

# Research on the Integration Application Mode and Implementation Path of Digital Teaching Materials and Traditional Teaching Materials

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**Abstract:** *The integration of digital teaching materials and traditional digital teaching materials is not only an inevitable trend in the development of educational technology, but also an effective way to improve the quality of vocational education and cultivate high-quality skilled talents. On the basis of exploring the advantages of digital teaching materials and traditional teaching materials, this article analyzes the possibility and inevitability of the integration of the two, sorts out the construction logic of the integration application mode of digital teaching materials and traditional teaching materials, and proposes the integration strategy of traditional teaching materials and digital teaching materials.*

**Keywords:** *Learning Effectiveness; Digital teaching materials; Traditional teaching materials; Fusion Application*

## 1. Introduction

In the context of the rapid development of information technology today, the education sector is undergoing a profound transformation, with the rise of digital teaching materials being particularly noteworthy. These new types of teaching materials, with the help of modern information technologies such as multimedia and the internet, not only greatly enrich the forms of teaching resources, but also provide students with more flexible and diverse learning experiences through their convenience, interactivity, and real-time updating of content.

However, while acknowledging the advantages of digital teaching materials, we should also pay attention to the uniqueness of traditional teaching materials. Traditional teaching materials have significant advantages in depth, systematicity, and authority due to their long compilation and revision cycles, especially in the arrangement of core concepts, theoretical frameworks, and classic cases.

Faced with the coexistence of traditional and digital teaching materials, how to organically integrate digital teaching materials with traditional teaching materials and achieve complementary advantages is not only a requirement for the construction of new forms of teaching materials, but also an effective way to comprehensively improve teaching quality and cultivate high-quality talents.

## 2. Digital teaching materials and Traditional teaching materials

### 2.1. Characteristics and Advantages of Digital teaching materials

Digital teaching materials, also known as electronic productions, digital productions, or digital learning resources, refers to the use of modern information technology to digitize, store, display, and interact with the content of traditional textbook through electronic devices such as computers, tablets, and smartphones. Digital teaching materials have become an important part of educational informatization<sup>[1]</sup>, and their characteristics and advantages are manifested in the following aspects:

#### 2.1.1. Rich Multimedia Resources

Digital teaching materials have rich multimedia resources that integrate various forms such as text, images, audio, and video, enriching the presentation of information and providing students with multiple sensory experiences. They concretize abstract knowledge concepts, greatly reducing learning difficulty and enhancing students' sense of learning efficacy. Secondly, digital teaching materials create immersive learning scenarios related to course content through multimedia, visualizing complex processes and

allowing students to explore and learn in an immersive manner, stimulating curiosity and making the learning process lively and interesting.

### **2.1.2. Powerful Interactive Platform**

Digital teaching materials use information technology to support group discussions, Q&A, online testing, and other functions, allowing students to learn without being limited by time and space. Through built-in interactive design, they can interact with teachers and students online anytime and anywhere, enhancing learning participation. At the same time, teachers can also monitor students' learning status through backend data, adjust teaching progress and difficulty in a timely manner, and achieve personalized teaching, making teaching reform traceable.

### **2.1.3. Intelligent Generation of Learning Solutions**

Digital teaching materials can use big data and artificial intelligence algorithms to analyze students' learning behavior, academic performance, and other data, generate students' "self-portraits", tailor learning paths for students, and push suitable learning resources. This personalized learning design improves learning efficiency, enhances the pertinence and fun of learning, and also enhances students' learning satisfaction and confidence.

### **2.1.4. Powerful Hyperlink Function**

The development and changes of science and technology in modern society are rapid, especially in vocational education that cultivates skilled talents for economic development and industrial upgrading. The specifications of talent cultivation should match the needs of industrial development, which requires vocational education to adjust and optimize educational and teaching content in a timely manner, ensuring the forward-looking nature of teaching content. Digital teaching materials can incorporate new knowledge and technologies into teaching content in a timely manner through cloud management and push technology, achieving knowledge renewal; By using intelligent hyperlinks and other methods, students can quickly form links with knowledge from other disciplines, forming interdisciplinary knowledge networks. This convenient update mechanism can help students obtain the most cutting-edge and accurate subject knowledge in a timely manner, and understand subject trends at first time.

