

Research on the Path and Practice of Information Technology Empowering Education and Teaching Reform

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Abstract

The rapid development of information technology has brought new opportunities and practical ways for education and teaching reform. By building smart classrooms, innovating teaching models and optimizing teaching evaluation systems, we can promote the deep integration of teaching content and methods, achieve a comprehensive improvement in education quality and teaching effects, and accurately present personalized learning materials based on big data analysis and artificial intelligence technology to help students carry out independent learning and promote differentiated growth. Create a sharing platform for educational resources, break the barriers of time and space, and achieve the popularization of high-quality resources. Relying on multidimensional evaluation methods, comprehensively track the learning process, flexibly adjust teaching strategies, and increase the scientific rationality and practical benefits of teaching feedback. The road to reform of education and teaching empowered by information technology is conducive to improving teaching efficiency, achieving educational equity, and promoting education to achieve modernization.

Keywords

Information Technology, Educational and Teaching Reform, Smart Classroom, Personalized Learning, Teaching Evaluation System

1. Introduction

The rapid development of information technology has greatly changed the pattern of education and teaching and has promoted a comprehensive transformation from teaching concepts to practice models [1,2]. The optimization of teaching evaluation systems, smart classrooms and personalized learning has gradually become a key trend in educational modernization. Deeply integrating big data analysis and artificial intelligence technology into educational scenarios can effectively enhance teaching efficiency and learning effects. How to fully tap the advantages of information technology and establish a scientific and efficient education and teaching model has become a key issue in education reform and has attracted widespread attention from academics and practitioners [1].

2. Theoretical Basis for Information Technology to Empower Educational and Teaching Reforms

2.1 Basic Concepts of Educational Informatization

The comprehensive application of information technology in the field of education is generally called educational informatization. It is not just the introduction of a single technology but a comprehensive system that deeply integrates information technology with education and teaching. Relying on digitalization, networking and intelligent means, educational informatization allows teaching resources to be effectively integrated and shared, breaking through the constraints of traditional teaching in time, space and resources. Its core pursuit is to improve educational efficiency, promote educational equity and achieve personalized learning. The large-scale application of information technology in education has gradually transformed classroom teaching from the traditional indoctrination style to an interactive and exploratory style and has also promoted the modernization of educational management and evaluation systems.

2.2 The Connotation and Characteristics of Educational and Teaching Reform

The so-called educational and teaching reform refers to the fundamental changes in educational concepts, teaching methods and learning forms driven by information technology. In the dimension of teaching concepts, the change is reflected in the shift from focusing on knowledge transfer to focusing on ability training, highlighting the cultivation of students' independent learning and innovation capabilities. The teaching model is constantly evolving. The traditional model dominated by teacher lectures has gradually transitioned to a variety of states such as smart classrooms, hybrid learning and online education. Smart classrooms use smart devices and platforms as a way to achieve the diversity of classroom interaction forms; online education relies on remote teaching platforms to carry out activities, so that educational resources can transcend geographical and temporal barriers and meet the needs of different learners. These changes not only add color to the educational form, but also significantly improve teaching effects and learning efficiency.

2.3 Theoretical Basis

Constructivist learning theory, hybrid learning theory and educational technology acceptance model are the main parts of the theoretical basis of educational and teaching reform.

Constructivist learning theory advocates that learning is presented as a process of actively constructing knowledge. Students in the information-based classroom gradually build their own knowledge framework through independent exploration and cooperative learning. Relying on interactive electronic whiteboards and learning management systems, students can actively participate and realize the autonomous construction of knowledge.

The hybrid learning theory advocates the organic combination of information technology and traditional classroom teaching to promote the optimization and upgrading of teaching effects. Online learning and face-to-face teaching are integrated to maintain the advantages of classroom interaction and make full use of the convenient functions of online learning to enhance learning flexibility and personalized experience.

The educational technology acceptance model focuses on the application effect of technology in teaching, and emphasizes the acceptance and willingness of teachers and students to use information technology. This model claims that the actual effect of information technology on teaching promotion is closely related to its ease of use and practicality. In the process of implementing educational informatization, it is crucial to enhance teachers' digital literacy and students' ability to accept technology.

