ISSN 2522-6398 Vol. 8, Issue 1: 143-148, DOI: 10.25236/FER.2025.080122

Application and Development of Information Technology in Vocational Education

Zhang Fenglian

Zaozhuang Vocational College of Science and Technology, Zaozhuang, Shandong, China

Abstract: *With the rapid development of information technology, the transformation of teaching methods in vocational education has deepened significantly. This paper explores the application and drawbacks of information technology in vocational education classrooms, analyzes its advantages in optimizing teaching efficiency and enhancing student interest, and identifies the challenges and issues encountered in current practices. It aims to provide targeted recommendations to promote the development of information technology in vocational education. The research is intended to serve as a reference for the theoretical advancement and practical innovation of information-based vocational education.*

Keywords: *Information Technology; Vocational Education; Classroom Teaching; Application and Drawbacks of Information-based Education*

1. Introduction

On April 18, 2018, the Ministry of Education issued the "Notice on the Action Plan for Education Informatization 2.0," marking a new stage of educational informatization in China. As a critical pathway for cultivating skilled technical personnel, vocational education has seen comprehensive optimization of its teaching models, methods, and resources with the support of information technology[1].

The in-depth application of information technology has injected new vitality into vocational education, not only improving many shortcomings of traditional teaching models but also broadening students' access to knowledge.

2. Application of Information Technology in Vocational Education Classrooms

The application of information technology spans the entire teaching process in vocational education, including preparation before class, classroom teaching, and post-class review. The following elaborates on its application in these phases.

2.1 Optimization of Pre-class Preparation

The application of information technology significantly improves teaching efficiency and the quality of students' pre-study during the preparation phase. In traditional teaching, tasks were often assigned orally, making it difficult to quantify student performance and ensure the quality of pre-study. However, with modern information technology, pre-class preparation is no longer limited to traditional task allocation models but achieves efficient resource sharing and pre-study management through various digital methods.

Teachers can use online learning platforms and mobile applications (such as Superstar Learning and Rain Classroom) to convert complex teaching content into diverse formats, such as short videos, micro-lectures, animations, and interactive courseware. These resources are not only rich in content but also intuitive and repeatable, helping students easily grasp abstract concepts during pre-study. For example, in electronics courses, teachers can use animations to demonstrate circuit working principles, enabling students to form a basic understanding of theoretical knowledge before class. By uploading videos of experimental operations, students can familiarize themselves with operational procedures in advance, improving the efficiency and accuracy of classroom practice.

Moreover, the interactive features of these platforms enhance teachers' ability to provide feedback and assess pre-study effectiveness. By designing chapter quizzes, task lists, or open discussions, teachers can access students' learning data in real-time, including completion rates, accuracy, and task duration.

ISSN 2522-6398 Vol. 8, Issue 1: 143-148, DOI: 10.25236/FER.2025.080122

These data provide essential insights for teachers to adjust subsequent teaching plans based on students' actual learning situations. For example, topics where most students perform poorly in chapter tests can be given extra attention during class to ensure comprehensive coverage of key points.

2.2 Interactive Experiences in Classroom Teaching

The core value of information technology in classroom teaching lies in fostering teacher-student interaction and enhancing the intuitiveness of teaching content. The widespread application of multimedia technology enables teachers to visualize abstract knowledge through tools such as PPT, videos, and animations. For instance, in welding technology courses, using 3D animations to display welding processes helps students quickly grasp key skills. Additionally, interactive tools such as quizzes,polls, and real-time tests enliven the classroom atmosphere and stimulate students' enthusiasm for learning.

The introduction of virtual simulation technology in vocational education is an important innovation. Through virtual experiment platforms, students can simulate complex operations such as mechanical assembly and circuit design, reducing training costs and avoiding risks associated with operational errors. For example, in automotive maintenance courses, students can simulate engine assembly and disassembly through simulation software, becoming more proficient in practice.

