

The Role and Positioning of Digital Textbooks in Vocational Education in Relation to Teachers

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Abstract: In recent years, with the rapid advancement of digital technologies, digitization in vocational education has become a major trend. Among these advancements, digital textbooks have emerged at the forefront of digitization, significantly impacting both their form and content. This article aims to analyze the existing issues in the use of digital textbooks in vocational education and emphasize the importance of recognizing the vital role of teachers in the wave of digital textbook innovation. It is crucial to clarify the role and positioning of teachers to avoid inadvertently diminishing their classroom significance while prioritizing technological innovations. Teachers should fully leverage the role of digital textbooks as tools for organizing classroom activities and recognize the core and essence of classroom teaching as digital technologies enter the scope of vocational education. By doing so, teachers can contribute to the high-quality development of modern vocational education.

Keywords: Vocational education; Digital textbook; Teacher

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1. Introduction

The concept and definition of digital textbooks have multiple interpretations, but summarizing its essence, digital textbooks encompass two core aspects. Firstly, they retain the fundamental characteristics of traditional textbooks as knowledge carriers, serving as tools for knowledge transmission that must adhere to national textbook standards and align with the principles of students' physical and mental development. Secondly, digital textbooks are closely integrated with digital technologies. In terms of their medium, they can be presented through digital devices, while in terms of content, they encompass various technological features such as multimedia, three-dimensionality, and interactivity. They represent a modernized form of textbooks that combines instructional guidance, assessment, and multifunctionality into one entity.

“Vocational education textbooks are an important component of vocational education reform, and strengthening textbook development is a key aspect of improving the quality of vocational education and talent cultivation”^[1]. Digital textbooks have gained significant attention in the education, publishing, and cultural industries due to their potential for greater possibilities in the process of technological advancement. However,

it is observed that the role of teachers in digital textbook development is increasingly marginalized, leading to a passive position for some teachers. There even exists negative discourse suggesting that the rich presentation forms of digital textbooks and the creation of online classrooms through various channels could replace the role of teachers as active participants in the classroom. This misalignment and misunderstanding are evidently conceptual errors.

2. Digital textbooks as tools for conducting classroom teaching

“Digital textbooks are a new type of educational product that integrates content and technology, with their essence being textbooks, and their core value lies in their educational and instructional attributes” [2]. While digital textbooks represent a breakthrough in vocational education innovation, they currently do not possess the ability to completely disrupt conventional classroom teaching. Particularly in the field of vocational education, emphasis should be placed on fostering students’ practical abilities, and classroom activities should always revolve around the two key participants, teachers and students. Digital textbooks, as tools for conducting classroom teaching, undergo innovations in terms of content and format to serve the purpose of classroom instruction and achieve educational objectives. Ultimately, the goal remains the realization of the long-term goal of educating and nurturing individuals, reaffirming that the essence of classroom teaching ultimately lies in human interaction.

Observations in real-life scenarios reveal that students tend to lean towards using traditional textbooks for self-directed learning due to factors such as reading habits, environmental conditions, and device availability. Traditional textbooks facilitate focused attention and deep thinking. On the other hand, digital textbooks, with their diverse presentation formats and interactive features, are better suited for classroom use. However, the use of digital textbooks also requires the active guidance of teachers. By leveraging multimedia presentation formats, classrooms can become more engaging, resulting in increased effectiveness and efficiency in the teaching and learning process.

Therefore, when considering the role of digital textbooks in the classroom, it is crucial to grasp the essence of them as “tools.” Regardless of the current stage of development where digital textbooks have not substantively replaced traditional textbooks, even in a future where digital textbook technologies and formats are mature, textbooks will always remain the carriers of knowledge. They cannot completely replace the independent role of teachers in classroom instruction. The precise and appropriate utilization of teaching tools, including textbooks, by teachers in gauging students’ understanding and emotional changes, remains an essential humanistic indicator in the classroom. It is an indispensable aspect of the instructional process.

3. Current situation and shortcomings of digital textbooks in vocational education

As vocational education is more closely related to social production and life, in conjunction with the overall expectation of the vocational education industry for digital textbooks, an examination of the current usage of digital textbooks in classroom teaching reveals noticeable shortcomings. The author finds that, at present, whether in terms of construction achievements or usage conditions, digital textbooks exhibit substantial deficiencies.

3.1. Singular digitization of printed textbooks

In recent years, vocational schools have been increasingly focused on textbook construction. In 2018, the Ministry of Education issued the “Management Measures for Special Funds for Education Curriculum

Textbook Reform and Quality Standards,” which clarified that digital textbooks are a typical innovative form of textbooks ^[3]. In 2020, the Ministry of Education promulgated the “Management Measures for National Textbook Construction Key Research Bases,” emphasizing the need to focus on the research of “new types of textbooks in the information age” ^[4]. The continuous promulgation of a series of management measures is actually strengthening the call of the era for digital textbook construction, hoping to pay attention to textbook construction from the level of school development, and also incorporating textbook construction as an important indicator of overall school evaluation into relevant standards.

