



Research on the Smart Classroom Teaching Model in Primary Schools Under the Digital Educational Environment

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Abstract

With the rapid advancement of information technology, digital education has emerged as a significant trend in contemporary education. As a crucial phase of basic education, the transformation of teaching models in elementary schools plays a vital role in developing students' comprehensive skills and innovative abilities. This paper aims to explore the teaching models of smart classrooms within the context of digital education, analyzing their characteristics, advantages, and implementation strategies to provide valuable references for educational practice. Research and practice concerning the smart classroom teaching model in a digital education environment are essential for promoting educational modernization and enhancing educational quality. By establishing smart classrooms, integrating teaching resources, innovating teaching models, and optimizing assessment methods, we can offer students a more personalized, efficient, and engaging learning experience. Simultaneously, these initiatives can foster teachers' professional development and facilitate the in-depth advancement of educational reforms.

Keywords

Digital Environment; Elementary School; Smart Classroom; Teaching Model

1. Introduction

Smart classrooms represent a new educational model that utilizes modern information technologies such as cloud computing, big data, and the Internet. This approach integrates various learning resources and educational tools to achieve personalized teaching content, interactive teaching methods, and real-time evaluation of teaching. By doing so, it significantly enhances teaching effectiveness and learning experiences. In the context of digital education, studying the teaching models of smart classrooms in elementary schools is crucial for advancing educational modernization and improving educational quality.

2. Overview of Smart Classrooms

2.1 Definition of Smart Classrooms

A smart classroom refers to a teaching method that uses the latest technologies such as communication technology, computer technology, and the internet within the school to enhance students' learning outcomes. It emphasizes a student-centered approach, focusing on personalized teaching, and provides teachers and students with richer and more convenient educational resources and tools through smart technology.

2.2 Characteristics of Smart Classrooms

- (1) **Personalized Teaching:** Smart classrooms can provide personalized learning resources and paths based on students' learning conditions and interests.
- (2) **Strong Interactivity:** With the aid of smart technology, interactions between teachers and students, as well as among students, are more frequent and efficient.
- (3) **Immediate Feedback:** Smart classrooms can record students' learning behaviors in real time, providing immediate feedback and assessments on their learning progress.
- (4) **Rich Resources:** Smart classrooms integrate various learning resources and educational tools, offering students a wide range of learning options.

3. Construction of Smart Classroom Teaching Models in Primary Schools

3.1 Technical Support

The key to building smart classrooms in primary schools lies in the effective use of modern information technologies such as cloud computing, big data, and the Internet of Things (IoT). The introduction of these technologies provides solid technical support for the implementation of smart classrooms. Cloud computing offers powerful data storage and processing capabilities, allowing teaching resources and data to be centrally managed and shared in the cloud. This supports the integration and sharing of teaching resources across multiple campuses and classes. Big data technology, through in-depth analysis of student learning data, helps teachers understand students' learning conditions, predict learning trends, and adjust teaching strategies in a timely manner to achieve personalized instruction. IoT technology is applied in smart classrooms through the installation of sensors, smart devices, and interactive terminals, enabling intelligent management of the teaching environment and equipment. For example, environmental sensors in smart classrooms can automatically adjust temperature, humidity, and lighting to ensure an optimal learning environment. Additionally, smart terminals such as tablets and interactive whiteboards support various teaching activities, including real-time interaction, remote teaching, and data collection (Li M & Dong L, 2024). The development of smart teaching platforms integrates functions such as course management, teaching resources, and assessment feedback, providing a unified experience for both teachers and students. These technological means not only enhance the efficiency and effectiveness of teaching but also lay a technical foundation for achieving truly smart classrooms.

3.2 Integration of Teaching Resources

The successful implementation of smart classrooms relies on the effective integration of various teaching resources, including electronic textbooks, micro-course videos, online question banks, and virtual laboratories. Electronic textbooks can replace traditional paper textbooks, making them easier to update and maintain, and enhancing students' learning experiences through interactive features. Micro-course videos, as a new type of teaching resource, offer efficiency, and intuitiveness by breaking down complex knowledge points into short video segments. This approach helps students engage in self-learning before or after class, reinforcing their understanding of key and difficult content. Online question banks provide a wealth of practice questions, supporting targeted review and consolidation by students after class. Virtual laboratories simulate real experimental environments, allowing students to conduct experiments without actual laboratory conditions, thus enhancing practical skills development. In the process of resource integration, these resources must be carefully designed and organized according to students' learning needs and teaching objectives to achieve personalized instruction. Teachers need to consider students' knowledge levels, learning styles, and interests in course design, reasonably allocate resources, and ensure that teaching content and activities effectively promote students' learning and development. The ultimate goal of resource integration is to meet the diverse needs of students with a variety of teaching methods, improving teaching quality and learning outcomes.

