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Research Article

Analysis and Practice of Using Modern Information Technology for Classroom Teaching Mode Reform

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In the context of continuous technological progress, the application of information technology in the field of education has gradually opened the door to innovation. The integration of information technology and curriculum is the use of information technology to present the curriculum in a new way in the teaching process. Therefore, compared with the traditional teaching mode, the integration of information technology and curriculum is more flexible and can show the boring classroom vividly and graphically in front of students, thus motivating students to learn actively and improving classroom efficiency. In recent years, with the continuous development of computer technology, the rise of information technology such as data analysis and the Internet of Things has caused a wave of "Internet+" education. With the promotion of education informatization, the smart classroom has been developed based on modern education technology. As a result, the classroom teaching mode based on modern information technology has become one of the hot spots for research. As a product of the integration of new technologies and teaching, the smart classroom creates a better learning environment for students with features such as intelligence, diversity, and personalization. At the same time, this teaching model gradually cultivates the information literacy of teachers and students while improving learning effectiveness. Also, with the rapid development of modern information technology, integrated teaching has become a popular and common teaching method. In this context, integrated teaching has a great impact on traditional teaching methods. This requires teachers to make corresponding changes in classroom teaching methods, approaches, and strategies in line with the trend of the times. However, although there are many changes, the corresponding teaching theory has not been updated. While modern information technologies such as artificial intelligence and big data have been widely used to track, collect, and analyze human behavior, it has been difficult for teachers to integrate these technologies into their teaching to help them teach effectively. In recent years, a growing number of experts and scholars have joined the discussion on instructional design that incorporates modern information technologies. There is a need to explore how to teach students in depth through big data and other tools, but there is no complete theoretical chain. Therefore, it is necessary to explore the reform and practice of modern Internet-based classroom teaching models. This study begins with an understanding of the current utilization of smart learning platforms in some schools and the teaching needs of IT subjects. After identifying the value of the IT smart classroom teaching model, the current research status of the smart classroom is outlined, and related concepts and theories are outlined and understood. After that, the characteristics of smart classrooms are summarized, and the traditional classroom, flipped classroom, and smart classroom are compared and analyzed.

1. Introduction

In recent years, with the advent of the information age, innovative technologies have penetrated into various fields, such as education [1, 2], construction [3–5], sports [6], logistics [7], and other industries. In addition, with the continuous progress of science and technology, people's material life has been greatly improved. At the same time, technology has also entered the field of education, integrating with the subject curriculum in order to better improve the quality of teaching and learning and promote the progress of teaching. In the context of the new curriculum reform, various disciplines are paying more and more attention to students' personalized learning and the

development of their innovation ability and emphasizing the main position of students in the teaching process [8]. At present, most IT classrooms adopt the traditional teaching methods of "lecture first and then practice" and "practice while lecturing." As a result, teachers and students interact individually, and teachers' feedback and evaluation are delayed, making it difficult for teachers to clearly grasp the teaching effect and for students to know their learning effect [9]. With the support of technology and equipment, the smart classroom effectively solves these problems, and its outstanding features, such as high interaction, personalization, and big data, meet the requirements of the new curriculum reform [10]. In the smart classroom, students are provided with personalized learning resources, diverse learning and communication paths, multiple interactions, timely feedback, and a variety of evaluation methods, which can give full play to the advantages of students' subjectivity, motivate them to learn, improve their learning effectiveness, and develop their problem-solving and cooperative inquiry skills.

With the introduction of new curriculum standards, the cultivation of core literacy for information technology subjects has become a teaching goal and a research hotspot in recent years [11]. The core literacy of information technology mainly includes four sections: information awareness, computational thinking, digital learning and innovation, and information social responsibility (Figure 1). Information awareness refers to an individual's sensitivity to information and judgment of information value [12]. Computational thinking emphasizes the use of thinking in the field of computer science to solve problems. Digital learning and innovation refer to an individual's ability to assess and select common digital resources and tools to manage the learning process and resources [13]. This results in the ability to creatively solve problems, complete learning tasks, and ultimately produce innovative work. Information society responsibility refers to the responsibility of individuals in the information society in terms of cultural cultivation, ethics and self-regulation of behavior.

