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Research on Intelligent Education Management under Intelligent Education System

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KEYWORDS

Intelligent education system;

Intelligent education management;

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ABSTRACT

With the rapid advancement of intelligent technologies, the intelligent era has fully arrived, presenting unprecedented opportunities and challenges for intelligent education management within the intelligent education system. By closely integrating intelligent systems with intelligent education management, we can better meet diverse educational needs, enhance teaching quality, and promote the development of intelligent education under the intelligent education framework. However, amidst the wave of the intelligent era, intelligent education management faces numerous challenges and opportunities. This paper actively explores research on intelligent education management within the intelligent education system, analyzes the value of intelligent transformation in education management, and proposes strategies to reconstruct innovative pathways for intelligent education management driven by the intelligent education system.

INTRODUCTION

In the new era of rapid scientific and technological development, the influence of intelligent education systems in the field of education is also increasing, becoming an important technical means to drive innovation in intelligent education management. The market size and growth rate of China's intelligent education industry from 2019 to 2024 can directly reflect the growing attention that intelligent education management is receiving from more people. (As shown in Figure 1) This indirectly reflects that the quality of education is directly related to the quality of talent cultivation, which not only affects individual career prospects but also impacts the development of future society. However, under the wave of development in the information age, the challenges and opportunities faced by research in intelligent education management are increasing, making it even more difficult to meet the developmental demands of the intelligent education system. The widespread application of intelligent technology in education makes the intelligentization of education management more urgent. This transformation is not only reflected in the improvement of education management efficiency and precision, the promotion of personalized education and student development, but also in the advancement of modernization and innovation in education governance. Building an intelligent management platform, promoting the precise allocation of curriculum resources, improving policy and legal support, strengthening information security construction, establishing a comprehensive protection system, accelerating the integration and innovation of information technology, enhancing application efficiency, and strengthening the training of education management personnel further drive the reconstruction of innovative pathways in intelligent education management under the intelligent education system. This is not only a promotion of progress in intelligent education management but also an important guarantee for the long-term development of the intelligent education system.

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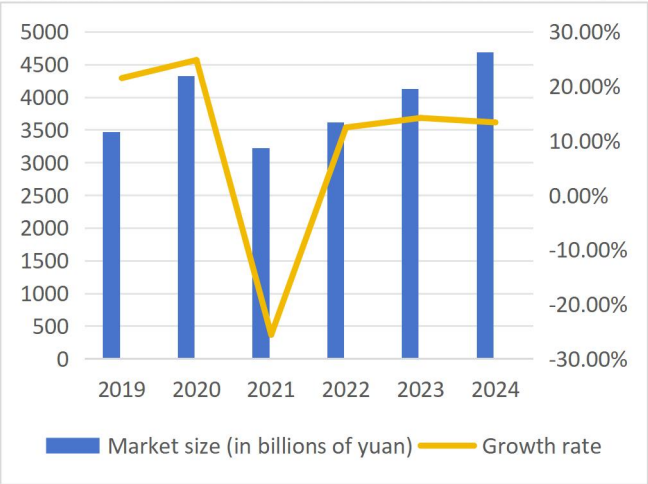

Fig.1. China's smart education industry market size and growth rate from 2019 to 2024

1.Problems and Opportunities of Intelligent Education Management under Intelligent Education System

1.1.Problems of Intelligent Education Management under Intelligent Education System

The fragmentation of information systems and poor data sharing have become critical challenges in smart education management. During implementation, the most prominent issue stems from disjointed systems developed by separate departments, creating severe data silos. The lack of effective inter-system connectivity and collaboration directly undermines information sharing efficiency. With no unified management or integration of data, information flows become inefficient, hindering the development of comprehensive and timely decision-making support. Furthermore, these fragmented systems increase operational costs and maintenance complexity, severely limiting the digital transformation and overall effectiveness of smart education management.

The data security framework remains inadequate, exposing high risks in digital transformation. In the development of smart education management systems, data security issues have become increasingly prominent. Many existing security mechanisms lack robust safeguards, creating significant risks. Frequent incidents such as cyberattacks, data breaches, and hacker intrusions threaten the security of critical data and information systems in smart education management. Furthermore, users' weak security awareness exacerbates these risks, disrupting system operations and posing potential threats to smart education management.