However, it is not difficult to observe that there are still many instances of digital textbook construction tasks being carried out simply by replacing printed textbooks with electronic versions, and vocational education, constrained by the objective conditions of textbook construction, is no exception. At the beginning of the integration of digital technology into textbook construction, traditional printed textbooks were digitized, completing the first step in the transformation of textbook form. However, this step was merely a preparatory work for more convenient retrieval of data from printed textbooks in digital textbook construction, not the entirety of digital textbook construction. A mere transformation in form does not comply with the definition of digital textbooks. Changing only the medium of the content does not touch on the essential properties of digital textbooks brought about by technological capabilities, such as data analysis, teacher-student interaction, intelligent assistance, and so forth. It does not constitute a substantive transformation into digital textbooks.

3.2. Aggregation of multimedia resources

In an effort to build a digital classroom, many teachers have fallen into the misconception of piling on multimedia content. They mistakenly think that incorporating dynamic media forms such as audiovisuals and animations into classroom teaching is an innovative approach, and equates to the construction of digital textbooks. However, this is not the case. Even before the concept of digital textbooks came into being, enriching students’ horizons by playing videos, documentaries, and other content was already a common method employed by many teachers to enhance the classroom content, it is not a novel method. Furthermore, the creation of digital textbooks is not as simple as adding a QR code link to audiovisual resources in the material.

Indiscriminately piling on multimedia resources may appear to enrich the classroom content, but broadcasting content without discernment essentially has no difference from traditional didactic education. In addition to diminishing the emphasis on enhancing teachers’ teaching abilities and overlooking the reception effect on students, overreliance on multimedia forms also deviates from the essence of digitalized classroom teaching. Modern vocational education demands that teachers regard students as individuals with independent consciousness in the education process, enhancing personalized education and teaching in accordance with their aptitude. Particularly in the face of societal development, where industry differentiation is undergoing rapid changes and is becoming more precise, the requirements for vocational school graduates in terms of employability and cultural literacy are becoming more refined. Vocational education should update in real-time according to the latest demands of social positions during the process of classroom teaching. This cannot be achieved by simply adding more multimedia content to the classroom.

3.3. Technological barriers result in insufficient momentum for the development of digital textbooks

From the perspective of publishing and media, the development of digital textbooks to date can be divided into the following four stages. The first stage is the digital replica phase of printed textbooks. The second stage is the digital enhancement phase based on printed textbooks. The third stage is the solution phase, where digital textbooks are integrated as an indispensable, core component into the entire digital solution, tailored to

specific teaching activities or subject-related educational issues. The fourth stage is the development phase of intelligent and ecological digital educational publishing^[3]. Consequently, one must acknowledge the challenges of constructing digital textbooks and the existence of certain objective thresholds. The complexities of digital technology are difficult to comprehend and master overnight. Internet technology is unfamiliar territory for many teachers. Vocational education teachers bear heavy pressure in terms of research, teaching, and practical training. Besides conventional subject education, they also need to strengthen vocational skills, practical training, and psychological counseling for students, contributing to their overall education. Therefore, after the conversion of traditional textbooks into electronic versions and the incorporation of some multimedia materials, the further planning of digital textbook construction appears to be somewhat lacking in momentum.

Moreover, the pace of development in the technology sector is incomparable to that in the field of education, and they also differ in their approach to adopting new ideas. Some schools, while promoting the construction of digital textbooks, fail to consider the actual situation of integrating subject characteristics with technology comprehensively. This results in a one-size-fits-all approach, which neither stimulates teachers' enthusiasm nor paves the way for the development of digital textbooks. Consequently, the progress of digital textbook construction has been slow and underwhelming for an extended period. The limited technical acceptance capability of teachers and their inadequate growth time are obstacles that urgently need to be overcome in the process of digital textbook construction.

4. Primary role of teachers in the development of digital textbooks in vocational education

Considering the issues currently present in the construction and usage of digital textbooks in vocational education, teachers, as the main constructors of digital textbooks, should take the initiative to play their roles, undertake the task of digital textbook construction, and work closely with schools, publishing institutions, and technical units. They should “construct a knowledge map of textbooks in accordance with modern teaching theories and subject logic characteristics, use intelligent technology and machine learning algorithms to predict students' learning status, form learner profiles, and provide students with structured, interactive, and generative learning content based on the knowledge map and learner profiles, thus promoting the development of digital textbooks towards intelligent textbooks”^[4].

