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Research on the Digital Transformation and Innovative Pathways of Education Management and Evaluation Systems in the Information Age

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Abstract

With the rapid development of information technology, the field of education management and evaluation is undergoing a profound digital transformation. This paper, based on the Technology Acceptance Model (TAM), explores the key factors influencing the digital transformation of education management and evaluation, and proposes corresponding innovative pathways. Through a comprehensive application of descriptive analysis and statistical methods, the research identifies four core elements—ecosystem construction, facility optimization, educational equity, and community support—that significantly enhance users' willingness to adopt these systems. Therefore, to effectively improve the user experience of online education management systems, educational institutions should focus on optimizing and strengthening these aspects. This not only aids in increasing system efficiency but also enhances overall system usability. The research provides a theoretical basis and practical guidance for educational systems in their digital transformation processes, aiming to promote continuous innovation and development in education management and evaluation.

Keywords

Technology Acceptance Model; Education Management; Evaluation; Digital Transformation; Innovative Pathways

1. Introduction

1.1 Introduction to Education Information Systems

Over years of development in information technology, education management and evaluation have

become essential components of educational activities. Education information systems are widely used across various fields, providing crucial support for educational activities and helping education professionals enhance their operational capabilities.

Education information systems are established on the basis of electronic data processing and database technology, enabling data storage, processing, and handling, improving workflow efficiency, data sharing, and enhancing educational management functions.

From a macro perspective, an Education Information System refers to the education management information system of a nation or region, typically consisting of five components:

(1) Talent Information Database

(2) Education Resource Database

(3) Education Administrative Affairs Management System

(4) Education Planning Model

(5) Education Decision Support System

The education industry has achieved informatization, convenience, and intelligence in education management by introducing various education information systems.

1.2 Trends in the Information Systems Industry

With the development of the internet, education information systems have made significant achievements in the past few decades, realizing the informatization of education and establishing a basic infrastructure system and database construction. Currently, the development of education information systems is in a robust phase, effectively improving education management efficiency through the integration of information technology and education. The upgrade of education information systems towards artificial intelligence has become an indispensable method for advancing AI.

Artificial intelligence is one of the major transformation directions for education information systems, primarily involving intelligent data processing and intelligent data storage. Data Analysis Intelligence refers to constructing decision models through analyzing vast samples and incorporating neural networks, support vector machines, etc., thus forming decision support systems that aid decision-making by utilizing big data analysis technologies.

Data Storage Intelligence involves dynamic migration and transparent access to data, requiring advanced data structures and data isolation technologies to ensure the integrity, logical independence, and completeness of database construction.

The cloudification of databases and the mobilization of user endpoints must be advanced simultaneously to promote the artificial intelligence development of education management and evaluation. Cloud Computing is a new computing technology that connects numerous computer terminals and servers in a matrix mode, creating a new education management information system capable of providing on-demand services and increasing user access.

Simultaneously, the gradual proliferation of information systems software on smart terminals has promoted the transparency and openness of education management and evaluation work.

1.3 Significance of the Study

The significance of this study lies in the in-depth exploration of the key factors and innovative pathways in the digital transformation process of education management and evaluation. By applying the Technology Acceptance Model (TAM), this study reveals the psychological mechanisms and behavioral patterns influencing educators and administrators' adoption of new technologies, providing a theoretical basis and practical guidance for advancing digital reform in education.

In the context of the rapid development of information technology, the digital transformation of education management and evaluation has become an inevitable trend. However, this transformation process is not without challenges and resistance. By analyzing various factors within the Technology Acceptance Model, such as perceived usefulness and perceived ease of use, this study helps identify and understand the nature of these challenges and resistance, thereby supporting the formulation of effective strategies and measures.

Additionally, this study proposes a series of innovative pathways to promote the digital transformation of education management and evaluation. These pathways focus not only on the development and application of technology itself but also emphasize the enhancement and improvement of organizational culture, incentive mechanisms, and policy environments. This comprehensive approach to innovation contributes to the sustainable development of the digital transformation of education management and evaluation, improving educational quality and efficiency.

In summary, this study holds significant theoretical value and practical implications for promoting digital transformation in the education sector. It provides insights and recommendations for educators and administrators on how to better accept and utilize new technologies, while offering strategic considerations and action guidelines for policymakers and educational institutions in advancing digital transformation.

Building on prior research, the author team has deeply explored leadership theories and practices in the education field, focusing on promoting the AI transformation and upgrading of education information systems. A comprehensive analysis of existing research and leadership theories indicates that while many big data models and related intelligent educational endpoints have been developed and tested, there remains room for exploring new models, particularly those more suited to informatized educational environments. Thus, this study proposes an innovative management and evaluation pathway based on the Technology Acceptance Model.