In the context of an information-based society, how to achieve core literacy training and teaching objectives with the advantages of technology is a hot topic of research in the field of education [14]. As a product of the deep integration of technology and education, the smart classroom is carried out in an environment supported by technology. As a result, the advantages of its features are conducive to the cultivation of subject core literacy [15]. In the smart learning environment, teachers and students can achieve access to learning resources, evaluation and feedback, communication and interaction, and personalized learning. While mastering knowledge, the diversified and intelligent teaching activities designed by teachers with the help of the platform are conducive to the development of digital learning and innovation capabilities of students, the gradual development of information awareness, and thus the cultivation of students' disciplinary core literacy [16]. At the same time, it is quite necessary to track students' learning process and collect learning data using multiple approaches. Timely feedback is needed to improve learning and optimize teaching and learning. The smart classroom visualizes data with the support of data analysis technology, and teachers and students can receive timely learning data [17]. As a result, they can visually grasp the learning situation, thus facilitating the improvement of teaching and learning and the achievement of teaching goals.

In fact, classroom teaching needs to accomplish certain tasks and objectives [18]. From another perspective, both the creation of situations and the use of information technology are teaching methods and tools. To be specific, they serve the classroom, the students, and the teaching content. At present, many students are still in a passive and supervised state of learning [19]. Students cannot often think independently in the process of learning. As a result, teaching classrooms should avoid this situation. Teachers can prepare lessons with appropriate contexts based on the curriculum standards [20]. The most important thing is to use the created situations in the classroom and to design and change the questions in a close and timely manner, considering the students' immediate responses. In this way, students are guided to think about the essence of the phenomenon through observation and confrontation [21]. First, the context guides students through a process of exploration from the superficial to the deep and progressive. Second, students experience the process of identifying, analyzing, and solving problems through independent thinking [22]. Finally, they make deductions and value judgments about mathematical problems based on this process. Through this process of thinking, students can establish connections and distinctions between new and old knowledge, thus acquiring the knowledge of the material required by the curriculum standards [23]. Eventually, students can gradually build up a relatively complete body of subject knowledge and can transfer and apply the knowledge they have learned flexibly. In addition, teachers should prepare instructional designs that combine scientific and effective information technology operations with appropriate teaching contexts [24]. This is also helpful for students to convert short-term memory into long-term memory so that they can transfer knowledge effectively.

Compared with the traditional teaching mode, the intelligent classroom teaching mode can effectively reflect the main position of students in the learning process. For students, their learning resources are no longer limited to textbooks [25]. Students can efficiently and conveniently consult materials, access learning resources, and broaden their learning channels. At the same time, timely feedback is a major advantage of the smart classroom compared to the traditional classroom. Once students' confusion is reflected, they will receive timely feedback from teachers, which can have a good impact on students' learning motivation [26]. In addition, the interactive nature of the smart platform is conducive to enhancing interaction between students and teachers, enhancing inter-group cooperation, and sharing resources. Multiple forms of learning resources and diverse interactions, feedback, and evaluation in the smart classroom are available throughout the teaching and learning process [27]. The process of students' smart learning is at the same time the process of improving students' digital learning