After analyzing educational informatization, teaching reform and theoretical foundation, information technology has given impetus to educational and teaching reform, has solid support in the theoretical field, and has achieved outstanding results in practice, helping educational modernization to move towards a new stage of development.

3. The Main Paths for Information Technology to Empower Educational and Teaching Reforms

3.1 Innovation and Optimization of Teaching Models

Under the background of information technology, teaching models are undergoing profound innovation and change. In the construction of smart campuses, the construction of online teaching platforms has become a key link. With the help of online classrooms based on cloud computing and big data, teachers can upload teaching resources at any time, and students can independently prepare before class and review after class. Teaching activities are freed from the constraints of time and space [3]. Online teaching platforms not only provide technical support for the interaction between teachers and students, but also use data analysis to quickly feedback learning results.

The hybrid teaching model is gradually becoming popular and has become one of the key ways to promote educational and teaching reforms. Hybrid teaching organically combines online and offline teaching, and uses online course resources and offline classroom discussions to complement each other to achieve personalized learning. Teachers can use online platforms to complete tasks and post-class test arrangements, and students can use digital resources to carry out consolidation and improvement work. This teaching model can maximize the advantages of educational informatization.

3.2 Sharing and Integration of Teaching Resources

The advancement of information technology has greatly enhanced the level of sharing and integration of educational resources. The cloud resource platform is the key carrier for achieving the sharing of educational resources. It has completed the co-construction and sharing of multi-campus and multidisciplinary teaching materials. By building a public service platform for educational resources, schools and teachers in various regions can upload high-quality courseware, teaching videos and teaching materials, realizing the efficient flow of resources in the education system and overcoming the problem of resource imbalance [2].

The integration of high-quality teaching resources is also one of the key paths. With the construction of open courses and micro-course resources, the teaching results of excellent teachers can be quickly disseminated through the network platform, realizing the integration effect of educational resources. Micro-courses, as concise teaching videos, can display knowledge points in a concentrated manner, making it easier for students to study independently and watch them repeatedly, and effectively achieving the goal of convenient and efficient teaching resources.

3.3 Intelligent Transformation of Teaching Evaluation System

Against the background of informatization, the teaching evaluation system is gradually entering the stage of intelligence and data. As an important feature of intelligent evaluation, data-driven evaluation can accurately evaluate learning effects and knowledge mastery levels by collecting and analyzing students' online learning behavior data. The learning platform records learning time, homework completion ratio and test scores in real time. By mining and analyzing data, it provides data support for teachers' teaching improvement [4].

The use of intelligent evaluation tools has greatly improved the scientificity and objectivity of evaluation. These tools can automatically correct multiple-choice questions and fill-in-the-blank questions, and can also use natural language processing technology to analyze and score short-answer questions. Compared with traditional evaluation models, intelligent evaluation tools can quickly process massive amounts of data. With personalized reports, teachers can better

control the overall learning level of the class and individual differences.

3.4 Exploration of Personalized Learning Paths

In the context of modern education, personalized learning is increasingly valued. Using intelligent push learning resources is one of the key ways for information technology to help personalized learning. Based on the analysis of learners' learning progress and knowledge mastery, the intelligent system can recommend suitable learning materials and review questions to help students carry out targeted learning and effectively consolidate knowledge.

Adaptive learning systems have been widely used in education and teaching. The system monitors students' learning results in real time and changes learning paths and content in real time. If students show obvious deficiencies in a certain knowledge point, the system will automatically push the corresponding basic content for supplementary learning until they are effectively mastered. Relying on intelligent and personalized path planning methods, students can choose the most optimized learning plan according to their own characteristics, which greatly improves learning efficiency and autonomy.

By exploring innovative teaching models, realizing resource sharing, carrying out intelligent evaluation and building personalized learning paths [5,6], information technology empowers the innovation and transformation of education and teaching, while enriching teaching methods and improving teaching quality and learning results. This change will continue to promote the process of educational modernization and achieve educational equity and personalized training goals.