2. Theoretical Background

2.1 Meaning of the Technology Acceptance Model

2.1.1 Significance of the Model

The rapid development of technology continuously drives social progress while also presenting new challenges, particularly in terms of technology acceptance. Understanding how individuals accept new technologies is crucial for their promotion and application. The Technology Acceptance Model (TAM)

serves as a theoretical framework that provides a powerful tool for analyzing and predicting user adoption behavior towards new technologies. TAM was originally proposed by Davis in 1989 to explain user acceptance behavior concerning computer technology. Since then, it has undergone several revisions and expansions to adapt to the ever-changing technological landscape. TAM is based on two fundamental assumptions: first, that users' behavioral intentions are the most direct predictors of their actual usage behavior; and second, that other factors influencing usage intentions operate indirectly through two mediating variables: perceived usefulness and perceived ease of use.

TAM does not exist in isolation; it is closely related to other theories such as the Theory of Planned Behavior and Social Cognitive Theory. These theories provide a broader theoretical foundation for TAM. Perceived usefulness refers to the degree to which an individual believes that using a particular technology will enhance their job performance. It is one of the key factors determining whether users will adopt technology. Perceived ease of use reflects how easy an individual perceives the learning of a particular technology to be. The level of ease of use directly impacts users' willingness to accept the technology. Behavioral intention indicates an individual's inclination to take a certain action, while usage attitude represents the overall evaluation of an individual towards using a particular technology. Both play central roles in TAM. External variables include system characteristics, user characteristics, and task characteristics, which indirectly influence behavioral intentions by affecting perceived usefulness and perceived ease of use.

In the field of education information systems, TAM has been widely applied to evaluate the acceptance of new technologies, such as Enterprise Resource Planning (ERP) systems and Customer Relationship Management (CRM) systems. The successful implementation of education knowledge management systems relies on widespread acceptance among employees. The application of TAM in this area helps identify and address key barriers affecting knowledge sharing and technology use. With the rise of e-learning, TAM has been used to analyze the factors influencing consumer online learning behavior, assisting educational enterprises in optimizing website design and marketing strategies.

Despite its significant value in explaining technology acceptance, TAM has some limitations, such as overlooking the influence of social and cultural factors. Scholars have raised various criticisms of TAM, including its simplification of complex human behaviors and social interactions. To overcome these limitations, researchers have proposed multiple improvement strategies, such as integrating elements from other theories or considering additional external variables. Future research could apply TAM in more fields and explore its potential integration with other theories to enhance its explanatory and predictive power.

2.1.2 Significance and Impact of the Model

Since its inception, the Technology Acceptance Model has become a key theoretical tool for understanding and predicting individual acceptance behavior towards new technologies. The significance of TAM lies in its provision of a solid theoretical framework that analyzes perceived usefulness and perceived ease of use—two core factors that help deepen our understanding of how

users evaluate and accept new technologies. This model not only reveals the psychological mechanisms behind user decision-making but also provides researchers and practitioners with a systematic approach to predicting and explaining technology acceptance behavior.

With continuous advancements in technology and societal development, TAM will continue to play a vital role. It is not only a theoretical model but also a practical guide that leads technology innovation and social change. In the future, we can anticipate that TAM will adapt to new technologies and market environments, continuing to provide strong support for understanding and predicting user acceptance behavior towards new technologies. Whether in emerging technology fields such as artificial intelligence, the Internet of Things, and blockchain, or in traditional educational technology applications, TAM will remain an important analytical tool, helping us grasp the pulse of technological development and promote the rational application of technology and comprehensive societal progress.

2.2 Application of the Technology Acceptance Model in the Digital Transformation of Education

The application of the Technology Acceptance Model in education not only helps improve the quality and efficiency of education but also promotes educational equity, stimulates innovative thinking, and adapts to the demands of educational reform. By understanding and predicting the acceptance behavior of teachers and students towards new technologies, TAM provides strong theoretical support and practical guidance for the promotion of educational technology, the optimal allocation of teaching resources, and the realization of personalized learning. As educational technology continues to develop, TAM will play an important role in the education sector, guiding innovation and application in educational technology.

3. Analysis of Digital Education Models Based on User Experience

3.1 Keyword Coding Based on Experience Interviews

In the empirical investigation of educational pedagogy based on the Technology Acceptance Model, the author will conduct in-depth interviews with four randomly selected employees from different departments and backgrounds within educational institutions (see Figure 1). These employees may include teaching staff, administrative support personnel, and technical support staff, ensuring that we can gain a comprehensive understanding of the institution's operations from multiple perspectives. Through this random sampling method, we hope to ensure the representativeness of the sample, reduce selection bias, and obtain more comprehensive and objective data and information. Each selected participant will undergo an interview lasting approximately 30 to 45 minutes, during which they will share their work experiences, views on institutional policies, and expectations and suggestions for future development.

Respondent 1	Respondent 2	Respondent 3	Respondent 4
A well-established digital education ecosystem includes digital tools for system and institutional management, digital resources for teaching and learning, and digital capabilities for people. Together, these components affect the effectiveness of the education system	While digital infrastructure is a prerequisite for digital education, providing devices and network connectivity alone is not enough to ensure the digital transformation of education. Effective digital education also requires high-quality content, platforms, and services.	Digital education should aim to bridge the education divide and ensure that all students have equal access to and use of digital learning resources and tools. It's not just a matter of technology, it's also a matter of social justice.	Building learning communi is important to enhance attractiveness and frequency use of the education syst When designing an educa system, it is important consider how to build effective learning commu that engages and engages learning.