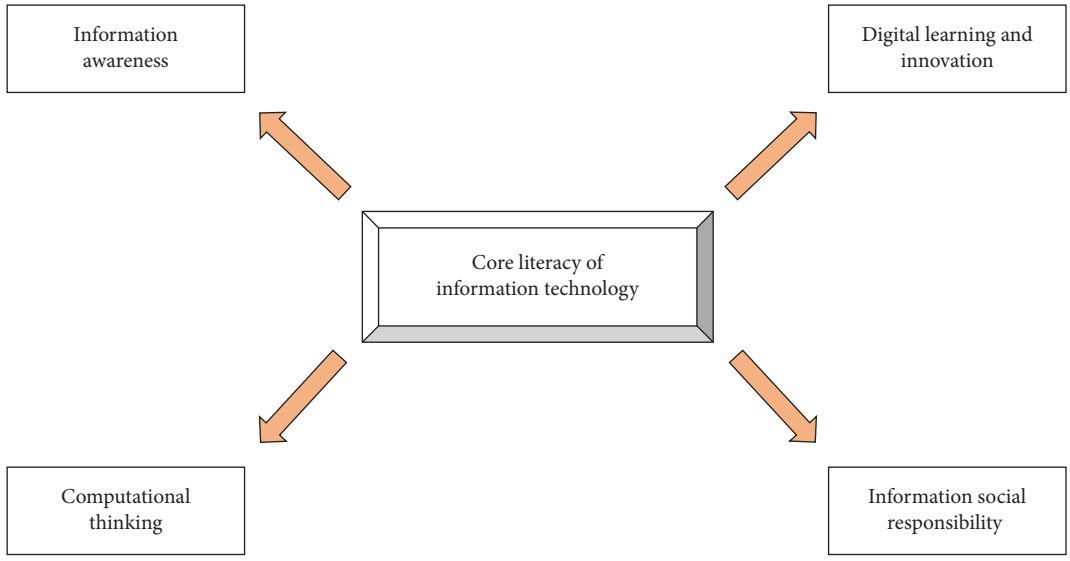

Figure 1: Core literacy of information technology.

ability and developing their innovation ability. This is conducive to gradually cultivating students' IT subject core literacy. For teachers, the smart teaching platform provides a platform for teachers to make scientific teaching decisions [28]. Teachers monitor students' online learning and can provide timely evaluation feedback for problems. As a result, teachers can accurately grasp students' learning situations, thus facilitating the pushing of personalized learning resources and achieving precise tutoring [29]. At the same time, the platform data generated by students in the learning process is a powerful material for teachers to reflect on their teaching. To be specific, these data can provide historical experience for future teaching design [30]. Teachers carry out teaching activities with the help of the smart teaching platform, produce digital learning resources, master learning analysis methods, and use the platform's teaching support functions wisely, which is an effective way to improve information literacy [31]. This study tests the teaching effectiveness of the constructed smart classroom teaching model in the form of applying it to the teaching of information technology subjects, with the hope that the research results and practical examples will be useful for future researchers and educators.

Smart Classroom is an autonomous, efficient, diversified, and personalized teaching model formed on the basis of the flipped classroom teaching model and supported by the concept of smart education with the help of a smart learning platform. At present, information technology has been commonly used in the field of education. However, according to the in-depth investigation of this study, it is found that there are certain problems in the current situation of using information technology in the classroom. With the development of technology, information technology in education has not been evident in mobilizing students' learning motivation. As a result, this study concluded that there is still much room for the integration of information technology into the elementary school mathematics curriculum. Based on the analysis of the current application of information technology in the mathematics classroom model, this study focuses on finding ways to better integrate information technology with the curriculum in order to improve teachers' teaching quality and students' learning efficiency. By opening up a new teaching idea of integrating information technology and curriculum, we can break the inherent teaching mode.

2. Smart Classroom

The smart classroom is an inevitable product of education informatization from concept to practice, from macro to concrete, and finally focused on classroom teaching. With the rapid development and widespread application of new-generation information technology, the integration of information technology and teaching continues to deepen, new teaching technologies emerge, and the classroom teaching model is constantly changing. The core of the smart classroom is to use the latest information technology tools to change and improve classroom teaching and learning, to solve the long-standing and difficult problems of traditional classroom teaching and learning. Further, it can create intelligent and efficient classrooms, and promote students' personalized growth and intellectual development through intelligent teaching and learning.

2.1. Feature of Smart Classroom. As can be seen in Figure 2, the smart classroom mainly includes four features.

First of all, in the smart classroom, all the student's independent learning and interactive communication realized with the help of the platform have intuitive and effective data statistics and scientific analysis. When teachers plan teaching content and choose teaching methods, they can accurately grasp the learning situation based on students' platform learning data, so as to analyze students' learning weak points and the difficulties of teaching content. As a result, teachers can design teaching programs in a targeted

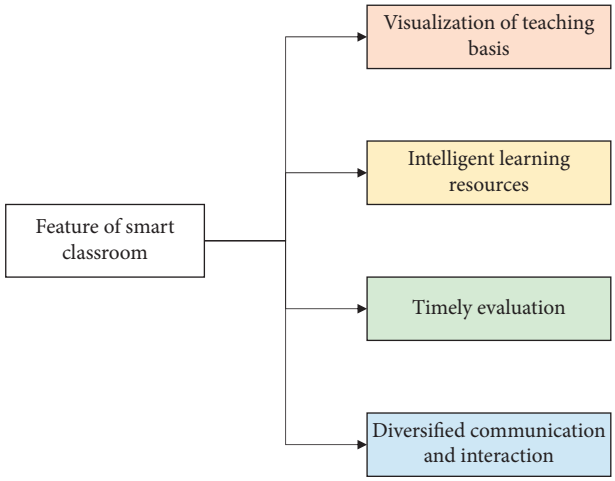

Figure 2: Feature of the smart classroom.

