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The Practice of Teaching Material Reform for Intelligent Transportation Construction Specialty in Higher Vocational Colleges

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Abstract: In the context of the continuous development of intelligent transportation construction, there is an urgent need to reform the teaching materials of intelligent transportation construction in higher vocational colleges. Starting from aspects such as the reconstruction of the content of the teaching materials in higher vocational transportation construction, the improvement of the teaching materials construction team, and the new form of teaching materials, it has explored the formation of excellent construction teams, the improvement of the operating mechanism, the definition of professional positions, the construction of teaching materials outline, and the construction of teaching materials based on the working process. Design the structure of teaching materials, close to the actual production, integrate the content of teaching materials, integrate information resources, and build the construction path of the resource platform.

Keywords: Textbook reform; Intelligent transportation construction major; New form teaching materials; Higher vocational school

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1. Introduction

With the implementation of national strategies such as the “Belt and Road Initiative” and “Transportation power”, the construction of transportation facilities in China has entered an unprecedented golden period. New technologies are deeply integrated with traditional transportation and civil engineering industries, and wisdom and intelligence have become the development direction of China’s infrastructure construction [1]. In the outline for a powerful country in transportation issued by the state council, it is proposed to vigorously develop intelligent transportation, and the “14th Five-Year Plan” intelligent manufacturing development plan vigorously promotes intelligent construction [1]. With the construction of transportation facilities entering a new era of “intelligent construction”, the demand for talent has undergone a great change, and a large number of professional and technical talents in intelligent transportation construction are urgently needed.

Teaching materials are an important carrier of talent training, a “script” of education and teaching, a “spiritual food” for students’ growth, and a carrier for the interaction between teachers’ and students’

teaching and learning [2]. Teaching materials for higher vocational education are a key element of the reform of "three educations" in vocational education [3]. 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", requiring that "in combination with the actual reform of professional teaching, colleges and universities, industry enterprises, teaching and research institutions, and publishing units should be organized in batches to jointly develop new forms of teaching materials." Therefore, it is imperative to reform the teaching material of intelligent transportation construction in higher vocational colleges. This paper takes "Engineering Measurement" as an example to research the practice of teaching material reform of intelligent transportation construction in higher vocational colleges.

2. The reform direction of teaching materials for transportation construction in higher vocational colleges

2.1. Reconstruction of teaching materials for higher vocational transportation construction

Higher vocational education is a type of education to cultivate technical and skilled talents, and the development and acquisition process of technical skills is based on the comprehensive application of "entity technology, normative technology, and process technology" based on specific work tasks [4]. Therefore, as the carrier of training technical talents, the teaching materials should be consistent with the working process. Professional course materials should be based on real production projects and typical work tasks to reflect the new technologies, new processes, new norms, and new standards of industrial development [3]. In the reform of higher vocational teaching materials, the content of teaching materials should return to vocational posts, break through the arrangement of traditional teaching materials based on knowledge structure logic, pay attention to technical principles and knowledge points, reflect the real career situation, take the completion of typical work tasks as the main line, and take the typical work process of enterprise posts as the main content of teaching materials. The knowledge principles and technical standards involved in the completion of this task will be integrated and reconstructed to form new student-centered, learning-result-oriented, and self-directed teaching materials to meet the logical thinking and technical skills required by training students to quickly adapt to changes in vocational positions [5].

In addition, in recent years, BIM, drones, data twins, GIS, and other widely used in transportation construction, traditional transportation civil construction technology teaching materials cannot meet the needs of modern intelligent transportation construction personnel training. Therefore, the reform of vocational transportation construction teaching materials needs to keep up with the development of the industry, docking the latest professional standards of the industry, and adding new technologies, new processes, new norms, and new standards of traffic engineering construction.

2.2. Higher vocational transportation construction teaching material construction team

Vocational education textbooks are useless without the industry so the reform of vocational education textbooks is bound to accompany school-enterprise cooperation and the integration of industry and education [6]. Field engineers are the explorers, makers, and users of new technologies, new processes, and new standards in the construction of intelligent transportation. They understand the development needs of the industry, can accurately grasp the professional post standards, are familiar with the actual work process, and master the technical requirements of typical work tasks. Their participation in the construction of teaching materials will bring cutting-edge technical information to the industry, accurately match the needs of vocational positions, and also more effectively integrate into the excellent culture and professional quality of the enterprise, enhance the

sense of vocational substitution of students, and help improve the vocational ability of students.