## **2.2. Characteristics and Advantages of Traditional teaching materials**

For a long time, traditional teaching materials have been widely used in educational practice, forming a relatively stable structure and content through strict writing, review, and publishing processes. Usually refers to printed materials, including textbooks, teaching aids, exercise books, etc., which are one of the most fundamental and core teaching resources in the school education system.<sup>[2]</sup>

Traditional teaching materials play a crucial role in traditional teaching models. Classic content design is one of the core advantages of traditional teaching materials. Through the baptism of time and the repeated verification of teaching practice, these teaching materials have condensed the essence and wisdom of the subject field to ensure the integrity and accuracy of the knowledge system. By studying these teaching materials, students can systematically grasp the basic knowledge of the subject, laying a solid foundation for subsequent learning and research.

The paper-based reading experience endows traditional teaching materials with unique charm. Paper textbooks are convenient for students to browse, annotate, and review at any time, and this physical interaction helps deepen memory and understanding. Meanwhile, paper-based reading also helps cultivate students' reading habits and self-learning abilities, allowing them to feel the weight and warmth of knowledge while flipping through books.

Strong stability is another major characteristic of traditional teaching materials. Both in terms of content, structure, and layout, traditional teaching materials are relatively classic. After layers of scrutiny and strict evaluation, they are finally published and have strong authority and social recognition. This type of teaching materials is conducive to standardizing teachers' teaching content and plays a certain role in stabilizing teaching quality.

The universality enables traditional teaching materials to be widely applied in various teaching environments and conditions. Without the need for special equipment or technical support, it can meet the teaching needs of different regions and schools, achieve balanced distribution and sharing of educational resources, and provide strong guarantees for educational equity and popularization.

### **3. Integrated application mode of digital teaching materials and traditional teaching materials**

Digital teaching materials and traditional teaching materials each have their own advantages and play an irreplaceable role in the field of education. With the deepening of digital transformation in education, the two will inevitably integrate and complement each other, jointly promoting the prosperity and development of the education industry.

#### ***3.1. The possibility of Fusion Applications***

##### ***3.1.1. More abundant Teaching Resources***

The integration of flexible and versatile digital teaching materials with classic and stable traditional teaching materials enables teachers to select teaching content, organize teaching resources, and design personalized classrooms more freely based on the characteristics of different subjects, courses, and student groups. For example, in the teaching of science and engineering or practical subjects, teachers can use virtual simulation systems, AI and other technologies to reconstruct the parts that cannot be reproduced in the real environment in a three-dimensional virtual scene, organize students to practice and enhance their learning experience. In the teaching of humanities or theoretical subjects, teachers can integrate traditional teaching materials classic cases and abstract concepts with digital teaching materials technology, transform them into vivid teaching materials such as animated videos, and enrich classroom teaching content. These diverse forms of teaching resources can effectively stimulate students' interest in learning and improve learning efficiency.

##### ***3.1.2. More Flexible Teaching Mode***

The integration of digital teaching materials and traditional teaching materials has created conditions for integrated online and offline teaching. The education sector is actively exploring new teaching models such as flipped classrooms and blended learning. These new teaching models are more flexible and can achieve student-centered learning, transforming the single time and space "teaching and learning" activities into "virtual classrooms" that are not limited by time and space and can be learned anytime and anywhere. They support students' autonomous learning and collaborative exploration, and integrate teaching activities such as previewing, discussion, and testing, effectively promoting students' enthusiasm and participation in learning<sup>[3]</sup>.

##### ***3.1.3. More Scientific Evaluation***

Integrated teaching materials can record the learning duration, process, and effectiveness in real-time during students' viewing and reading, making the teaching and learning process transparent. By collecting and analyzing learning data, students can timely understand their mastery of knowledge, and teachers can accurately grasp the learning dynamics of each student. The teaching evaluation adapted to the teaching mode integrated with teaching materials is not only based on scores, but transformed into a three-dimensional evaluation of the three stages of "before learning, during learning, and after learning", and the four dimensions of "learning attitude, learning ability, learning effectiveness, and moral literacy". This evaluation system can pay more attention to students' learning process, focus on learning effectiveness, and make teaching evaluation more scientific and comprehensive.