The pace of technological advancement in information systems remains sluggish, with application capabilities requiring enhancement. Despite the rapid evolution of digital technologies, the implementation of smart education management systems still lags behind, as many hardware devices and software systems have remained outdated for years, failing to meet the demands of modern digitalization. This not only hinders the adoption of new technologies but also compromises the efficiency and performance of management systems. The low proficiency in applying information technologies, coupled with insufficient technical expertise and operational skills among administrators, ultimately prevents information systems from reaching their full potential.

Outdated management models and a lack of comprehensive planning in digital infrastructure development pose critical challenges in smart education management systems. Many universities lack systematic top-level design and long-term planning during digital transformation, resulting in fragmented initiatives without unified objectives. For instance, when advancing smart education systems, departments often independently initiate projects without coordinated resource integration, leading to redundant infrastructure and resource waste. Furthermore, the management framework for digital infrastructure suffers from significant deficiencies. Information management departments struggle to meet rapidly evolving digital demands in terms of functional positioning, resource allocation, and performance evaluation.

1.2.Opportunities for Intelligent Education Management under Intelligent Education System

Intelligent education management can be supported by robust data. In the era of artificial intelligence and big data analytics, traditional research methods like field surveys and online questionnaires are no longer sufficient to track the evolving trends in intelligent education management. By leveraging big data analytics to collect relevant information, we can more accurately reflect current characteristics of intelligent education management and enhance its role in education. Big data technology effectively collects, integrates, and analyzes developmental data, providing

managers with objective, detailed, and actionable insights to formulate effective educational policies and implementation plans. Artificial intelligence, combined with computational technologies, computer vision, and machine learning, enables precise and scientific analysis and prediction. Through systematic research and in-depth investigations using intelligent technology systems, we can identify future trends, provide effective guidance for intelligent education management, and better understand and control the development progress of intelligent education management within the intelligent education framework.

Intelligent education management can achieve greater transparency and personalization. In today's digital and information-driven era, it faces dual opportunities: transparency and personalization. Transparency requires maintaining open, fair, and impartial information flow throughout decision-making, resource allocation, and teaching evaluation processes, ensuring administrators fully understand educational management procedures and outcomes. Personalization represents another crucial direction for intelligent education management. Each student is unique with distinct thinking patterns, preferences, and behavioral habits. Therefore, intelligent education management must address individual differences by providing personalized educational services. In curriculum design, teaching methods, and student assessment, it should fully respect students' individual characteristics, innovate educational models, and meet diverse learning needs.

The effectiveness of intelligent education management can be monitored and evaluated. With continuous technological advancements, artificial intelligence has become a crucial tool for assessing the quality of smart education. Its capabilities include precise data analysis, rapid response mechanisms, and regular report generation, enabling us to gain a comprehensive understanding of learner groups and develop more targeted educational strategies to enhance teaching quality. If the monitoring system detects anomalies in the actual educational environment, it will immediately activate the early warning mechanism, allowing teaching administrators to promptly identify potential risks and take preventive measures.

2.The Value of Intelligent Transformation of Educational Management

2.1.Improving the efficiency and precision of education management

In previous educational management practices, human bias was difficult to avoid, and the emergence of intelligent educational management has brought a turning point for resolving this dilemma. Intelligent education management is capable of deep mining and analysis of student data, including academic performance, attendance records, and consumption behavior, which can provide more refined data support for education management and decision-making. For example, when formulating enrollment plans, artificial intelligence accurately predicts the number of applicants and the appropriate enrollment scale for each major by analyzing historical enrollment data, major application trends, job market demand, and other big data. This avoids the problem of unreasonable enrollment plans caused by human judgment errors, making the enrollment work more scientific and efficient. Universities can use artificial intelligence technology to build real-time monitoring and warning mechanisms, quickly grasp the usage of various resources, such as classroom usage, frequency of experimental instrument operation, etc., and optimize resource allocation. When there are problems with resource utilization, managers can respond quickly, such as taking timely measures to adjust classrooms or supplement teaching staff when the number of course selections suddenly increases, to ensure the safe progress of teaching activities. Teacher allocation also benefits from artificial intelligence. By integrating multi-dimensional data such as teacher evaluation, course requirements, and professional expertise, better scheduling plans can be generated, and teacher efficiency can be improved. Ultimately, precise allocation of educational resources can be achieved, and educational management efficiency can be comprehensively improved.