4. Practical Case Analysis of Information Technology Empowering Education and Teaching Reform

4.1 Smart Classroom Teaching Case

Case 1: Construction of smart classrooms in primary and secondary schools

With the advancement of the construction of digital campuses, smart classrooms are gradually becoming a key link in the teaching reform of primary and secondary schools. Smart classrooms are not only a reflection of modern educational concepts, but also an innovative practical activity that deeply integrates information technology and classroom teaching. In order to keep up with the pace of education development in the new era, many schools have actively introduced smart teaching facilities and management platforms to seek efficient and interactive smart classroom construction styles.

During the practice of smart classrooms, interactive electronic whiteboards and learning management systems serve as core support tools. When teachers conduct classroom teaching, they use interactive electronic whiteboards to timely display courseware, multimedia resources and experimental processes. The classroom content is both intuitive and vivid. Students can use electronic whiteboards to conduct interactive questions and answers, classroom exercises and group discussions, which greatly enhances the enthusiasm and degree of interaction in class participation. The teaching activities before, during and after class are all run through the learning management system, helping students to preview knowledge, participate in class and consolidate homework independently. Relying on online task assignments and feedback, teachers can control students' learning progress in real time and optimize teaching strategies according to data analysis results.

The construction of smart classrooms has greatly enhanced the classroom interaction effect and students' enthusiasm for learning. The frequency of students speaking in class and interactive communication have increased significantly. With the help of information technology, cooperative learning and task-driven learning have achieved remarkable results. The intuitive presentation of teaching content and the diversity of interactive methods have further activated students' interest and initiative in learning. The quality of classroom teaching has been comprehensively improved, laying a scientific and effective new track for the reform of primary and secondary education and teaching.

4.2 Online Education Platform Application Cases

Case 2: Promoting the construction of online courses in higher education

Driven by information technology, higher education has gradually moved towards a hybrid teaching form that integrates online and offline. In order to cope with the challenges faced by the modernization of education, many universities have actively built online education platforms, relying on MOOC (massive open online courses) and online live teaching initiatives to drive the large-scale sharing of high-quality educational resources. This teaching model has broadened the scope of teaching in the two dimensions of time and space, and also given students more flexible learning options.

Under the background of this teaching reform, the mainstream practice is the combination of MOOC platform and online live courses. Teachers use MOOC platform to record high-quality course resources, and students can watch and learn independently according to their own learning progress. Online live courses implement real-time teaching and interactive communication at a set time, which maintains the timeliness of classroom teaching and promotes the effect of teacher-student interaction. In practice, a new hybrid teaching style of "independent learning + real-time interaction" is gradually created.

This practice has greatly expanded the coverage of high-quality educational resources. A large number of students from

remote areas can access the course explanations of top universities with the help of online platforms. Teachers can also analyze the platform data, grasp the students' learning progress in all aspects, and flexibly adjust teaching measures. This higher education teaching reform model has effectively improved the utilization efficiency of educational resources and helped to make educational equity a reality.

4.3 Typical Cases of Personalized Learning

Case 3: Focus on learning APPs in the K12 stage

In the process of basic education, information technology has given new development opportunities to personalized learning. The cognitive level and learning ability of students in the K12 stage vary greatly. How to achieve teaching students in accordance with their aptitude has become a thorny problem in teaching reform. Many schools and educational institutions promote artificial intelligence adaptive learning platforms and achieve personalized teaching with the help of intelligent apps.

In the specific implementation process, learning apps use knowledge graphs to create personalized learning paths. After students complete the knowledge point test on the platform, the system automatically identifies learning shortcomings, and then pushes matching supplementary content, adjusts learning tasks in real time, and combines the learners' mastery of the situation, so that each student can steadily advance according to their learning rhythm. The app has the functions of wrong questions reappearing, personalized homework selection, and learning progress tracking.

This adaptive learning model based on artificial intelligence not only improves students' learning efficiency, but also enhances students' interest in learning. Students can do targeted training according to their own weak links, and gradually promote the accurate breakdown of knowledge. Teachers can fully grasp the progress and difficulties of individual students' learning with the help of the background monitoring system, and achieve the goal of implementing differentiated teaching.

Referring to the cases of smart classroom creation, higher education online platform application and K12 personalized learning app practice, we can see the remarkable results of information technology in empowering education and teaching reform. Different education stages and teaching forms are the starting points of these cases, showing the positive effects of information technology in improving classroom interaction, expanding the coverage of educational resources, and achieving personalized learning, which has opened up a practical and feasible practical path for education to move towards modernization.