2.3 Personalized Support for Post-class Review

Post-class review is critical for knowledge internalization and consolidation. Information technology provides students with the flexibility to review and reinforce knowledge anytime, anywhere, significantly improving learning efficiency. Teachers can upload micro-lecture videos, interactive exercises, and mock tests to learning platforms. After completing tasks, students can receive instant answer explanations and detailed knowledge point analyses. This feedback mechanism helps students identify and address learning gaps effectively.

Information technology also supports customized learning paths. By analyzing students' learning behavior data, platforms can intelligently recommend practice content related to their weak areas, achieving personalized learning guidance. For instance, in electronics courses, if a student performs poorly in circuit design tests, the system can recommend relevant review videos and simulation experiments to help the student overcome challenges. This targeted guidance aids students in deeply understanding circuit principles and improving their practical application abilities.

Additionally, information platforms provide a wealth of learning resources, such as interactive case studies, real-time discussion forums, and online Q&A sessions with teachers. These features extend the effects of classroom teaching to online learning. Regular checks and records of homework performance enable teachers to accurately monitor students' progress and make targeted adjustments in subsequent teaching.

3. Drawbacks of Information Technology in Vocational Education Classrooms

Despite the significant improvements brought by information technology to vocational education classrooms, its practical application also reveals several issues:

3.1 Misalignment Between Technology and Teaching Goals

Information technology has injected new vitality into vocational education, but its application effectiveness largely depends on how well the technology aligns with the teaching objectives. However, in actual teaching, the issue of a disconnect between technology and teaching objectives is quite common, severely affecting the effectiveness of information-based teaching. Some teachers overly rely on technological tools in the classroom, using technology as a means of showcasing innovation, while neglecting to achieve the teaching objectives and student learning outcomes. This tendency of "technology for the sake of technology" not only wastes valuable class time but also tends to distract students' attention. This disconnect often manifests as the formalization of technology applications. For example, in some information-based teaching competitions or open classes, teachers, in an attempt to demonstrate their ability to use various technologies, frequently switch between tools and platforms, from PowerPoint to animations to real-time interactive tools, even introducing a large amount of technology effects unrelated to the course content. While this superficial piling up of technology may

ISSN 2522-6398 Vol. 8, Issue 1: 143-148, DOI: 10.25236/FER.2025.080122

attract students' attention in the short term, it makes the teaching logic fragmented, leading to an ineffective understanding of core knowledge points by the students. For instance, in electronic professional courses, a teacher may use multimedia animations to demonstrate the working principle of circuits, but the complex design of the animation may obscure the key logic of the knowledge, making students confused and hindering effective learning.

Additionally, some teachers lack guidance from teaching objectives in their technology choices, focusing more on the novelty of technology rather than its applicability. For example, some teachers tend to choose complex multimedia tools, such as 3D modeling and dynamic simulations, for theoretical teaching, but due to students lacking sufficient background knowledge or relevant practical experience, these technological methods fail to enhance understanding and may instead make the knowledge points more obscure and difficult to grasp. At the same time, some interactive features, such as quiz games and voting, while potentially energizing the classroom atmosphere, can make students feel that the form outweighs the content if not closely integrated with the teaching material, failing to deepen their learning.

The main reasons for the disconnect between technology and teaching objectives are as follows: first, some teachers lack a deep understanding of information technology, believing that using more technology equates to higher quality teaching; second, there is a lack of systematic training in instructional design, making it difficult for teachers to integrate technology into specific teaching objectives and content; third, schools fail to fully consider course needs when introducing technology, leading to a mismatch between technological methods and actual teaching scenarios.