2.2.Promoting Personalized Education and Student Development

The intelligent mentor system is increasingly vital in supporting students 'academic and psychological development, as traditional education models often fail to address individualized needs. Powered by AI-driven analytics, this system comprehensively evaluates learning

progress, assignment quality, and assessment fluctuations to create personalized development plans. When detecting learning challenges in specific subjects, it instantly delivers targeted study materials and instructional videos to help students overcome obstacles. In psychological support, the system identifies potential issues by analyzing students' social media activity patterns, club participation, and online interactions, providing early intervention suggestions. The differentiated teaching management framework addresses diverse student needs through stratified categorization, tailoring instructional content and methods to each group. For high-achieving students with academic interests, the system recommends advanced courses and research projects; for those lacking practical skills, it offers corporate collaboration internships and hands-on training. Moving beyond standardized testing, the system employs multi-dimensional evaluation methods based on personalized learning trajectories, ensuring comprehensive assessment of academic achievements. This truly implements differentiated instruction that fosters holistic development for every student.

2.3.Promoting the Modernization and Innovation of Educational Governance

The emergence of intelligent education management provides an opportunity to break existing constraints, with its focus on building an integrated intelligent education management information platform to achieve instant information sharing and rapid circulation. Taking student affairs management as an example, processes such as leave requests and excellence evaluations can be efficiently handled online through intelligent systems, enabling relevant departments and personnel to obtain information promptly and take swift action, thereby significantly shortening the processing cycle. Departmental collaboration can also be deepened through a unified data platform, allowing departments such as academic affairs, student affairs, and finance to share student data via artificial intelligence systems, achieving more efficient coordination in policy formulation and implementation, thereby optimizing management efficiency, shaping a flat and collaborative governance structure, streamlining intermediate steps, and enhancing the scientific nature of decision-making and the effectiveness of execution. The application of intelligent education management has brought profound changes to education management. The digital transformation of intelligent education has become a wave of the times, with intelligent technologies emerging as the core engine for innovation in the intelligent education system. The pioneering application of artificial intelligence in the field of intelligent education management has established a replicable transformation paradigm. Numerous aspects of academic affairs management, administrative services, and even teaching and learning have taken on a new digital appearance due to the intervention of intelligent means, giving rise to intelligent online teaching platforms and increasingly mature smart library management systems. Such innovative practices are too numerous to list. As shown in the distribution of China's intelligent education application scenarios, the demonstrative effects of intelligent education management under the intelligent education system will continue to be unleashed, strongly driving the overall evolution of higher education toward deeper intelligence and digitization. (As shown in Figure 2)

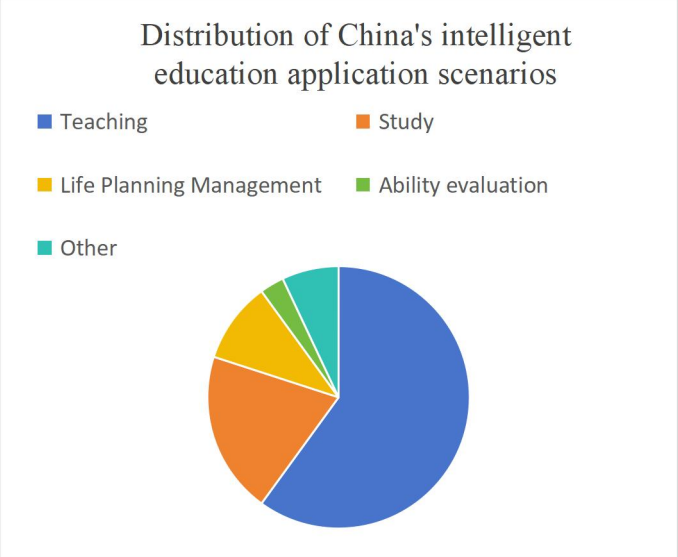

Fig.2. Distribution of China's intelligent education application scenarios

3.Reconstruction Strategy of Intelligent Education Management Innovation Path Driven by Intelligent Education System