#### ***3.2. The Inevitability of Fusion Applications***

##### ***3.2.1. Beneficial for improving learning motivation***

The integration of digital teaching materials and traditional teaching materials makes abstract concepts vivid and complex processes real and interesting. Rich and diverse learning resources can cater to the preferences of different students, attract attention, and stimulate learning interest.

##### ***3.2.2. Beneficial for Enhancing the Learning Experience***

The integration of digital teaching materials and traditional teaching materials has improved the timeliness of learning feedback. Teachers can timely grasp students' learning process and learning effects, customize personalized learning paths, enhance students' adaptability to learning, enable them to gain knowledge, and enhance their sense of learning achievement.

##### ***3.2.3. Beneficial for Strengthening Deep Learning***

Through overall arrangement and design, digital teaching materials are integrated with traditional teaching materials to form a three-dimensional teaching materials with distinct knowledge construction

gradients, in-depth knowledge content, and knowledge evaluation throughout the entire process. This achieves the unity of knowledge in depth and breadth, meets the needs of knowledge exploration and internalization at different learning stages, and enhances innovation capabilities.

**3.2.4. Beneficial for Broadening Learning Horizons**

Digital teaching materials can update content in real time, reflecting cutting-edge trends and the latest research results in the discipline; Traditional teaching materials, meanwhile, lay a solid theoretical foundation for students through the inheritance of classic content. The integration of the two enables students to broaden their learning horizons, understand the development trends and cutting-edge issues of the discipline, and lay the foundation for building innovative thinking while mastering basic knowledge.

**3.2.5. Beneficial for Cultivating Self-learning Ability**

The integration of digital teaching materials and traditional teaching materials is beneficial for cultivating students' habits of self-directed learning. The learning process highlights students' subjectivity and autonomy. Integrated teaching materials allow students to design learning content and progress based on their own learning habits and acceptance. Through the independent selection of learning communities, interactive communication and collaborative learning can be carried out, which is conducive to forming a strong learning atmosphere.

**3.3. The Construction Logic of Fusion Applications Mode**

Digital teaching materials and traditional teaching materials have their own unique advantages and limitations. By integrating the flipped classroom teaching model, a new type of "active" teaching materials is constructed, which combines "loose leaf teaching materials, work manuals, and integrated media platforms". This forms a learning ecosystem that supports personalized learning for students, both online and offline, in class and in class, and in multiple scenarios. It is conducive to stimulating students' interest in learning and enhancing their sense of learning effectiveness.

The figure 1 shows the construction logic of the teaching model that integrates traditional and digital teaching materials:

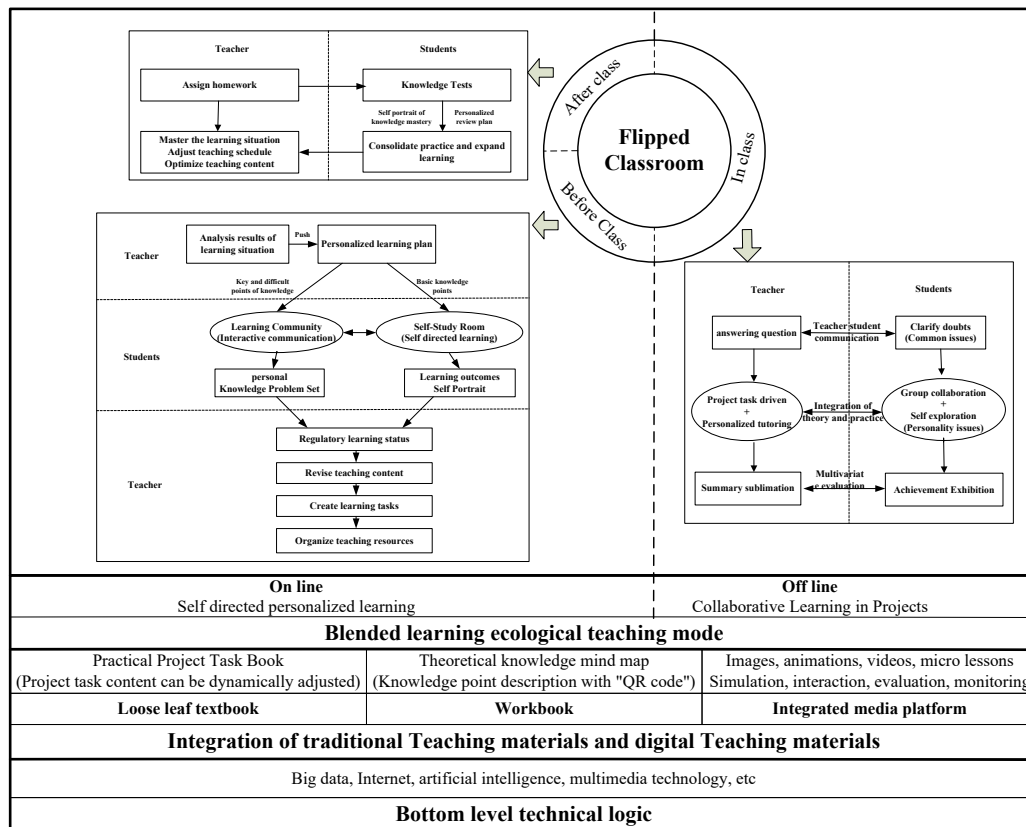


Figure 1: The teaching mode of integrating traditional and digital teaching materials

As can be seen from the above figure, the integration of traditional and digital teaching materials requires the support of information and digital technologies. The combination of traditional teaching materials and digital teaching materials, combined with the flipped classroom teaching model, enables the construction of virtual scenes and project-based teaching. Students can repeatedly train without being limited by time and space, achieving the teaching requirements of "learning by doing, learning by doing", and enhancing their ability to solve practical problems. At the same time, this integrated application model also supports various learning forms such as personalized learning and blended learning, allowing students to dynamically grasp their personal learning status and learning effectiveness, and choose suitable learning content and training projects based on the results of intelligent learning "portraits" and intelligent learning plans, which is of great benefit to improving students' learning efficacy and learning effectiveness. This integrated application teaching model has the following advantages:

### ***3.3.1. Flipped Classroom: A New Pattern of Reshaping Teaching Time and Space***

Flipped classroom utilizes the convenience of digital teaching materials to break the fixed process of traditional classroom teaching. Students complete preview tasks through digital teaching materials before class, and the focus during class is on internalizing and sublimating knowledge with the help of teachers. Teachers are no longer mere transmitters of knowledge, but guides of learning and facilitators of discussion. This integrated application model significantly improves students' learning initiative, effectively exercises their thinking ability, and promotes more frequent and in-depth interaction and communication between teachers and students, as well as among students themselves<sup>[4]</sup>.

### ***3.3.2. Project Based Learning: Building an Ecosystem for Cultivating Practical Abilities***

Digital teaching materials provide rich resources and interactive platforms for project-based learning. During the project implementation process, students solve problems in real-life situations through team collaboration, independent exploration, and other methods, relying on digital teaching materials and related online resources. This process not only deepens students' understanding and mastery of subject knowledge, but more importantly, cultivates their innovative thinking, practical ability, and teamwork spirit. Digital teaching materials play multiple roles as knowledge carriers, resource bridges, and interactive media in this process.

### ***3.3.3. Personalized Learning: Precise Services to Meet Students' Differentiated Needs***

By utilizing the data analysis function of digital teaching materials, teachers can track students' learning progress, knowledge mastery, and preference characteristics in real time, and thus design personalized learning resources and guidance strategies for students. This "tailor-made" learning model effectively meets students' personalized needs, enhances learning efficiency and interest. At the same time, it also provides strong support for teachers to optimize teaching content and adjust teaching strategies, achieving the coordination and unity of precise educational services and personalized learning guidance.

### ***3.3.4. Blended Learning: An Innovative Path that Integrates Online and Offline Advantages***

Blended learning combines the flexibility of online learning in digital teaching materials with the interactivity of offline teaching in traditional teaching materials. When students engage in self-directed learning, they utilize online digital teaching materials to achieve interactive learning and feedback on their learning outcomes; During classroom teaching, teachers answer questions and clarify doubts based on the traditional production knowledge system, guide students in case analysis and practical operation, and form a learning ecology with complementary advantages. This teaching model not only enriches the forms and ways of learning, but also promotes the sharing and utilization of educational resources, and improves the quality of education<sup>[5]</sup>.

