

Education Collaborative Management System Based on Intelligent Multimedia Technology

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Abstract: With the rapid advancement of educational informatization, traditional educational management models can no longer meet the learning and management needs of teachers and students in daily teaching. Therefore, it is necessary to use advanced multimedia technology for deep application to improve the low energy efficiency of traditional educational management models. In order to solve the problems of traditional education management models that rely too much on the decision-making and deployment of relevant staff, low teacher work efficiency, and insignificant improvement of student grades, this article analyzes the workflow and management structure of traditional education management models. Starting from the current demand of education management, this paper summarizes the defects of education management technology conditions and the direction of synergistic optimization, and tentatively introduces intelligent multimedia technology to structure a more excellent performance of education synergistic management system. The adjustment of system functions and the advantages and disadvantages of performance need to be verified through experiments. This article verifies its performance by optimizing the application of the education collaborative management system. The experimental results show that the optimised educational collaborative management system has a higher level of security in the gathering of data and analysis of information. The application effectiveness evaluation index of relevant staff and teachers and students has increased by about 15.6% compared to the application effectiveness evaluation index of traditional education collaborative management systems. The optimized education collaborative management system in this article has more excellent performance, providing interactive services more conveniently for teachers and students engaged in daily teaching activities on campus. It not only meets the teaching needs of sound and image synchronization in the classroom, but also achieves the relevant expectations of safety monitoring students. Especially for the design of data transmission and storage functions, it greatly improves the intelligence and informatization of the education collaborative management mode.

Keywords: Intelligent Multimedia, Educational Management, Collaborative Optimization, Information Technology

1. Introduction

With the rapid development of the Internet and information technology, the application of advanced information technology in the domain of education governance has become the main direction of collaborative optimisation. The importance and potential benefits of collaborative education management systems can be explored using intelligent multimedia technologies. The traditional education management model has not been able to apply intelligent multimedia technology more widely, and lacks the ability to integrate various educational resources and teaching content information, making it difficult to achieve information integration and synchronous sharing between educators and learners. Faced with increasingly complex educational management needs, it is difficult to allocate more efficient resource allocation plans. When carrying out educational collaborative management tasks, a large amount of human and material resources could be wasted, and the implementation effect is not very obvious. The traditional educational management model is often independent and decentralized, and the efficiency of educational management is not efficient and convenient enough. Therefore, the emergence of educational collaborative management systems based on intelligent multimedia technology has opened up new development directions and practical support for educators and managers.

The work structure of the traditional education management model is relatively rigid, which hinders the implementation of collaborative management related work. There is a need to identify the needs of the traditional education management system so as to explore the direction of optimization of the education management model. Education management systems have been widely applied in the field of education, but they still face some challenges and challenges. With the progress and development of society, the current education situation is gradually becoming more serious. Improving the information collection ability of education management systems is the preferred strategy to address collaborative management tasks [1-2]. For some areas with poor educational resources and loose management structures, stable internet connectivity and resource information mining can more effectively optimize educational management systems. However, due to technological barriers, the application status of advanced technologies is stagnant [3-4]. Education management involves a large amount of personal and institutional privacy information. Education managers need to develop resource allocation plans that conform to educational concepts based on the development status of different situations, while ensuring corresponding data security and privacy protection [5-6]. The research on the application of advanced smart multimedia technology can enrich the means of education control systems, greatly enhance the optimisation of traditional education control systems and meet the needs of education management.