3.1.Exploring the Innovative Integration of Technology and Education

xTo address the challenges posed by intelligent technologies in educational management, education authorities should spearhead the integration of research data and technical

insights from smart education systems. This involves establishing an open data-sharing network to advance intelligent education management and strengthen foundational theoretical research. Educators should be encouraged to conduct applied research based on frontline teaching and research needs, allowing practical applications to inform theoretical development and drive continuous innovation in "AI + Education". Building on this foundation, interdisciplinary exchange platforms should be developed to foster intellectual exchanges among educators from diverse fields, sparking innovative synergies. Through case studies and workshops, teachers should be motivated to explore how intelligent education management can enhance curriculum design and teaching strategies, thereby continuously improving educational quality. Concurrently, a robust evaluation system must be established to dynamically monitor the effectiveness of educational reforms and ensure the implementation of all measures.

3.2.Improving policy and regulatory support

The integration of artificial intelligence with higher education management requires policy and regulatory support to ensure standardized application and healthy development of the technology. The Chinese government has initiated a series of measures to promote innovation and application of AI in education. These policies and action plans reflect the nation's emphasis on educational modernization and its strategic layout to drive AI integration through policy guidance. With continuous technological advancements and improved policies, this integration will become more profound and extensive, necessitating further refinement of policies and regulations to promote the transformation of higher education management through legal and standardized approaches. First, it is essential to establish technical application standards for educational data, data usage principles, and data sharing scopes, define standardized procedures for open technology applications, and improve regulations for AI in education to ensure data security and digital copyright protection. Second, potential biases and discriminatory practices should be assessed, and effective systems should be established to identify, mitigate, and resolve potential harm.

3.3.Strengthen information security construction and build a comprehensive protection system

In the intelligent era, information security has become paramount in the digital transformation of smart education management. As technological advancement accelerates, data and information systems in this field face growing threats including data breaches, cyberattacks, and system failures. To ensure information confidentiality, integrity, and availability, it is essential to strengthen cybersecurity infrastructure through comprehensive protection frameworks. This requires implementing multi-layered safeguards such as firewalls, intrusion detection systems, data encryption technologies, along with robust security protocols and emergency response mechanisms. During the digital transformation of smart education management, adopting advanced cybersecurity technologies and establishing multi-tiered defense systems is crucial. Deploying efficient firewalls and intrusion detection systems enables real-time monitoring of network traffic, identifying and blocking potential threats. This approach effectively prevents hacker intrusions and malicious attacks, safeguarding critical school data and systems.

3.4.Strengthening professional training for teachers and administrators

The adoption of artificial intelligence in smart education management has charted a new course for teachers 'professional growth, equipped them with innovative tools, and set new benchmarks for educators. To implement smart education management, it is imperative to enhance training for both teachers and administrators, boosting educators' AI application skills to meet the demands of intelligent education systems. Concurrently, standardized protocols for AI usage must be established: in teaching, implementing scientific restrictions on student data access; in research, requiring authors to rigorously label AI-generated content and take responsibility for its accuracy; in administration, preventing data security breaches or biased conclusions caused by human errors.

Conclusion

This study conducts a comprehensive analysis of intelligent education management within the smart education

framework, examining both challenges and opportunities in this context. The research further highlights the value of intelligent transformation in educational administration, focusing on three key dimensions: enhancing management efficiency and precision, advancing personalized education for student development, and promoting modernization and innovation in educational governance. By identifying existing issues and opportunities in intelligent education management, the paper proposes strategies to reconstruct innovative pathways under the smart education system. These include exploring innovative integration of technology and education, improving policy and regulatory support, strengthening information security infrastructure, establishing comprehensive protection systems, and enhancing professional training for educators and administrators. These measures aim to ensure intelligent education management fulfills its essential role in promoting educational equity and improving educational quality.

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