Vocational education textbooks are worthless without "education." The reform of vocational education textbooks is bound to be inseparable from higher vocational educators, who are the main group in the construction and use of vocational textbooks. They are familiar with vocational education and students' cognitive patterns and understand students' needs and teaching needs [6]. In particular, professional leaders who have a profound theoretical foundation of vocational education and practical experience in education and teaching can integrate their experience and concepts into textbooks in the compilation of textbooks, and constantly adjust and improve them promptly based on reflection on teaching practices [7].

At the same time, in the context of information-based teaching, information technology can be fully utilized to develop and integrate rich professional teaching resources, technical achievements, teaching interaction, and other resources into teaching materials, which cannot be separated from the support of information technology practitioners and publishing companies [8].

Therefore, the reform of teaching materials for higher vocational transportation construction needs to take school-enterprise cooperation as the core, rely on key enterprises, have highly skilled front-line professional and technical personnel and professional leaders with high textbook literacy as the main body, and the press and information technology as the important guarantee, and set up a diverse teaching material construction team.

2.3. New form of teaching materials for higher vocational transportation construction

In the construction of teaching materials for transportation construction in higher vocational colleges, students should be at the center. However, as Internet users, vocational students' learning styles and habits have undergone profound changes. Traditional teaching materials cannot meet their diversified, personalized, and fragmented learning needs, and it is difficult to effectively support students' extended learning, timely evaluation, and dynamic feedback [9]. A large number of traffic construction site photos, videos, audio, and so on have been shared on the Internet, professional and technical personnel have accumulated rich materials in the practice of traffic engineering construction, and professional teachers have built excellent online courses containing a large number of digital teaching resources in their teaching practice. Therefore, in the construction of teaching materials for transportation construction in higher vocational colleges, various media resources can be integrated into the teaching materials in the form of two-dimensional code, interactive content such as evaluation and discussion can be interspersed in the teaching materials in the form of small programs, to form multi-media presentation and transmission, so that the teaching materials for transportation construction in higher vocational colleges can be presented in new forms such as media style and become real "living" teaching materials for higher vocational colleges [10].

3. The reform practice of teaching materials for transportation construction in higher vocational colleges

Based on clarifying the reform direction of the teaching material of the transportation construction major in higher vocational colleges, this study has carried out the reform practice of the teaching material "Engineering Measurement" and explored the teaching material construction path.

3.1. Establish an excellent construction team and improve the operation mechanism of the team

In the construction of "Engineering Measurement" teaching material, the study has created a multi-linkage team. The school includes an engineering surveying teaching team and students majoring in transportation

construction, among which the teaching team can effectively complete the construction of the textbook framework. Students are the users of the textbook, and their feedback is an important basis for the improvement of the textbook. Enterprises include leading enterprises in the southern surveying and mapping industry, as well as enterprise engineers, who have mastered the latest new measurement technologies such as drones, have rich experience in traffic engineering construction, and accumulated a large number of construction site photos and other resources required for teaching materials. In addition, publishing institutions provide strong support for textbook editing, typesetting, copyright screening, and other aspects, and information technology experts provide strong technical support for the transformation and integration of teaching resources and platform construction. At the same time, the Engineering Measurement teaching material development team has formulated a regular meeting system and a regular information contact system, subdivided the responsibilities and rights of each subject, clearly implemented the tasks to the person, refined the progress of each link, implemented the time node, improved the performance management system, and stimulated the enthusiasm and initiative of the team. Only such a perfect team operation mechanism can ensure the efficient completion of the teaching material.

3.2. Clarify the vocational positions and construct the content outline of the textbook

According to the survey and interview of the enterprise industry, the graduates of the smart transportation construction professional group are engaged in engineering surveyors, and construction workers and other positions also need to have engineering measurement capabilities. Therefore, in the establishment of the talent training plan for the professional group of intelligent transportation construction, Engineering Measurement is determined as the basic course of the professional group. According to the enterprise industry demand research and post-ability analysis, it is clear that the engineering measurement post needs to have a variety of instrument and equipment operation, measurement data collection, data analysis, and processing capabilities, with unity and cooperation, seeking truth from facts and professional quality. The preliminary list of professional ability is formed by combining the requirements of professional grade ability and skill competition ability of engineering surveyors. According to the preliminary list of vocational abilities, the use of level, total station, GNSS receiver, error analysis of measurement data, and engineering construction measurement are constructed as the content outline of Engineering Measurement teaching material, while focusing on cultivating students' knowledge and skills, thinking ability and comprehensive quality of ideological and political moral education.