The rise of intelligent mass media technology has brought new opportunities for the architecture of educational collaborative management system, which can help administrators to better integrate various educational resources and realise a more intelligent allocation of teaching resources. The informatization of educational resources such as textbooks, courseware, videos, experimental equipment, and experimental venues in the educational process can improve the initial efficiency of

collaborative management. After the release of teaching tasks, plans and deployments that meet the requirements of the tasks can be quickly made, promoting resource sharing between educators and managers [7-8]. During the process of students acquiring knowledge, an educational collaborative management system based on intelligent multimedia technology can provide resource allocation solutions that are more in line with students' needs, thereby improving learning effectiveness and self-learning ability, and ensuring students' learning efficiency while enhancing their autonomy in learning [9-10]. The equipment composition of intelligent multimedia technology is the foundation for optimizing the architecture of educational collaborative management systems. The establishment of internet databases can store information about educational individuals and teams, as well as various resource layouts. By analyzing and mining information data, while deeply understanding educational needs, targeted adjustments to educational goals and teaching plans can be made [11-12]. Education managers provide personalized learning suggestions and guidance plans through the system, but further research and exploration are needed for their specific implementation. The performance level of traditional education management systems to a certain extent determines the progress span in the education field. Enhancing the collaborative capacity of education management systems through intelligent multimedia skills plays an important part in fulfilling the tasks of education management [13]. The aim of this paper is to improve the information collection and resource integration capabilities of educational collaborative management systems, enrich the technical means of information mining, and provide diverse teaching methods and tools. By combining intelligent multimedia technology, relevant information between educators and students is collected and stored, and the internal relationships between information data are explored. The general needs of educational management are summarized. Thus, more efficient educational resource allocation plans can be made based on the educational situation, achieving collaborative management of educational resources and teaching activities. The education collaborative management system optimized based on intelligent multimedia technology has stronger potential in cultivating education managers and outstanding students, improving the information processing ability and intelligence level of the education collaborative management system, and promoting the development and innovation of the education management field.

2. Key Technology Evaluation of Education Collaborative Management System

The educational collaborative management system has extremely high application value in the field of education, providing more efficient, convenient, and personalized teaching services for educators and managers to allocate and plan educational resources and teaching activities [14-15]. The education collaborative management system needs to manage a large amount of educational resources and student learning data, so efficient data management and storage technology is crucial. Reasonable data management and storage technologies can achieve the integration and sharing of educational resources, and the collection and analysis of student learning data, and provide effective decision-making support for educators and managers.

The education collaboration management system not only needs to support various forms of educational resources such as text, images, audio, and video, but also collects, analyzes, and uses learners' learning data to understand their learning situation and needs, and provide personalized suggestions and guidance. Data mining and analysis technology, as well as multimedia technology, can help educators and managers discover potential patterns and associations from a large amount of learning data, and present educational content to learners in a more visual and intuitive manner [16-17].

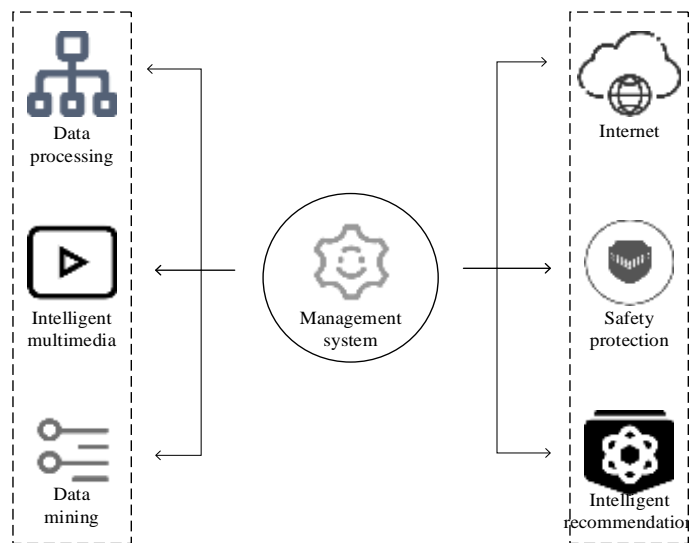


Fig.1 Key technical components of the education collaborative management system

The foundation for seamless execution of educational management tasks is to achieve sharing of educational resources and collaboration of learning activities through the Internet and network technology, thereby achieving remote communication and collaboration between students and teachers, and promoting the sharing and acquisition of educational resources [18]. However, the promotion of management activities also involves a large amount of personal data from individuals and educational institutions, so data security and privacy technologies are also very important. In the collaborative education management system, data security and privacy technologies such as identity verification, data encryption, and access control can be provided through reasonable data security and privacy technologies to improve user trust and satisfaction. Figure 1 shows the key technical components of the education collaborative management system.