manner to achieve accurate teaching. In addition, in the smart classroom, teachers can provide students with various forms of learning resources with the help of the smart teaching platform. And they can monitor students' learning of resources in real-time, grasp students' learning progress, and summarize the problems reflected by students. Then the teacher can recommend appropriate learning resources for students according to their learning characteristics and differences, and realize personalized learning for each student. Thus, the intelligence of resources can help students consolidate learning content and expand learning paths. The diversity and personalization of learning resources in the smart classroom are conducive to improving the learning effect.

Furthermore, in the smart classroom, with the advantages of the platform, teaching evaluation and feedback can be used throughout the teaching process. At the stage of students' independent learning, teachers issue independent learning tests. In response to students' test results, teachers can provide feedback and answer questions. At the same time, students can understand their own learning situation in a timely and accurate manner. In the teaching stage, teachers can set up the accompanying tests to check the gaps for students in time. In the post-lesson consolidation stage, teachers can evaluate students' performance in class and homework, and push personalized learning resources according to students' characteristics. In this kind of learning environment with timely evaluation and feedback, students can better grasp the learning content and achieve good learning results.

What is more, due to the addition of information technology, the smart classroom extends the time and space of the traditional classroom. As a result, the communication between teachers and students is no longer limited to the classroom. In the independent learning stage, students can bring difficult problems they encounter in their learning to the smart learning platform for discussion after they finish the learning content. At the same time, teachers can keep abreast of students' learning situations. In the lecture stage, teachers can set up diverse classroom activities to increase students' motivation in class. In the after-class stage, students can share learning resources among themselves and exchange and discuss learning experiences with each other, and teachers can release teaching tasks and notifications at any time.

2.2. System Construction of Smart Classroom. The smart classroom in the information era is essentially a new classroom teaching form based on dynamic learning data analysis. Specifically, the smart classroom is a classroom teaching system composed of the system (information technology platform and tools), people (teachers and students), and their activities (teaching links before, during, and after class), etc. Its overall composition is shown in Figure 3.

Resource management and services provide the basis for the teaching content of the smart classroom and are the basic support conditions for the realization of teaching and learning in the smart classroom. Based on the resource management platform, we can establish a resource base of curriculum standards, digital teaching materials for all subjects, micro-lessons and multimedia courseware, various question bank systems, dynamic teaching data, and educational management information, and provide management and services of learning resources.

The application process of teaching and learning is the application and way of teaching and learning in the smart classroom. The study of the smart classroom teaching process includes the analysis of a theoretical model of teaching structure and the analysis of the practical teaching process. The practical teaching process of smart classrooms consists of three parts: before, during, and after class. The pre-class process includes learning analysis, pre-testing, and instructional design. The in-class process includes a topic introduction, inquiry learning, real-time testing, and summary improvement. The post-lesson process includes post-lesson assignments, micro-lesson tutorials, and reflective evaluation.

2.3. Comparison with Traditional Classroom. In this study, the teaching models of traditional, flipped, and smart classrooms are compared in terms of teaching philosophy, learning resources, learning styles, and interaction, as shown in Table 1.

In terms of educational philosophy, in the traditional classroom, most of the time teachers teach based on the content of the material and the characteristics of the students. Students receive knowledge from the teacher and follow the teacher's thinking. As a result, students have less time for independent learning, and their main role is not easily reflected. In a flipped classroom, students are the main focus of the class, and the focus is on student mastery of the content, minimizing the teacher's lecture time. The smart classroom also focuses on the student's subjectivity and the teacher's role as a guide in the student's learning process.