3.3 Innovation in Teaching Models

In smart classrooms, innovation in teaching models is a key factor in improving teaching quality. Micro-course video teaching, as an innovative model, helps students better understand and master important content by breaking down complex knowledge points into short videos. This model not only facilitates students' self-learning before class but also allows teachers to focus on explaining difficult points and engaging in in-depth discussions during class. Micro-course videos, being short and easily disseminated, enable students to learn anytime and anywhere, aligning with modern students' learning habits. Interactive teaching with electronic whiteboards transforms abstract mathematical concepts into intuitive

images and animations, increasing students' interest and participation. The interactive features of electronic whiteboards allow real-time interaction and feedback between teachers and students, enhancing classroom engagement and teaching effectiveness. The flipped classroom model fundamentally changes the traditional teaching process by shifting learning activities to before and during class. Students engage in self-learning through videos and readings before class, while class time is used for discussions and applications, promoting deeper knowledge and practical application. The flipped classroom model not only fosters students' self-learning abilities but also stimulates their innovative thinking, making classroom teaching more flexible and efficient. These innovations in teaching models enhance students' learning experiences and improve overall teaching effectiveness (Li K, Huang K, & Shi R, 2023).

3.4 Optimization of Teaching Evaluation

Smart classrooms also optimize teaching evaluation to achieve immediate feedback and personalized assessment. Through smart teaching platforms, teachers can record students' learning behaviors and performance data in real time. The analysis and mining of these data provide precise teaching feedback and personalized recommendations. For example, by analyzing students' assignments and test results, teachers can identify learning difficulties, adjust teaching strategies, and offer targeted support. Students can also use the data provided by the platform for self-assessment and adjustments, setting learning goals, and developing study plans to achieve personalized progress. The immediate feedback mechanism makes the teaching process more transparent, allowing students to promptly understand their learning progress and make quick adjustments when issues arise. This data-driven teaching evaluation model not only improves teachers' teaching efficiency but also enhances students' learning initiative and self-management abilities. Ultimately, the optimization of teaching evaluation in smart classrooms achieves refined management and personalized services in the teaching process, contributing to better student learning outcomes and overall teaching quality.

4. Implementation Strategies for Smart Classrooms in Primary Schools

4.1 Teacher Training

Teacher training is a critical component for the successful implementation of smart classrooms. Teachers need to not only master the use of smart teaching platforms but also understand how to integrate modern information technologies into their teaching practices to enhance teaching effectiveness. Training should include foundational knowledge of information technology, such as the basic concepts of cloud computing, big data, and the Internet of Things (IoT), ensuring that teachers have a sufficient understanding of these technologies. Additionally, teachers should be trained in designing and implementing teaching activities in smart classrooms, including how to use tools like electronic textbooks, micro-course videos, and electronic whiteboards to optimize the teaching process. Teachers also need to learn how to integrate teaching resources effectively to meet the diverse learning needs of students. Furthermore, training should cover how to analyze data in smart classrooms, use data to adjust teaching strategies and assess students' learning progress. Through systematic training, teachers will be able to navigate the smart classroom environment effectively, achieve teaching goals, and promote students' overall development.

4.2 Student Guidance

Guiding students is a crucial strategy for ensuring the smooth implementation of smart classrooms. When introducing new learning methods and environments, teachers need to adopt effective measures to help students adapt. For example, teachers can design engaging learning tasks and activities, such as using gamified learning tools and interactive platforms, to stimulate students' interest and curiosity. This approach helps students learn in a relaxed atmosphere and actively participate in classroom activities. Additionally, teachers should pay attention to students' emotional and psychological changes in the smart classroom, and regularly communicate with and provide feedback to students to understand their adaptation status and challenges. By caring for and supporting students, teachers can help them better adjust to the new environment and improve learning outcomes. Teachers can set up dedicated discussion times for students to express their concerns and feelings while offering timely assistance and advice to ensure comprehensive support and encouragement in the smart classroom (Manakul T, Somabut A, & Tuamsuk K, 2023).

4.3 Home-school Collaboration

Home-school collaboration plays a vital role in the implementation of smart classrooms. Schools should actively maintain contact with parents through methods such as parent meetings, WeChat groups, and other communication channels to regularly discuss students' learning progress and the implementation of smart classrooms. Parent meetings can introduce

the goals and progress of the smart classroom initiative, helping parents understand the new teaching model and gain their support and feedback. Schools can also involve parents in the learning process, such as organizing family homework exhibitions or inviting parent volunteers to participate in classroom activities, increasing parents' understanding and involvement in the smart classroom. Through home-school collaboration, schools can effectively convey the concepts and practices of smart classrooms to families, enabling parents to continue supporting students' learning at home. Moreover, home-school collaboration can help schools obtain additional resources and suggestions, collectively promoting students' growth and development. Parental involvement not only boosts students' learning motivation but also strengthens the family's emphasis on and support for education, creating a collaborative educational effort and facilitating the successful implementation of smart classrooms.

5. Conclusion

Research and practice on the smart classroom teaching model in the digital education environment are of great significance for advancing educational modernization and improving educational quality. By establishing smart classrooms, integrating teaching resources, innovating teaching models, and optimizing teaching evaluations, we can provide students with a more personalized, efficient, and engaging learning experience. At the same time, these measures can promote teachers' professional growth and the in-depth development of educational reforms.

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