3. Application of Intelligent Multimedia Technology in Educational Management Systems

With the continuous development of information technology, the application of intelligent multimedia technology in educational management systems is becoming

increasingly widespread. In the education management system, intelligent multimedia technology can help educational institutions to play an important part in improving the quality of teaching and management efficiency and reducing costs [19-20]. This paper is based on intelligent multimedia technology, providing richer, more vivid, and intuitive teaching resources for teaching. Through multi-intelligent multimedia technology, teachers can digitize various teaching resources such as text, pictures, audio, video, etc., helping students more intuitively understand knowledge points. At the same time, intelligent multimedia technology can also provide more flexible teaching methods, such as remote teaching through online live streaming, video conferencing, and other modes, allowing students to learn anytime and anywhere.

Intelligent multimedia technology can provide more efficient and convenient ways for educational management tasks. Through intelligent multimedia technology, this paper enables educational institutions to acquire, share and manage learning resources, and centrally manage different learning resources based on cloud storage and other methods, so as to facilitate the learning of teachers and students. Intelligent multimedia technology also provides educational institutions with more refined management methods. By analyzing and mining stored data, students' learning status and patterns are summarized, helping educational institutions better understand students' learning status and improve teaching quality.

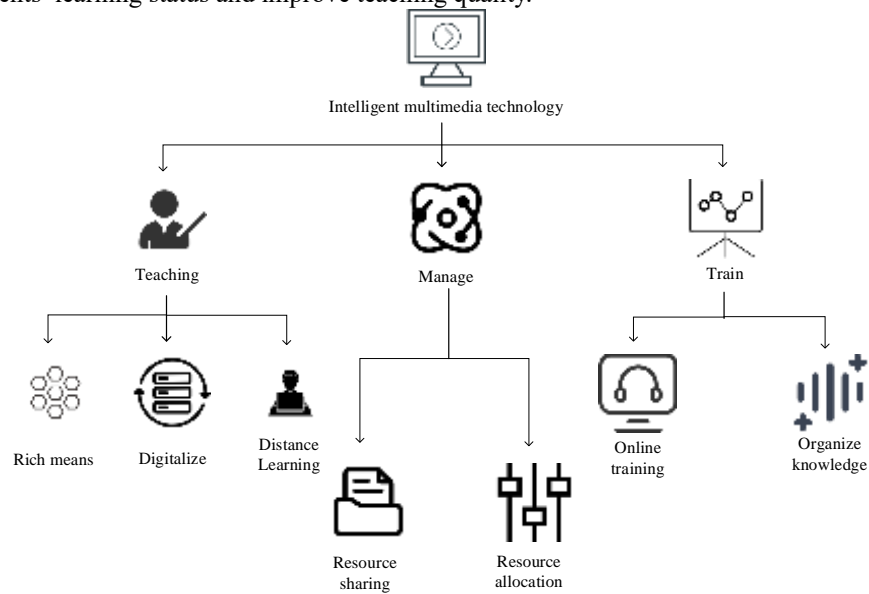


Fig.2 Application demonstration of intelligent multimedia technology

In the process of education and training, the performance of traditional education management systems is not sufficient to clearly analyze the complex and ever-changing student states. This article uses methods such as online live streaming and video conferencing to enable students to break free from the constraints of space

and time and conduct efficient learning at a reasonable time and place. Intelligent multimedia technology is applied to the work structure of education collaborative management systems, making the content of traditional education management highly informationized. Based on the usage of advanced technologies, students can understand the knowledge points more intuitively, improve the quality of teaching and management efficiency, and greatly reduce the cost of education, widely promote the deep usage of smart multimedia technology in the education collaborative management system, which is of great meaning to promote the research and development in the field of education. As shown in Figure 2, the application of intelligent multimedia technology is demonstrated.