In the traditional classroom, learning resources are mainly textbook content, supplemented by paper-based materials such as lesson plans provided by the teacher. In the

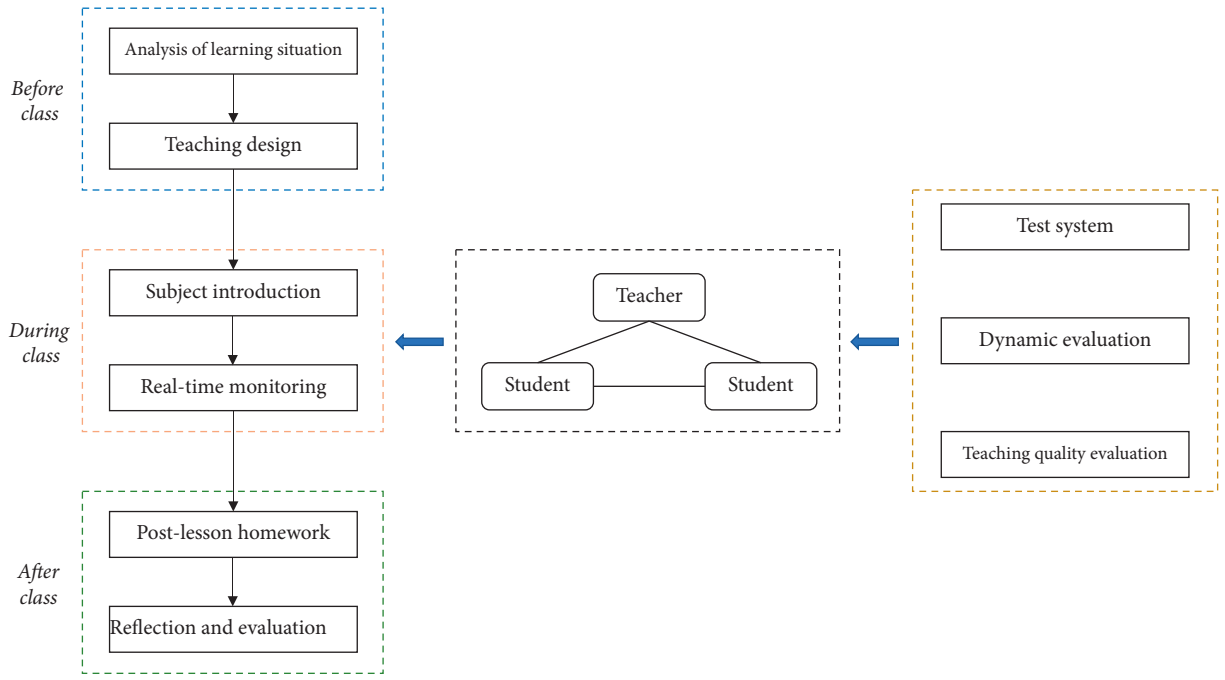

Figure 3: System construction of a smart classroom.

Table 1: Comparison among different classrooms.

	Traditional classroom	Flipped classroom	Smart classroom
Teaching Philosophy	Student-centered	Student-centered	Student-centered
Learning resources	Textbook-based	Mainly online classes	Multimedia learning resources
Learning styles	Passive learning and active learning	Active learning	Personalized learning
Interaction	Classroom interaction	Classroom interaction	Platform interaction

flipped classroom, students' learning resources include textbooks and micro-lessons recorded by the teacher. These resources help students better understand what they are learning. In the smart classroom, learning resources take different forms depending on the nature of the content, including video, audio, pictures, electronic documents, Internet connections, PPT courseware, and other resources. These rich resources can provide students with more resource choices for learning and enrich their learning resources channels. In addition, these resources help develop students' independent learning ability and increase their interest in learning. In summary, the various resources of different classrooms are illustrated in Figure 4.

In the traditional classroom, students learn mainly by receiving knowledge from the teacher. As a result, students have little time to learn on their own. In a flipped classroom, students are given the opportunity to complete their learning before class, and the task in class is to answer questions and consolidate. The smart classroom approach to learning is based on the independent learning of the flipped classroom, with more emphasis on individualized learning and personalized recommendations for each student's learning situation.

3. Practice of Teaching Reform with Modern Information Technology

As information technology has progressed with society, the state has gradually begun to pay attention to the use of information technology in education. The purpose of this study is to understand the current situation of the application of information technology in teaching and learning. Based on the analysis, we will propose countermeasures for better integration of information technology into teaching and learning. This can further enhance students' learning motivation and provide a reference for in-service teachers.