4.1. Developing digital textbooks to enhance classroom upgrades

The “Action Plan for Improving the Quality of Vocational Education (2020–2023)” jointly issued by the Ministry of Education and other nine departments clearly proposes that the construction of textbooks should “improve the dynamic updating and adjustment mechanism of textbooks, with major revisions every three years and minor revisions each year.” It also advocates for innovative forms of textbooks, promoting a system of “loose-leaf, workbook, and multimedia textbooks” that are scientifically rigorous, simple yet profound, richly illustrated, and diverse in form^[4]. Education is a cause for training and reserving talents for national and social development. The rapid development of the country and society has achieved a quantum leap with the progress of technology. As the education cause adapts to national development, it should play a leading role. Therefore, the construction of digital textbooks is already on the agenda.

Firstly, there is the need to form a team of teachers for the construction of digital textbooks. As the backbone of textbook construction, the creativity of teachers is a critical juncture in the realization of breakthroughs in digital textbooks. The team of teachers in vocational education lacks initiative in textbook construction and often uses existing textbooks in classroom teaching. However, in terms of content adaptability,

different vocational colleges have different specialized majors and advantageous disciplines, and many teaching contents have their own unique practical results, making them better suited for digital textbook construction. Moreover, teachers, as the initiators and controllers of classroom teaching, determine the content of textbooks through their choice and confirmation of teaching content. They should not be limited by other authors who do not understand the actual situation of their school. In the construction of digital textbooks, the school should take the lead and form a team of teachers based on disciplines as the first step. Fully utilizing the collective power of the team of teachers within the discipline, taking the national textbook construction standards as the guideline, basing on teaching practical experience, referencing the actual situation of the school, and focusing on students, constitute the foundation for building good digital textbooks.

Secondly, it is necessary to integrate data resources for the construction of digital textbooks. Resource integration and collaborative development are highly practical channels for the construction of digital textbooks. Especially under the blessings of the achievements in digital technology development, breaking through the limitations of time and space is no longer challenging. By promoting cross-disciplinary and cross-institutional cooperative development, it is possible to achieve resource sharing and flow, allowing digital textbooks to overcome the shortcomings of a single institution and gather the latest research results across the entire discipline. Furthermore, after their construction, these digital textbooks can go beyond the classroom and become important tools for promoting educational equity. Through cross-industry and cross-domain cooperative development, we can realize the horizontal connection of disciplines, and the integration with technology becomes the foremost aspect of digital textbook construction. Through technical means, we can link it with social practices and job requirements, resulting in clearer objectives and more relevant content in vocational education.

Thirdly, it is necessary to break through the spatiotemporal limitations in the construction of digital textbooks. Deliberately building digital classrooms through digital textbook construction, continuously updating and iterating digital textbooks in the teaching practice process, and not regarding the publication of textbooks as the end but as the starting point, can establish a timeline for digital textbook construction. By continually refining practical data, the content of digital textbooks can be gradually enriched and the defects during the textbook construction phase can be corrected. Subject knowledge training can be directed towards society by aligning with user needs as it is not confined to the physical environment of the classroom, nor to the current physical limitations of students. By enhancing the societal standing and perspective of vocational education, not only can the education level of vocational institutions be improved, but training and teaching can also be provided to workers in society who need relevant skills and knowledge, thus serving the modernization construction of socialism. This approach will greatly enhance the social benefits of vocational education and contribute to the enhancement of the occupational literacy of the entire population.

4.2. Integrating technological momentum for dynamic classroom updates

The distinction between digital textbooks and traditional textbooks ultimately lies in the dimension of digital technology. Digital textbooks have emerged under the requirements of the rapid development of Internet technology and the high-quality development of education. Due to its close connection with social practice, vocational education not only needs to establish classroom attractiveness through digital technology, but also needs to place more emphasis on consciously cultivating students' technology application abilities in the classroom, thereby creating a driving effect. Therefore, in the face of the practical requirements of digital textbook construction, vocational education teachers must also enhance their own technological literacy.

Firstly, it is essential to strengthen the overall digital literacy of vocational college teachers and incorporate

it into teacher evaluation criteria. The construction of digital textbooks represents the high-quality development requirement proposed to the teacher community as education evolves into a new era. As the main constructors, teachers inevitably bear the most responsibility. For schools, in the process of advocating for teachers to enhance the construction of digital textbooks, it is indispensable to provide digital technology training for the teacher community, scientifically plan the growth path of teachers in technological literacy, and arrange reasonable training courses. Teachers should be given a certain space for growth; the cause of digital textbook construction cannot be achieved overnight nor be hurried, it requires a gradual and steady growth. Moreover, the technical strength of the digital textbook construction team can be strengthened by introducing a professional technical team to join forces with the professional teacher team, customizing technical development according to the characteristics of the disciplines. When faced with technical problems in the development process, providing scientific solutions is a good way to overcome technical challenges in digital textbook construction.