3.3. Optimize the structure of teaching materials based on the working process

The preliminary list of job vocational abilities is processed by teaching, combined with the specific work process of typical work, and typical work tasks and specific ability requirements are analyzed to form a detailed and specific list of vocational abilities. According to the list of vocational abilities, combined with theoretical knowledge, operational skills, and occupational requirements, based on actual production cases, design learning situations, and learning projects. Each learning situation, according to the work process, is then subdivided into specific work tasks. Therefore, in the design of the teaching material structure of Engineering Surveying, the teaching material structure of theoretical knowledge, technical skills, and curriculum ideology and politics is formed from the perspective of professional activities based on the work task.

3.4. Close to the actual production, update and integrate the content of teaching materials

According to the investigation of enterprise units and the guidance of enterprise engineers, it is found that new technologies such as intelligent total station, precision electronic level, UAV mapping, and BIM are widely used in traffic construction projects, and a series of national standards and industry standards such as the

"Precision Engineering Measurement Specification (GB/T 15314-2024)" have been recently promulgated. In the construction of "Engineering Measurement" teaching material, the use of total station is integrated, drone surveying is added, the technical requirements of measurement standards are updated, and the real production projects and engineering construction production cases of enterprises are introduced, so that students can analyze and solve the measurement problems in the actual engineering construction projects so that the content of the teaching material can keep up with the development of the industry and be close to the actual production.

3.5. Information resource integration to build an information resource platform

In the construction of Engineering Surveying teaching material, the information resource platform was built according to the structure and content of the teaching material, the resource demand list was formed, and then the targeted collection was made. The information resources were converted into two-dimensional code and integrated into the teaching material. The mini program for testing and evaluation and the WeChat public account for interactive discussion was established to realize the presentation of Engineering Surveying teaching material in a new form of digital information.

4. Conclusions

Teaching material is an important carrier of personnel training, and its construction and development are directly related to the quality of personnel training [2]. The reform of teaching materials for intelligent transportation construction is the development demand of the time and the specific implementation of the national "three educations" reform. Although the study carried out reforms in the aspects of content reconstruction, improvement of teaching material construction team and a new form of teaching material, and explored a certain construction path in the construction of Engineering Survey teaching material, the reform of teaching materials for intelligent transportation construction in higher vocational colleges still has a long way to go. Some problems need to be solved, such as the evaluation of new-form teaching materials construction, the integration of curriculum ideology and politics, and the integration of teaching materials with five education [11]. Researchers will continue to explore and seek for better teaching materials reform direction and construction path.

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Disclosure statement

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References

[1] Li XP, 2023, Vigorously Develop Smart Transportation, Accelerate the Construction of a Transportation Power, and Inject New Momentum into Being a Pioneer of Chinese Path to Modernization. Qizhi, 2023(05): 21–23.

[2] Shi HL, Qian XH, 2024, The Main Characteristics, Practical Examination, and Development Strategies of New Forms of Vocational Education Textbooks. Vocational and Technical Education, 45(05): 6–10.

[3] Zhou HQ, Wang YL, 2022, The Realistic Situation and Possible Strategies of the "Three Teachings" Reform in Vocational Colleges in the Digital Era. Research in Higher Education of Engineering, 2022(04): 169–175.

[4] Yang H, Fu YF, 2024, The Basic Framework of the Quality Evaluation Index System for New Forms of Vocational Education Textbooks. Chinese Vocational and Technical Education, 2024(11): 66–75.

[5] Li JY, Zhu SY, 2021, The Strategy and Path of Empowering Vocational Talents Training through the Reform of "Three Teachings". Chinese Vocational and Technical Education, 2021(08): 74–78.

[6] Zeng TS, 2024, Industrial Transformation and Upgrading Promote the Construction of a Vocational Education Industry Education Integration Community. Ethnic Education of China, 2024(04): 34–37.

[7] Sun HF, 2023, Research on the Improvement of Higher Vocational Curriculum Teaching in the Internet Era. China Science Paper, 18(03): 357.

[8] Feng JJ, 2022, Thoughts on the Publication of New Forms of Textbooks for Higher Vocational Education in China in the New Era. Publishing Journal, 30(02): 40–46.

[9] Liu P, Niu JH, 2022, Reform and Practice of Biopharmaceutical Separation Technology Course in Higher Vocational Education based on the Construction of Stereoscopic Textbooks. Chinese Journal of Chemical Education, 43(04): 88–95.

[10] Liu C, 2021, Opportunities and Challenges Faced by Higher Vocational Curriculum Reform in the Context of Internet Plus Technology. China Science Paper, 43(04): 88–95.

[11] Chen XY, Wang WW, 2023, Research on the System Construction of Developmental Evaluation for Vocational College Students under the Background of Five Education Integration. Chinese Vocational and Technical Education, 2023(33): 73–79.