3.2 Enhance the effectiveness of teacher training in information technology

The smooth implementation of information-based teaching demands higher technical abilities and comprehensive literacy from teachers. Therefore, improving teachers' information literacy is not only a matter of technical training but also a comprehensive upgrade of their teaching philosophy and application capabilities. To enhance the effectiveness of information technology training, schools should design more targeted training plans. For example, in the field of electronics, the training content could cover everything from basic usage of teaching platforms to advanced applications of virtual simulation training technologies, helping teachers fully grasp information-based methods from both theoretical and practical aspects. At the same time, the training should be combined with actual teaching cases, providing personalized technical application guidance for different types of courses. Additionally, schools can organize cross-campus experience-sharing activities, allowing teachers to learn about outstanding information-based teaching practices and innovative ideas from their peers. Another key to improving teachers' comprehensive information literacy is to build a continuous learning mechanism. In addition to regular training, schools can establish teacher learning resource libraries, providing the latest technical application cases, tool tutorials, and industry development updates to motivate teachers to self-improve. Through this series of measures, it can be ensured that information technology is truly integrated into the classroom and effectively improves teaching quality.

3.3 Infrastructure construction lagging behind

Information-based teaching relies heavily on network environments and device performance, but many vocational schools lack sufficient investment in this area[2]. For example, some schools have outdated hardware that cannot meet the demands of modern information-based teaching. Traditional multimedia equipment has a single function, lacks compatibility with information platforms, and cannot support high-end applications such as virtual simulation experiments and interactive teaching software. This is especially problematic in electronic professional courses, where if laboratory equipment is outdated or lacks necessary upgrades, students may face issues such as software crashes or lag when designing and testing complex circuits, directly affecting the development of practical skills.

At the same time, there are shortcomings in the construction of network infrastructure. Some schools have insufficient campus network coverage or face issues like low bandwidth and unstable connections, leading to poor user experiences when teachers and students use online learning platforms. For instance, in virtual simulation classes that require real-time synchronization, network delays or interruptions can cause operational failures or loss of experimental data, which in turn affects teaching effectiveness and student motivation.

The lack of planning by school management in infrastructure construction is also one of the problems. Some schools lack a long-term, overall plan when introducing information technology equipment, failing to allocate resources reasonably based on the actual needs of specialized courses. For example, electronic

ISSN 2522-6398 Vol. 8, Issue 1: 143-148, DOI: 10.25236/FER.2025.080122

professional courses require high-precision measuring instruments and simulation software support, but the school prioritizes purchasing equipment unrelated to the course content, further exacerbating the waste of resources and teaching difficulties.

3.4 Students' self-directed learning ability is insufficient

Vocational school students often have strong practical skills but tend to show a lack of self-discipline in theoretical learning. This phenomenon is particularly evident in an information-based teaching environment. Since information platforms emphasize self-directed learning, students are required to independently complete pre-class preparation, post-class review, and online exercises assigned by teachers. However, some students lack clear learning goals and plans, making them prone to decision fatigue or apathy when faced with the vast resources provided by learning platforms. Some students even resort to perfunctory learning just to complete tasks, neglecting in-depth understanding and reflection on key knowledge points, which significantly undermines learning outcomes.

The uneven level of students' information literacy is another critical factor affecting the effectiveness of self-directed learning. Some students are unfamiliar with platform functions and cannot fully utilize the learning resources and interactive features. For example, in electronic professional courses, students might fail to complete complex circuit simulation experiments due to a lack of proficiency in simulation software, which in turn diminishes their interest in learning. Additionally, the absence of supervision mechanisms and clear feedback further contributes to some students' lack of sustained motivation, making it difficult for them to persevere in completing long-term learning tasks.

To address the issue of insufficient self-directed learning ability among students, schools and teachers need to provide more support and guidance in instructional design. For instance, using the progress tracking function of platforms, teachers can regularly provide feedback to students, praise those who perform well, and remind or counsel students who are falling behind. Furthermore, setting up points-based reward mechanisms, learning competitions, or group collaboration tasks can effectively enhance students' motivation. To address the lack of information literacy, schools can offer specialized training or embedded guidance to help students master platform operation skills, lowering technical barriers and improving learning efficiency.