5. Challenges and Countermeasures of Information Technology Empowering Education and Teaching Reform

5.1 Challenge Analysis

When the process of information technology empowering education and teaching reform is launched, even if there are certain results, there are still many challenges that affect the manifestation and promotion of reform results.

A prominent problem is the lack of technology application level. Teachers are the main body of direct implementation of information-based teaching, and their digital literacy is directly related to teaching results. Many teachers have been influenced by traditional teaching models for a long time, and their ability to use and master emerging information technology is limited, which makes it difficult for smart classrooms and online teaching platforms to play their due role in actual teaching practice. Some teachers have difficulties in operating intelligent teaching tools and lack of technical support, which restricts the widespread use of information technology in classroom teaching.

The inequality of educational resources is also a significant bottleneck for information technology to empower teaching reform. In areas with large urban-rural gaps, the construction of smart education infrastructure is relatively lagging, and digital equipment and online education platforms cannot be fully covered. This unequal distribution of resources is not only reflected in the hardware facilities, but also includes the lack of high-quality digital education resources. There is a significant gap between urban and rural schools in the application of information technology and the richness of teaching resources, which makes it difficult to ensure educational equity.

The effective application of information technology in teaching is limited by the low digital literacy of students, especially in primary and secondary schools. Some students lack independent learning ability and technical operation ability, and have low recognition and acceptance of information-based learning. When in the smart classroom and online teaching stage, some students are not proficient in the use of smart devices and the operation of online learning platforms, and cannot fully rely on digital resources to carry out independent and exploratory learning. This ability shortcoming has weakened the effect of information-based teaching reform to a certain extent.

5.2 Countermeasures and Suggestions

In terms of the challenges faced by information technology in empowering educational and teaching reforms, multidimensional countermeasures need to be implemented to enhance the application effect of information technology in education and help education move towards a modern stage.

In order to address the insufficient level of technology application, the intensity of teacher training can be increased. Schools and education management departments should regularly carry out special training on information technology

application capabilities to help teachers learn how to operate smart classrooms, manage online platforms and use data analysis tools. An evaluation mechanism for teachers' digital literacy should be established. Relying on assessment and incentives, teachers should be encouraged to continuously improve their information technology literacy and promote the modernization of teaching methods.

Accelerating the construction of smart education infrastructure is the fundamental way to resolve the contradiction of resource imbalance [7]. Education departments at all levels should increase investment levels, support the configuration and updating of information equipment in urban and rural schools, and use the construction of regional education resource platforms as a means to achieve the joint construction and sharing of high-quality teaching resources, overcome the shortcomings of insufficient digital resources in remote schools, and promote enterprises and social forces to participate in the construction of smart education infrastructure, so as to jointly promote the achievement of balanced urban and rural education resources.

Cultivating students' digital literacy is the key to ensuring the improvement of information-based teaching effects. Schools should add digital literacy education to curriculum design, pay attention to cultivating students' independent learning, information retrieval and digital tool practical skills, adopt digital skills practice courses to enhance students' adaptability to information-based learning, and guide students to actively contact and master the operation of smart devices with the help of club activities and extracurricular practice, so as to create excellent digital learning habits.

Relying on comprehensive measures to improve teachers' digital literacy, strengthen infrastructure construction and enhance students' digital skills, it can successfully resolve the bottlenecks in the stage of information technology empowerment education and teaching reform, thereby promoting the deepening and sustainable development of information-based teaching reform.

6. Conclusion

Information technology empowers the transformation of education and teaching, and has become the core driving force for the modernization of education. Relying on the construction of smart classrooms, the application of online education platforms and the exploration of personalized learning paths, teaching models and educational concepts have undergone significant changes. The lagging level of technology application, uneven distribution of resources and poor digital literacy of students still hinder the popularization and expansion of information-based teaching. In response to these thorny challenges, strengthening information technology training for teachers, accelerating the construction of smart education-related infrastructure and cultivating students' digital literacy have become the core means to overcome bottlenecks. Only by achieving comprehensive enhancement of technology, resources and capabilities can we better demonstrate the empowering value of information technology in education and teaching, and truly achieve the improvement of education quality and the evolution of fairness.

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