3.1. Questionnaire Data. This study focused on the current situation of information technology application in English teaching at universities, and a questionnaire survey was conducted among students and teachers. A total of 240 questionnaires were distributed, of which 120 freshmen and sophomore students were randomly selected for the survey. At the same time, 50 English teachers were randomly selected from the five universities visited for this study. The proportional distribution of the questionnaire is shown in Table 2.

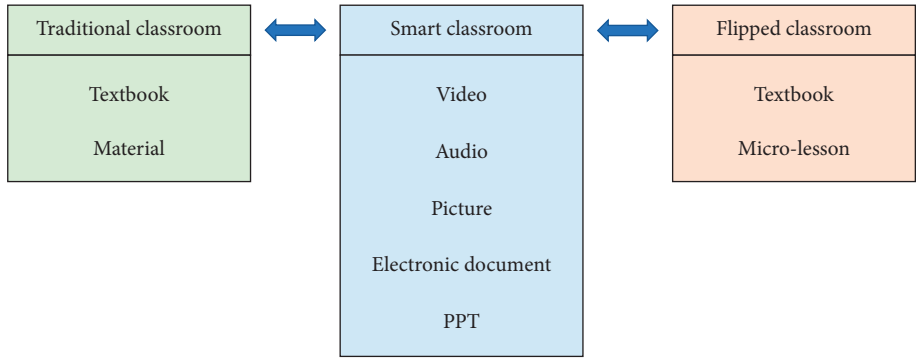

Figure 4: Various resources from different classrooms.

Table 2: Proportional distribution of the questionnaire.

	Male (%)	Female (%)
English teacher	33	67
Freshmen student	25	75
Sophomore student	21	79

The validity and reliability of the valid questionnaire data are analyzed using IBM SPSS Statistics 22.0 data statistical software.

3.2. Questionnaire Analysis. Figure 5 illustrates students' attitudes toward the use of technical information in the classroom. The percentage of students who prefer to use technical information in application classes is 63%. The percentage of students who like technology information in English lessons little is 19%. The percentage of students who do not like technology information in English class is 8%. The percentage of those who do not like using technology information in English classes at all is 10%. The analysis of the survey data shows that 82% of the students like the use of information technology in classroom teaching, which indicates that the students have positive attitudes toward the use of information technology in teaching. Therefore, it is necessary to integrate technology information with curriculum teaching.

As shown in Figure 6, 21% of the teachers had information technology training frequently in the past 4 years. About 55% of the teachers had occasional training, 13% had minimal training, and 11% had no training. Therefore, it is clear from the data that teachers do not have many opportunities for information technology training. As shown in Figure 7, 62% of the teachers felt that information technology training was quite necessary. 26% of teachers felt that information technology training was necessary, 7% felt that information technology training was somewhat necessary, and 5% felt that information technology training was not necessary. As a result, 88% of the teachers thought that information technology training was necessary to improve their information technology application skills.

3.3. Suggestion for Application of Information Technology in Teaching. In today's increasingly advanced information technology, the state has also begun to invest heavily in

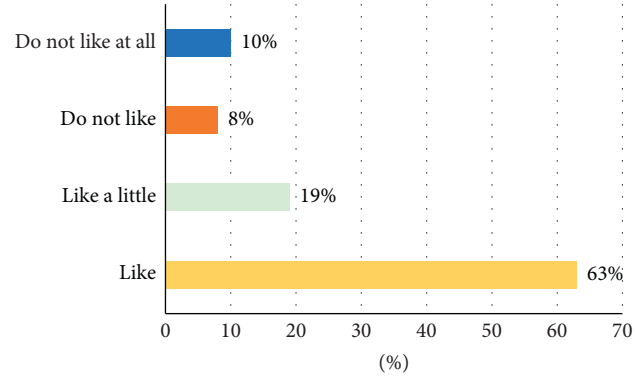

Figure 5: Students' attitudes toward the use of technical information in the classroom.