4. Optimize the Application Practice of Educational Collaborative Management System

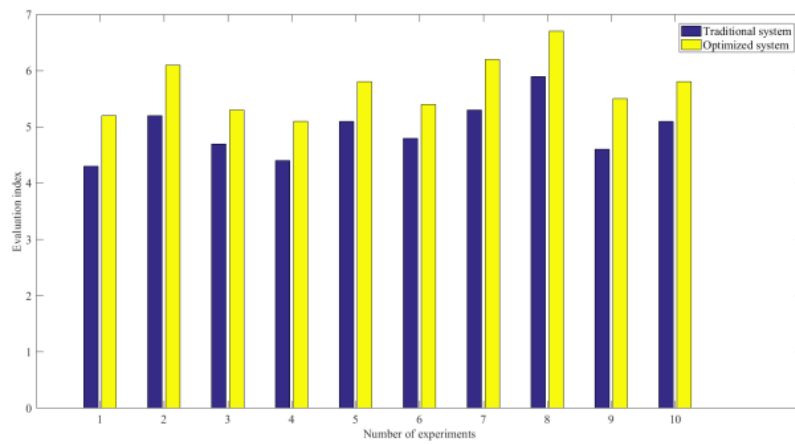
With the continuous development of information technology, the traditional educational collaborative management model is difficult to meet the growing demand for education, and the development and progress of the education field are facing severe challenges. This paper is based on the intelligent multimedia technology architecture to optimize the education collaborative management system, which arranges and reorganizes various processes in education management more efficiently. Through data collection, secure storage, and data analysis of cloud multimedia databases, functions such as information sharing, collaborative management, and information mining are achieved in the education management process. However, the actual application effect of the system still needs further verification. The effectiveness of the application of the education collaborative management system is related directly to the quality and efficiency of education management. The aim of this paper is to validate the effectiveness of the Optimised Educational Collaborative Management System in an educational institution. The experiments that applied traditional and optimized educational collaborative management systems were set up as a control group and an experimental group, respectively. Hackers were simulated in the background to maliciously attack the two types of educational collaborative management systems, and the results of each security performance verification experiment were recorded. 20 random sampling experiments were conducted to list the results, There were 10 experiments on each of the two types of educational collaborative management systems, as shown in Table 1 for the comparison of system security performance.

Table 1. System Safety Performance Comparison Display

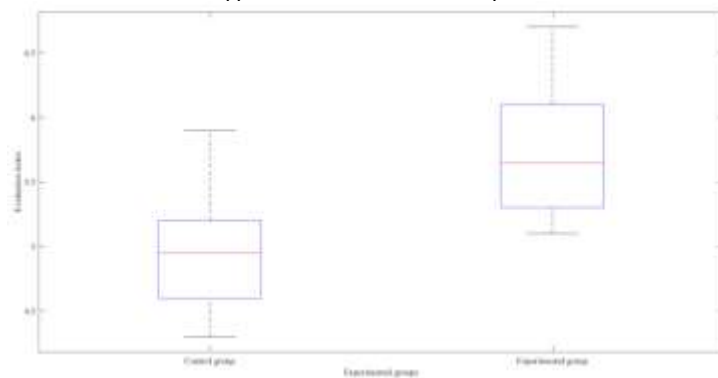
	Traditional system	Optimized system
1	Fail	Fail
2	Fail	Fail
3	Success	Fail
4	Fail	Fail
5	Fail	Fail
6	Fail	Fail
7	Fail	Fail
8	Success	Fail

9	Fail	Fail
10	Fail	Fail

As shown in Table 1, out of 10 randomly sampled security performance testing experiments of traditional educational collaborative management systems, there were two successes and eight failures. In the security performance testing experiment of optimizing collaborative management systems, malicious attacks all failed. The experimental results showed that compared to traditional educational collaborative management systems, the security performance of optimizing educational collaborative management systems was higher, facing malicious attacks from the outside world. The security protection measures of cloud database are more comprehensive, the ability to deal with sudden sexual network security accidents is stronger, and the security of private information of individuals and teams can be more guaranteed.