## **4. Integration Strategy of Digital teaching materials and Traditional teaching materials Based on Improving Learning Efficiency**

The integration of traditional and digital teaching materials is a profound digital transformation in the field of education, which requires us to construct a new teaching materials system that retains the essence of traditional teaching materials while incorporating digital elements, achieving the effect of "1+1>2" in improving learning efficiency. The construction of new teaching materials to enhance learning efficiency should be based on students' needs, integrate the advantages of traditional and digital teaching materials, fully consider issues such as knowledge system reconstruction, presentation of learning resources, creation of virtual and real scenarios, and interdisciplinary integration, and form a "living" teaching

material that can integrate self-directed learning, interactive communication, simulated training, and diverse evaluation. The specific construction strategy is as follows:

#### ***4.1. Knowledge Docking: Forming an Integrated teaching materials Knowledge System***

The seamless integration of digital teaching materials and traditional teaching materials in terms of knowledge points is the foundation of fusion. To address the issue of duplicate knowledge points between digital teaching materials and traditional teaching materials, it is necessary to carefully sort and screen the knowledge points of traditional teaching materials, reconstruct the integrated knowledge system of digital teaching materials and traditional teaching materials, ensure the synergy and unity of the two in terms of knowledge framework, core concepts, and detailed descriptions, and avoid confusion among students due to inconsistent knowledge expression. In this process, teachers need to play a bridging role, guiding students to understand the complementary relationship between the two teaching materials and promoting the formation of a complete and systematic knowledge system<sup>[2]</sup>.

#### ***4.2. Matching Knowledge and Digital Resources: Creating a Vivid and Three-Dimensional Learning Environment***

Digital teaching materials, with their rich multimedia resources such as videos, animations, virtual experiments, etc., provide students with abundant teaching materials for knowledge learning. By cleverly integrating digital resources with knowledge content in traditional teaching materials, more intuitive and vivid learning scenarios are constructed to stimulate students' interest and curiosity in learning. For example, in traditional production teaching materials texts, adding QR codes and linking rich multimedia resources enables students to experience and understand complex knowledge concepts and principles from all angles and perspectives, thereby enhancing learning effectiveness<sup>[6]</sup>.

#### ***4.3. Real Scene Creation: Strengthening the Combination of Theory and Practice***

Integrating theory and practice is a good way to enhance students' practical and problem-solving abilities. Digital teaching materials can activate case information from traditional teaching materials into real-life scenarios with the support of technologies such as virtual reality, augmented reality, big data, and artificial intelligence, forming a teaching environment that integrates theory and practice. Students can undergo repeated practical training in such an environment, which not only enhances their practical experience but also stimulates their interest in learning and cultivates their ability to think systematically about problems<sup>[7]</sup>.

#### ***4.4. Interdisciplinary Knowledge Integration: Building a Multidisciplinary Knowledge Fusion System***

In the era of knowledge explosion, interdisciplinary integration has become an important way to cultivate comprehensive literacy and innovation ability. Traditional teaching materials have advantages in the construction of subject basic knowledge and theoretical systems. By utilizing the hyperlink technology of digital teaching materials, the knowledge of various subjects in traditional teaching materials can be integrated and reorganized to form a multidisciplinary knowledge network. Through mind mapping, the connections between subjects can be clearly displayed, promoting the improvement and development of students' comprehensive innovation ability.

### **5. Conclusions**

It is crucial to reveal the complementarity between digital teaching materials and traditional teaching materials by studying their integration models. By embedding multimedia resources, interactive learning tools, and designing personalized learning paths, the learning experience and effectiveness can be enhanced. The integration of digital teaching materials and traditional teaching materials can improve teaching quality and efficiency, promote personalized learning, promote educational equity, enhance teacher-student interaction, cultivate students' information literacy and innovation ability, promote innovation and reform of educational models, and have profound significance for the development of modern education.

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