4. Improvement suggestions

The following improvement suggestions are proposed to address the above issues:

4.1 Optimize the deep integration of information technology with teaching objectives

The application of information technology in the teaching process should always center around educational objectives, with teaching content as the core and technology as an auxiliary tool, avoiding the pitfalls of formalism and over-reliance on tools. When designing lesson plans, teachers need to precisely select information technology tools based on course objectives to ensure that their use enhances teaching effectiveness.

For example, in electronic professional courses, teachers can use virtual simulation technology to demonstrate complex circuit design principles, transforming theoretical knowledge into visual operations. This intuitive presentation helps students quickly understand abstract concepts. Additionally, teachers can design interactive tasks closely tied to course content, such as assigning simulation experiment tasks via online platforms and providing real-time feedback mechanisms to help students practice repeatedly and grasp key content.

To achieve a deep integration of technology and teaching, schools should strengthen instructional design guidance by providing teachers with a series of targeted lesson plan templates and practical case studies. For instance, in mechanical manufacturing courses, for different skill modules, schools can design multi-level technology application scenarios aligned with teaching objectives, such as 3D modeling and virtual assembly operations. These specific teaching strategies enable teachers to integrate information technology tools more effectively into the classroom, thereby improving student learning outcomes.

ISSN 2522-6398 Vol. 8, Issue 1: 143-148, DOI: 10.25236/FER.2025.080122

4.2 Build a systematic information-based teaching training mechanism

Teachers' information literacy directly determines the effectiveness of information-based teaching. Therefore, establishing a systematic and tiered training mechanism for information-based teaching is key to improving the quality of vocational education.

First, schools should design differentiated training content based on the needs of various disciplines and positions. For example, mechanical engineering teachers can focus on training in the operation and maintenance of virtual simulation software, while basic course teachers can prioritize online platform course design and data analysis skills. Additionally, training should shift from a combination of theory and practice to a practice-centered approach, simulating real teaching scenarios to allow teachers to directly apply the technologies they learn and improve their practical skills.

Second, promote a culture of continuous learning in information-based teaching. Single-session training often falls short of addressing the rapidly changing technological demands. Schools should provide long-term learning support through learning resource libraries, online learning platforms, and inter-school exchange programs. For instance, resource libraries can include tutorials on the latest teaching tools, exemplary classroom cases, and industry trend reports, helping teachers continually update their teaching skills and concepts.

Third, motivate teachers to engage in innovative practices in information-based teaching. Schools can establish teaching competitions and reward mechanisms, using both honor and material incentives to inspire participation. For example, an annual "Best Information-Based Classroom Design Award" can be created, with award-winning cases included in school-wide training materials. Additionally, schools can collaborate with enterprises, inviting industry experts to provide training and guidance for teachers, enabling them to understand cutting-edge developments and further enhance the practicality and foresight of their teaching methods.

Finally, to improve the specificity and effectiveness of training, the "mentoring" model is recommended, where experienced teachers serve as mentors to provide hands-on guidance to younger teachers. This knowledge transfer not only helps teachers quickly master technology but also fosters collaboration and collective progress within the teaching team.

4.3 Strengthen the construction of information-based teaching infrastructure

The efficient implementation of information-based teaching relies on a well-established infrastructure. However, some vocational schools are currently lagging behind in information-based infrastructure construction, making it difficult to maximize teaching effectiveness. Therefore, strengthening infrastructure development is an important step in promoting the informatization of vocational education.

First, schools should increase financial investment to update teaching equipment and network facilities. For example, they should equip higher-performance computers, portable devices, and specialized laboratory equipment that supports virtual simulation to meet the teaching needs of different disciplines. In modern manufacturing-related programs, high-performance virtual simulation laboratories can significantly reduce safety risks and resource consumption in practical operations, providing students with more extensive hands-on opportunities.