A. Application effect columnar comparison



B. Comparison of application effect box lines

Fig.3 Comparison of traditional and optimized system performance evaluation

To verify the actual application effect of the optimized education collaborative management system, 10 relevant staff and teachers and students were randomly

invited to evaluate the satisfaction of the system's application effect. The establishment of evaluation rules is a prerequisite for accurately evaluating the application effect. In this experiment, the upper limit of the satisfaction index is 9, with 1-3 being average, 4-6 being good, and 7-9 being excellent. Figure 3 shows the comparison of the application effect evaluation between traditional and optimized systems. Figures A and B shown in Figure 3 show the evaluation of the effectiveness of traditional and optimized education collaborative management systems by relevant personnel. The average evaluation index of traditional education collaborative management systems is 4.94, while the average evaluation index of optimized education collaborative management systems is 5.71. Compared to traditional education collaborative management systems, the application effectiveness evaluation index of optimized education collaborative management systems has increased by about 15.6%.

5. Discussions

After experimental verification, the application effect of optimizing the education collaborative management system is more prominent compared to traditional education collaborative management systems. The optimized education collaborative management system based on smart multimedia technology has higher management efficiency, ensuring teaching quality while greatly reducing management costs. It also provides better data security during the data collection and information analysis process. However, there are still certain limitations in the experiment in this article. Due to the limitations of the experimental site and sample data size, this experiment only conducted a comparative analysis of the system's safety performance and application effectiveness. In future expansion research, more in-depth exploration and research are needed on the system's technical structure and workflow.

6. Conclusions

In addressing the limitations of traditional collaborative educational management, this paper delineates the conventional workflow, identifying inefficiencies and resource underutilization. It delves into key technologies pivotal to the collaborative educational management system, such as real-time data sharing, multi-party collaboration platforms, and intelligent analysis coupled with decision support systems. A notable advancement is the integration of intelligent multimedia technology, enriching the interactive medium for educators and administrators, thereby facilitating a more intuitive and efficient information exchange and decision-making process. To validate the optimized system's feasibility, a series of experiments were conducted. The results underscored the system's robust security and accuracy in data collection and information analysis, effectively safeguarding individual and team information. Feedback from relevant staff and users further corroborated the system's enhanced capabilities, especially lauding the improvements in data collection, management efficiency, and training methodologies. The optimized collaborative educational management system elucidated in this paper not only expands the means of data

collection but also introduces cutting-edge data analysis techniques. The infusion of intelligent multimedia technology invigorates the training and teaching processes, significantly elevating teaching quality and management efficiency. These advancements substantially propel the level of digitization in the education sector, laying a solid groundwork for future educational innovations, thereby marking a substantial stride towards a more efficient and effective educational management paradigm.

