Research on the Application of New Form Loose-Leaf Textbooks in Practical Teaching

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Abstract. In recent years, driven by the dual impetus of the high-quality development of vocational education and its digital transformation, new form loose-leaf textbooks have become the core direction and practical focus of textbook reform in vocational education. This paper applies new form loose-leaf textbooks to equipment practical teaching of a professional course, and proposes optimized solutions targeting the main problems arising during the application process. Ultimately, remarkable results have been achieved, providing a replicable and promotable new paradigm for equipment practical teaching, as well as practical references for the teaching reform and quality improvement of equipment-related courses in vocational education.

Keywords: New form loose-leaf textbooks; Practical teaching; Vocational education

1 Introduction

In the process of advancing the reform of education in the new era in depth, vocational education, as an important part of China's education system, is ushering in a transformation opportunity centered on quality improvement and excellence cultivation, as well as the integration of production and education[1]. At the same time, it is also facing severe challenges where the textbook system is incompatible with post demands and technological development. At present, traditional equipment practical textbooks have encountered many problems in long-term use: first, the large variety of textbooks and inconvenience in use have seriously affected the efficiency and quality of practical teaching; second, the single form makes it difficult to match modern teaching concepts and students' learning needs; third, the long compilation cycle and lack of an effective dynamic update mechanism fail to meet the talent demands of employers. The emergence of new type loose-leaf textbooks has pointed out the direction for the innovative development of equipment practical textbooks.

This paper applies new form loose-leaf textbooks to practical teaching, and proposes optimized solutions targeting the main problems arising during the application process. It provides a replicable and promotable practical paradigm for equipment practical

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teaching, laying a solid foundation for the sustainable development of vocational education equipment-related courses.

2 Overview of New Form Loose-Leaf Practical Textbooks

In 2019, the National Vocational Education Reform Implementation Plan issued by the State Council proposed the concept of "new type loose-leaf textbooks" for the first time, clearly defining it as the core direction of vocational education textbook innovation. In recent years, with the transformation and upgrading of vocational education and the rapid development of digital technology, new form loose-leaf textbooks have been widely applied in vocational education in various fields such as machinery, electronics, and rail transit[2,3], and have become an important carrier for promoting teaching reform and improving teaching quality[4].

New form loose-leaf textbooks are a new type of textbook carrier based on traditional loose-leaf textbooks, integrating modern educational concepts and digital technology. They take the cultivation of post competencies as the core, modular content as the support, flexible adjustment as the characteristic, and digital resources as the supplement[5]. Breaking the fixed binding form and subject-based content system of traditional textbooks, they realize the dynamic adaptation between textbooks and teaching implementation, post demands, and technological development, and possess the core characteristics of "flexible form, open content, rich resources, and strong interactivity"[6].

The development of loose-leaf practical teaching materials for equipment holds significant implications for equipment-focused practical teaching, the cultivation of students' competencies, and even the advancement of vocational education reform.

From the pedagogical perspective, these loose-leaf materials offer abundant teaching resources and diverse instructional approaches, enabling instructors to break free from the constraints of traditional teaching models, innovate teaching methodologies, and streamline teaching processes. Their modular design allows flexible adaptation to various teaching scenarios—whether classroom instruction, hands-on equipment training, or on-the-job training provided by employers—with relevant content modules combinable according to specific requirements. By closely aligning with the actual demands of professional roles, the materials make teaching more relevant to employers' practical needs, thereby enhancing students' professional identity and learning motivation. Furthermore, the modular content arrangement and flexible update mechanism effectively reduce textbook revision costs, improve the utilization efficiency of teaching resources, and facilitate the continuous deepening of teaching reform.

From the students' perspective, the use of loose-leaf practical teaching materials for equipment empowers them to better integrate theoretical knowledge with practical operations, strengthening their ability to address real-world problems. Additionally, the emphasis on independent and inquiry-based learning fosters students' innovative thinking, lifelong learning awareness, and job adaptability, laying a solid foundation for their future career development.

3 Application and Implementation of New Form Equipment Practical Textbooks

In the first semester of 2025-2026, new form loose-leaf textbooks were fully applied to the practical teaching of a professional course. Adopting an organizational model of "modular structure + dynamic updates," the teaching materials rationally arrange content in accordance with teaching logic and practical processes, ensuring the systematicity and timeliness of the content. In terms of content, oriented towards cultivating the core competencies required for equipment-related positions, the materials cover knowledge and skills such as the basic principles, structural composition, operational methods, maintenance, and fault diagnosis and troubleshooting of equipment. An "online-offline blended teaching" model was constructed to give full play to the advantages of the textbooks in flexibility, interactivity and practicality.

In the pre-class preview stage, teachers push preview content to students through the digital teaching platform. With the help of resources such as basic knowledge in the textbooks, MOOCs and micro-course videos linked by QR codes[7,8], and pre-class thinking questions, students independently complete preview tasks and master basic principles and key operation points in advance.

In the in-class implementation stage, a teaching process combining "task-driven + hands-on practice + manual guidance" is adopted. Taking the typical post tasks in the textbooks as the carrier, teachers assign teaching tasks in combination with actual application scenarios. Students conduct group-based hands-on training with reference to the operation steps, precautions, work processes and other contents in the textbooks and in conjunction with actual equipment; through targeted Q&A, group comments and other methods, teachers guide students to operate standardizedly and solve problems, ensuring the achievement of teaching objectives.

In the post-class consolidation stage, students use the extended resources in the textbooks for intensive training, including typical case analysis, extended thinking exercises, online test questions, etc.; teachers view students' learning data through the digital platform, such as resource viewing duration, test completion status, score statistical analysis, etc., analyze students' learning effects, conduct centralized Q&A for common problems, and provide one-on-one tutoring for individual problems.