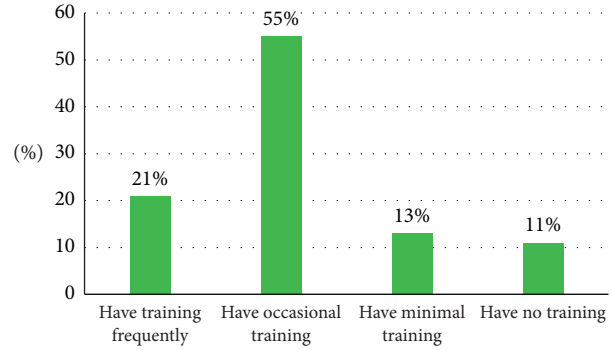

Figure 6: Teacher's situation of training.

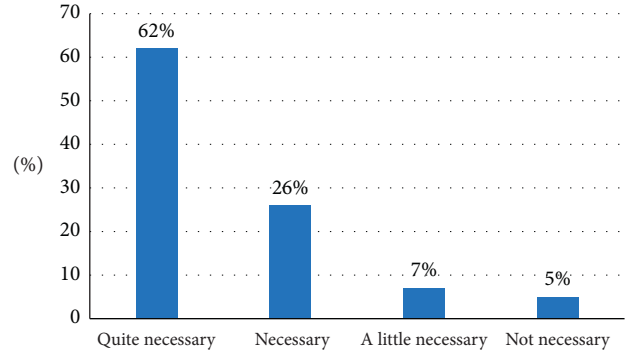

Figure 7: Teacher's attitudes toward the training of technology information technology.

teaching construction. Most schools have basically completed the construction of information technology hardware and equipment for classroom use, and have basic and complete hardware facilities. However, what needs to be improved is the level of teachers' information technology application ability. In addition, we need to strengthen teachers' ability to integrate information technology with the curriculum and promote the effective use of information technology to attract students' attention in the classroom.

With the continuous progress of technology, the country is vigorously applying advanced technology to education. Education is the foundation of the country and is the main channel for training talents. In order to improve the teaching level of teachers and to better integrate information technology with the teaching curriculum, different provinces have regular teacher training programs. These programs have greatly contributed to the development of the teaching force. However, there are still some problems, including the fact that teachers have different levels of prior training and have received different levels of training. In addition, teachers' understanding of the concept of information technology and curriculum integration is one of the factors that influence the integration of information technology and curriculum. State funding and support for schools in various areas can encourage teachers to integrate information technology into the curriculum. If teachers' attitudes toward the use of information technology in the classroom are not positive, the role of information technology in teaching and learning will not be fully realized. As a result, there are a series of negative effects that hinder the development of information technology and curriculum integration.

Therefore, the integration of information technology with the curriculum is a way to promote teaching and learning and enhance students' motivation. The carrier of information technology and curriculum integration is teachers. Therefore, if we want better integration of information technology with teachers, we must first change teachers' attitudes toward the application of information technology in teaching. For teachers, changing the traditional teaching mode is a challenge to learning ability and a challenge to the traditional teaching mode. The curriculum reform proposed by the state forces teachers to learn information technology application skills to a certain extent. In addition, teachers need to change their mindset and believe that they can use information technology well in teaching. Therefore, teachers need more cutting-edge pedagogical knowledge to pave the way for students' future learning.

4. Conclusion

The ultimate goal of modern information technology-based classroom teaching reform is to promote students' development and to teach them to better understand the hidden meaning of "knowledge after knowledge." This study found that there are still many problems in the current situation of teaching and learning. Most of the students like the use of information technology in teaching and learning. However, the use of information technology in teaching and learning does not have a significant impact on students' learning abilities. The analysis shows that teachers' information technology is not well integrated with the classroom, and the use of information technology is unified and lacks interaction with students, which makes information technology not well used. Therefore, using advanced technology to help teachers teach can help students learn at a deeper level. This is not only beneficial support for education but also an important part of promoting the overall development of students' core literacy.

However, there are many aspects of this study that should be further explored. First, the applicability of the smart classroom model in teaching needs to be further verified by frontline teachers in their teaching practice. In addition, the technical expertise in learning resource design and instructional design will also affect the results of the study. Therefore, this area of competence needs to be further improved. In the study, the Pygmalion effect on student learning was overlooked, resulting in some data errors.

Data Availability

The labeled data set used to support the findings of this study is available from the corresponding author upon request.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

Acknowledgments

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