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References

- [1] Vaughn Malcolm Bradley. "Learning Management System (LMS) use with online instruction." *International Journal of Technology in Education* 4.1 (2021): 68-92.
- [2] Olaf Zawacki-Richter, Victoria I. M, Melissa Bond, Franziska Gouverneur. "Systematic review of research on artificial intelligence applications in higher education—where are the educators?." *International Journal of Educational Technology in Higher Education* 16.1 (2019): 1-27.
- [3] Melissa Bond, Victoria I. M, Carina Dolch, Svenja Bedenlier , Olaf Zawacki-Richter. "Digital transformation in German higher education: student and teacher perceptions and usage of digital media." *International journal of educational technology in higher education* 15.1 (2018): 1-20.
- [4] Bill Cope, Mary Kalantzis , Duane Searsmith. "Artificial intelligence for education: Knowledge and its assessment in AI-enabled learning ecologies." *Educational Philosophy and Theory* 53.12 (2021): 1229-1245.
- [5] Jamal Abdul Nasir Ansari , Nawab Ali Khan . "Exploring the role of social media in collaborative learning the new domain of learning." *Smart Learning Environments* 7.1 (2020): 1-16.
- [6] J. Ignacio Criado, J. Ramon Gil-Garcia. "Creating public value through smart technologies and strategies: From digital services to artificial intelligence and beyond." *International Journal of Public Sector Management* 32.5 (2019): 438-450.
- [7] Ben Williamson. "The hidden architecture of higher education: building a big data infrastructure for the 'smarter university'." *International Journal of Educational Technology in Higher Education* 15.1 (2018): 1-26.
- [8] Chong Guan , Jian Mou , Zhiying Jiang. "Artificial intelligence innovation in education: A twenty-year data-driven historical analysis." *International Journal of Innovation Studies* 4.4 (2020): 134-147.
- [9] Syed A. Raza , Wasim Qazi, Komal Akram Khan, Javeria Salam. "Social isolation

and acceptance of the learning management system (LMS) in the time of COVID-19 pandemic: an expansion of the UTAUT model." *Journal of Educational Computing Research* 59.2 (2021): 183-208.

- [10] Fakhurrizi M. Amin, Hanna Sundari. "EFL students' preferences on digital platforms during emergency remote teaching: Video Conference, LMS, or Messenger Application?." *Studies in English Language and Education* 7.2 (2020): 362-378.
- [11] Marcos Wander Rodrigues , Seiji Isotani , Luiz Enrique Z. "Educational Data Mining: A review of evaluation process in the e-learning." *Telematics and Informatics* 35.6 (2018): 1701-1717.
- [12] Vikas Kumar, Pooja Nanda. "Social media in higher education: A framework for continuous engagement." *International Journal of Information and Communication Technology Education (IJICTE)* 15.1 (2019): 97-108.
- [13] Shaofeng Wang, Zhuo Sun , Ying Chen. "Effects of higher education institutes' artificial intelligence capability on students' self-efficacy, creativity and learning performance." *Education and Information Technologies* 28.5 (2023): 4919-4939.
- [14] Sujit Kumar Basak, Marguerite Wotto, Paul B. "E-learning, M-learning and D-learning: Conceptual definition and comparative analysis." *E-learning and Digital Media* 15.4 (2018): 191-216.
- [15] Xin Xie, Keng Siau , Fiona Fui-Hoon Nah. "COVID-19 pandemic—online education in the new normal and the next normal." *Journal of information technology case and application research* 22.3 (2020): 175-187.
- [16] Ashraf Alam. "Possibilities and challenges of compounding artificial intelligence in India's educational landscape." Alam, A.(2020). *Possibilities and Challenges of Compounding Artificial Intelligence in India's Educational Landscape*. *International Journal of Advanced Science and Technology* 29.5 (2020): 5077-5094.
- [17] Alaa Zuhir Al Rawashdeh , Enaam Youssef Mohammed, Asma Rebhi Al Arab , Mahmoud Alara , Butheyra Al-Rawashdeh , Butheyra Al-Rawashdeh. "Advantages and disadvantages of using e-learning in university education: Analyzing students' perspectives." *Electronic Journal of E-learning* 19.3 (2021): 107-117.
- [18] Cedric B. Mpungose. "Emergent transition from face-to-face to online learning in a South African University in the context of the Coronavirus pandemic." *Humanities and social sciences communications* 7.1 (2020): 1-9.
- [19] Robin Castro. "Blended learning in higher education: Trends and capabilities." *Education and Information Technologies* 24.4 (2019): 2523-2546.
- [20] Christopher Alan Bonfield , Marie Salter , Alan Longmuir , Matthew Benson, Chic Adachi. "Transformation or evolution?: Education 4.0, teaching and learning in the digital age." *Higher education pedagogies* 5.1 (2020): 223-246.