4 Problems and Solutions in Application

4.1 Existing Problems

Through classroom observations, teacher-student interviews, teaching joint meetings and other means, four major problems have been identified during the application of the textbooks:

First, difficulties for teachers in adaptation. Influenced deeply by traditional teaching modes, some teachers are accustomed to lecture-based teaching. As a result, they still adopt conventional teaching methods in the teaching process and fail to give full play to the advantages of the textbooks.

Second, insufficient autonomous learning ability of students. Some students are used to the traditional passive learning mode and have weak awareness and ability of independent learning. They perform poorly in pre-class preview and post-class extended learning, with problems such as superficial preview and low participation in extended learning, thus failing to fully exert the textbook's function as a "learning-oriented tool".

Third, inadequate embedding of digital resources. The development and integration of digital resources require significant investment of time and energy. At present, the digital resources of the textbooks are not sufficiently abundant and fail to cover all core skill points, making it impossible to fully meet the diverse learning needs.

Fourth, relative lag in updates. Although a textbook update mechanism has been established, the update speed of textbook content remains relatively slow due to factors such as certain delays in information transmission and long resource development cycles. Some new technologies have not been integrated into the textbooks in a timely manner, resulting in a significant gap between the textbook content and the forefront of equipment technology as well as the evolving requirements of employers.

4.2 Solution Measures

To address the above problems, the following targeted solutions have been adopted:

First, strengthen teacher training. Establish a three-level training system, and regularly organize teachers to participate in special training on the development and application of new form loose-leaf textbooks. Invite textbook development experts and renowned teachers to deliver lectures and provide on-site guidance; carry out activities such as smart teaching observation and teaching experience exchange to share excellent teaching cases and methods; establish a teacher mentoring mechanism, where experienced teachers are paired with novice teachers to rapidly improve the latter's understanding and application ability of the new textbooks through classroom observation, evaluation and collective lesson preparation.

Second, cultivate students' autonomous learning ability. In the teaching process, focus on guiding students to establish awareness of independent learning and teach them autonomous learning methods, such as making study plans, consulting materials, summarizing and concluding, and exploring problems; design group cooperative learning tasks and carry out project-based learning; establish a learning incentive mechanism, such as implementing reverse score increment for after-class remedial learning and incorporating extended learning into the assessment scope, so as to stimulate students' learning initiative.

Third, enhance the construction of digital resources. Relying on projects such as curriculum development and multimedia resource construction of the vocational university, invite other equipment teachers, enterprise experts from employer units, and on-site enterprise instructors to jointly develop high-quality digital resources and enrich the textbook resource library; at the same time, actively introduce high-quality external resources to further expand the textbook resource library.

Fourth, optimize the update mechanism. Further improve the textbook update mechanism by clarifying update time nodes, responsibility division and process specifica-

tions, and establish an update system of "minor updates every semester and major updates every year"; set up a regular communication mechanism with employer units to collect information on changes in job requirements and technological innovations on a regular basis; simplify the textbook revision process by adopting flexible methods such as "module replacement" and "online resource update" to shorten the update cycle and ensure the timely updating of textbook content.

5 Effectiveness of Teaching Practice Application

To comprehensively and scientifically evaluate the application effectiveness of new form loose-leaf textbooks in practical teaching, a multi-dimensional assessment was conducted from the perspectives of both students and teachers, using methods including classroom observation, process documentation, questionnaire surveys and interview research.

The assessment results show that remarkable outcomes have been achieved in equipment practical teaching after the application of new form loose-leaf textbooks.

First, students' comprehensive abilities have been significantly enhanced. In terms of practical operation capabilities, students showed improvement in the standardization of equipment operation, the accuracy of parameter measurement and the efficiency of practical task completion. The average time spent on task completion was reduced by 13% compared with previous semesters. In terms of problem-solving capabilities, during fault maintenance practice, students were able to analyze the causes of faults and propose solutions more quickly and accurately; the average fault handling time was shortened by 15%, and the accuracy of fault location was improved by 23%. In terms of autonomous learning capabilities, students' learning enthusiasm and initiative were significantly boosted: the completion rate of pre-class preview increased from 62% to 97%, and the participation rate in post-class extended learning rose from 45% to 85%. Most students were able to conduct targeted learning based on their own weak points.

Second, the overall quality of teaching has been notably improved. In terms of teaching method innovation, most teachers were willing to actively design teaching activities, resulting in more diversified teaching methods and a more dynamic classroom atmosphere. Among the 22 participating teachers, 18 were able to apply blended teaching methods, accounting for 90.5%, and the number of teaching innovation cases increased by 60% compared with previous years. In terms of teaching effectiveness, feedback from phase tests indicated that students' scores on practical ability rose from 75 to 89. In the final practical assessment of the course, students' average scores in practical operation increased by 28%, and the excellent rate climbed from 15% to 30%.

In addition, questionnaire survey results showed that 89% of students believed that the textbook content was practical, the organization was clear and the resources were abundant, which could effectively guide practical operation. 92% of teachers reported that the textbook had strong adaptability, facilitated teaching organization and method innovation, and significantly improved teaching efficiency.

6 Conclusion

Taking the practical teaching of a certain professional course as an example, this paper explores the application of new form loose-leaf textbooks in practical teaching, which has effectively achieved the training goal of transforming students from "knowledge acquisition" to "competence development". In the next step, we will continue to improve the construction of online course resources and strengthen the development of digital resources, so as to better serve the cultivation of new - type talents.

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