Secondly, it is important to intelligently monitor the effectiveness of classroom activities and pay attention to data feedback. Digital textbooks can not only provide students with teaching content but also offer teachers data feedback on their teaching. Students are always the target group for classroom teaching. Even in future classrooms, teachers can provide personalized and customized classes according to the needs of different students. Therefore, teachers must fully motivate and engage students, pay attention to student feedback in the classroom, including pre-class preparation and guided learning, browsing, and clicking during teaching, and assessment and exams after teaching, and establish a teaching chain data model. The content of digital textbooks can be visually edited, dynamically updated in real-time, and adjusted immediately based on classroom feedback, and a digital textbook resource bank can be built to immediately retrieve needed data and facilitate resource retrieval. This forms a digital teaching model, achieving various teaching methods such as “scenario teaching that surpasses traditional classrooms, real-time evaluation, user-generated content, mutual teaching and learning, visible teaching, collaborative teaching, and flexible teaching”^[5].

4.3. Enhancing copyright awareness and avoiding ethical risks

“The issue of the relationship between technology and ethics is one of the most core and fundamental problems in the field of machine ethics”^[5]. Content creation on the Internet has always faced serious copyright issues, with untraceable sources of content, users autonomously forwarding and recreating content, leading to a mix of good and bad content on Internet platforms. Digital textbook construction belongs to the field of education, which inherently has strong authority. Furthermore, as teachers who are responsible for shaping the future worldview and values of students, they need to be strict with themselves in content creation, avoiding related ethical risks.

Firstly, it is crucial to explore the establishment of standards for digital textbook construction in vocational education in order to define industry norms. In the early stages of digital textbook construction, most initiatives borrowed existing online educational platforms. After a period of evolution and attrition, several mature platforms have emerged as industry leaders. Not only that, many vocational schools involved in digital textbook construction have begun to build their own platforms and databases. Considering the current state of digital textbook construction, a certain foundation has already been established. It is feasible to explore the establishment of industry-specific standards. Based on the national textbook construction standards and taking into account the characteristics and circumstances of digital textbooks, it is possible to form a set of referential norms and standards, providing a solid basis for the construction of digital textbooks.

Secondly, there should be a proactive approach to protect original content by applying for intellectual property registration. Being aware of copyright protection and emphasizing the safeguarding of original content

is a starting point. Many teachers invest considerable effort into content creation, and it is frustrating to see rampant piracy immediately after publication with little recourse for restitution. This issue has already emerged in the process of traditional textbook publishing. As digital textbooks are born out of Internet platforms, piracy is even more rampant, making it all the more important to emphasize copyright protection and apply for intellectual property registration in a timely manner. Furthermore, technology can be fully utilized in the development of digital textbooks to prevent content plagiarism, placing copyright protection ahead of publication and distribution, thereby contributing to the establishment of a harmonious environment for Internet knowledge creation.

Thirdly, it is vital to quote reasonably and legally, paying attention to discerning the authenticity of Internet resources. According to relevant regulations, “translating or copying a small amount of published works for classroom teaching or scientific research, to be used by teachers or researchers, but not for publication or distribution,” is deemed fair use. Therefore, quoting published content in the classroom to carry out educational activities is reasonable and legal. However, there is a risk associated with unrestricted quoting of other people’s content in digital textbooks that are to be published. Some teachers, during the process of digital textbook creation, link to a large amount of other people’s content through QR codes, without even carefully verifying the authenticity of the quoted content. It is not uncommon that after scanning the QR codes, students are redirected to pornographic or scam websites due to the webpages being long unmaintained and stolen by illegal elements. As the content creators of digital textbooks, teachers should be responsible for the content involved in the textbooks. Reasonably quoted content must be properly attributed, with the source and origin clearly marked, and the consent of the original author obtained. Verification of content sources and authenticity should be conducted to ensure the accuracy of the information received by students. There should be full utilization of self-built platforms for content management, and timely detection of webpage risks, with immediate corrections made.

5. Conclusion

Digital textbooks serve as the vanguard of the future digital and intelligent evolution of education. Some experts and scholars have already proposed the creation of “thinking, intelligent” cognitive and wise textbooks. As the primary users of textbooks, teachers should not be passively waiting for opportunities. Instead, they should leverage their existing disciplinary knowledge and teaching experience, treating the construction of digital textbooks as an avenue for career growth. By creating high-quality digital teaching examples, they can achieve comprehensive enhancement of their teaching abilities and contribute to the development of the education sector.

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Author contributions

L.Y. wrote the paper. D.W. and W.Z. analyzed the data. F.Z. conceived the idea of the study.

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