. Exploration of teaching materials construction for a professional group of intelligent transportation construction in higher vocational colleges

3.1. Establish a construction team through multiple collaboration

In the construction of teaching materials for the professional group of intelligent transportation construction in higher vocational colleges, it is necessary to adhere to the school-enterprise cooperation development and form a school-enterprise combination writing team with teachers with dual quality, enterprise skilled craftsmen and industry experts to ensure that the teaching materials not only comply with the laws of vocational education and teaching but also fully connect with frontline production positions [10]. Adhere to the cooperation between the university and the association, and develop the teaching materials of the professional group of intelligent transportation construction in higher vocational colleges under the support and guidance of the China Transportation Education Research Society. Adhere to the cooperation between the school and the community, fully communicate and cooperate with the publishing house, exchange views on the layout of textbooks, graphic matching, and other professional publishing issues, and obtain professional help. Adhere to school-school cooperation, and jointly develop teaching materials and supporting teaching resources with sister transportation colleges, give full play to their respective advantages, and achieve win-win cooperation.

At the same time, through the curriculum ideological and political education training, collective meeting discussion system, advanced commendation incentive, and so on, strengthen the ideological consciousness of team education, learn political theory and higher vocational education theory, improve the ideological and political education ability, and actively participate in various professional skills practice training, improve the comprehensive education ability, update the education and teaching concept, and improve the teaching material construction team's professional teaching material construction ability.

3.2. Docking production and optimizing teaching material content

China's transportation construction has entered a stage of high-speed and high-quality development, and intelligent transportation construction in higher vocational colleges is characterized by strong comprehensiveness, a high degree of multi-specialty integration, and fast technological updates. In the construction of teaching materials for the professional group of intelligent transportation construction in higher vocational colleges, it is necessary to fully conduct enterprise research, closely connect with actual production, clarify the needs of vocational positions and vocational abilities, and timely and dynamically incorporate new standards, new knowledge, new technologies, new processes, and new methods into the content of teaching materials. At the same time, the National Vocational College Vocational Skills Competition, the Belt and Road and BRICS Skills Development and Technological Innovation Competition, the BRICS Vocational Skills

Competition and other competition content, as well as 1+X vocational skills certificate, national vocational standards into the construction of teaching materials, make full use of the actual drawings, technical solutions, production projects, and other industrial enterprises as content cases. Emphasis should be placed on the practical and applied content of the textbook content to strengthen the training of skills and practical operation ability [11].

3.3 Service teaching reform, choose the appropriate form

The professional group courses in intelligent transportation construction in higher vocational colleges include theoretical courses, practical courses, integrated courses of science and practice, and so on. For different course materials, according to the characteristics of their course teaching, to meet the purpose of course teaching implementation and service education reform, the form that can best serve the teaching content and teaching organization is selected. For highly theoretical professional course textbooks, such as bridge engineering, media integration textbooks can be used to realize the visualization of abstract knowledge points, the procedural display of complex operation steps, and the virtual reality experience of working situations and working processes through the integration of a large number of rich media information. For course materials with a strong vocational orientation such as BIM modeling, a work manual style can be adopted to fully present vocational post activities and working processes with vocational post activities as the center and typical work tasks as the carrier, to satisfy students' learning on the job site and realize "learning by doing." For courses with different career directions, different teaching priorities, and fast technology updates, loose-leaf textbooks can be used to make their basic organizational units relatively independent, and can be combined, split and dynamically updated. For example, engineering measurement includes the measurement work of different construction projects such as roads, bridges, tunnels, buildings, and water conservancy, and teachers can choose combinations according to the vocational position direction and students' learning situation.

4. Conclusion

The reform of "three education" provides a theoretical basis and inspiration for the construction of teaching materials for the professional group of intelligent transportation construction in higher vocational colleges. It explores the construction of teaching materials for the professional group of intelligent transportation construction in higher vocational colleges by forming a construction team through multiple collaborations, connecting production and optimizing the content of teaching materials, serving the teaching reform, and selecting the appropriate form of teaching materials. The subsequent researchers will apply the exploration results to the practice of textbook writing, and constantly revise them in practice, to form a teaching material construction idea that has the characteristics of vocational education, integrates ideological and political thinking, and reflects the reform spirit of "three education".

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Disclosure statement

The authors declare no conflict of interest.

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