Second, schools should focus on improving the coverage and stability of campus network environments. In information-based teaching, network interruptions or delays directly affect classroom efficiency and students' learning experience. Therefore, schools need to enhance the optimization and maintenance of campus networks to ensure smooth operation of online learning platforms and teaching tools.

Additionally, schools should establish dedicated technical support teams responsible for the daily maintenance and upgrades of equipment, as well as providing technical guidance to teachers. For example, during the initial rollout of new equipment, the technical support team can organize training sessions for teachers to explain equipment operation procedures and precautions, reducing the difficulty of operation. In daily teaching, the team can assist with any technical issues, ensuring that teaching activities proceed smoothly.

Finally, to achieve resource sharing and collaborative development, schools can establish mechanisms for co-building and sharing information-based infrastructure with other vocational colleges. For instance, by sharing virtual simulation laboratories and large teaching equipment, and jointly developing high-quality teaching resources or conducting remote courses, schools can maximize the

ISSN 2522-6398 Vol. 8, Issue 1: 143-148, DOI: 10.25236/FER.2025.080122

benefits of information infrastructure development.

4.4 Stimulate students' motivation to learn

Students are the main participants in information-based teaching, and their learning outcomes largely depend on their motivation and self-directed learning ability[3]. However, students in vocational schools generally exhibit low levels of self-discipline and initiative, which affects the practical effectiveness of information-based teaching. Therefore, schools and teachers need to take effective measures to help students set learning goals and enhance their interest in learning.

First, teachers should focus on designing learning tasks that combine both fun and interactivity. For example, they can set up gamified learning modules within the learning platform, motivating students to participate through mechanisms like points rewards and leaderboards. Additionally, teachers can design case-based teaching tasks that align with real-world scenarios. For instance, in logistics management courses, students can use online simulation systems to plan logistics distribution solutions, making learning both enjoyable and practical.

Second, students' self-directed learning abilities need to be gradually improved through systematic training. Schools can organize learning skills workshops, teaching students how to efficiently utilize online learning resources, create study plans, and manage learning progress. For students with weaker learning abilities, teachers can provide personalized coaching plans, such as setting up regular online Q&A sessions or after-class feedback meetings.

Additionally, schools should strengthen home-school cooperation by communicating with parents to jointly motivate students. For example, sending regular learning reports to parents will allow them to understand their child's progress, and home-school collaboration can create a positive learning environment for the student.

Finally, to enhance students' motivation, schools can establish career experience projects or school-enterprise collaboration practices. For example, by cooperating with companies to develop simulation projects based on real workplace scenarios, students can experience the value of applying knowledge in practice, which can stimulate their interest in learning. For instance, automotive maintenance students could participate in simulated workshop management tasks, using systems to complete vehicle inspection and maintenance planning, experiencing the enjoyment and sense of achievement in professional practice.

5. Conclusion

The in-depth application of information technology is reshaping the teaching model and practical paths of vocational education. From pre-class preparation to classroom teaching and post-class revision, information technology has injected new vitality into vocational education by improving teaching efficiency, optimizing resource allocation, and enhancing interactivity. However, its development also faces many challenges, requiring continued efforts in areas such as the integration of teaching objectives with technology, infrastructure development, and the improvement of teacher competencies. In the future, with continuous technological advancements and educational reforms, information technology will undoubtedly provide more solid support and guarantees for the modernization of vocational education.

References

[1] Ministry of Education. Notice on the Action Plan for Education Informatization 2.0 [EB/OL].http://www.moe.gov.cn/srcsite/A16/s3342/201804/t20180425_334188.html

[2] Lei Chaozi. Education Informatization: From 1.0 to 2.0 — Trends and Ideas for the Development of Educational Informatization in the New Era [J]. Journal of East China Normal University (Education Science Edition), 2018, 36(1): 98-103+164.

[3] Chi Dongsheng. Reform and Exploration of Information-based Teaching [J]. Mould Manufacturing, 2024, 24(11): 102-104.