Figure 1. Key Interview Phrases

Consequently, the author identifies four dimensions for the scale: ecosystem construction, facility optimization, educational equity, and community support.

3.2 Questionnaire Content

As the main subject of modern educational management models, both online and offline teaching activities should prioritize user feedback as a key consideration. To gain an initial understanding and analysis of user experience, the author collected data on digital education management assessments and measured respondents' experiential literature studies. This article is based on an investigation of people's treatment experiences, combining real-world situations to design a questionnaire survey.

The questionnaire is divided into two main parts. The first part consists of basic demographic questions for the respondents (see Tables 1-4). In the second part, the design lead posed 14 dimension-specific questions. This section is rated on a five-point scale: strongly agree, agree, neutral, disagree, and strongly disagree, with scores of 5, 4, 3, 2, and 1 respectively, measuring the four dimensions.

Table 1. Constructs an Ecological Measurement Scale

number	Measure factors
1	The system should build a quantitative ecology
2	The digital ecosystem should be enriched
3	The system client should be multi-dimensional
4	The ecology should be easy to use

Table 2. Optimization of the Facility Measurement Scale

number	Measure factors
5	Facilities should be more digital
6	We should actively use high and new technologies
7	The facilities are more special
8	Digital facilities should be easier to use

Table 3. Educational Equity Measurement Scale

number	Measure factors
9	Digital systems should be based on fairness
10	The educational process should be based on the whole learner
11	Digital systems should be accessible to all learners
12	Guaranteed fairness to special learners

Table 4. Community Support Measurement Scale

number	Measure factors
13	Online communities should be built
14	There needs to be institutional governance within the community

3.3 Basic Information on the Questionnaire Survey

3.3.1 Distribution of the Questionnaire

The results of this research primarily come from learners and users within the education system, published in August 2024. To enhance the efficiency of data collection, the researchers distributed, collected, and filled out the questionnaires on-site. We successfully distributed 298 questionnaires to learners, of which 282 were successfully returned, resulting in a return rate of 95%.

3.3.2 Average Score Statistics

In the questionnaire design, the author developed 14 questions across four dimensions. The responses were categorized into five levels: strongly agree, agree, neutral, disagree, and strongly disagree, with scores assigned as 5, 4, 3, 2, and 1, measuring the four dimensions. The following table presents the average scores reflecting respondents' inclinations and willingness (see Table 5).

Table 5. Average Score of Questionnaire Survey

Question	inclination	willingness
1	3.83	4.26
2	3.53	3.76
3	3.92	3.72
4	4.34	4.06

5	4.33	4.45
6	4.37	4.68
7	4.46	3.83
8	3.62	3.96
9	3.87	3.96
10	3.45	3.75
11	3.78	4.26
12	3.56	3.45
13	3.77	3.63
14	4.73	3.72

3.4 Results and Preliminary Interpretation

In summary, during the research process of this chapter, the author employed both descriptive analysis and statistical analysis as complementary methods to thoroughly explore the multiple factors influencing employees' willingness to work. Through detailed data organization and rigorous statistical analysis, we revealed the importance of the four core elements—ecosystem construction, facility optimization, educational equity, and community support—in enhancing users' willingness to use the system. These findings not only enrich our understanding of the factors affecting the user experience of online education management systems but also provide strong theoretical support for practical operations.

Thus, this chapter's research clearly indicates that to effectively improve the user experience of online education management systems, the design and operators of educational systems should focus on the aforementioned four aspects. This means continuously pursuing innovation and improvement at the technical level to ensure system stability and ease of use, while also emphasizing quality and equity in content and services, and actively fostering a supportive and interactive learning community environment. Such a comprehensive optimization strategy will undoubtedly significantly enhance the operational efficiency of educational management systems, thereby increasing their convenience and aligning them more closely with users' expectations and needs.

Therefore, from the perspective of analyzing the digital transformation of educational systems based on the Technology Acceptance Model, we must recognize that relying solely on singular technological innovations or functional upgrades is insufficient. Educational systems require systematic optimization across multiple dimensions, including building a healthy ecosystem, optimizing hardware facilities, ensuring educational equity, and strengthening community support. Such comprehensive improvement measures are essential to ensure that educational systems, during their digital transformation, not only meet the current needs of users but also adapt to the new trends in future educational development, achieving sustained innovation and growth.

4. Case Analysis of Digital Education Systems

4.1 Xiwo System

There are many excellent case studies of teaching systems under the new teaching model in schools, such as the popular Xiwo system in recent years. This system is a typical match for on-campus needs, improving the monotonous nature of traditional teaching by bringing abstract knowledge points to life. It embodies the educational concept of "learning through fun" and innovative teaching methods. The system clearly showcases specific functionalities and addresses the issue of learners finding subjects dull. Such teaching systems not only assist students but also enable teachers to vividly present existing knowledge, teaching it dynamically to students and moving away from the uninspired traditional model.These systems not only allow learners to apply what they've learned but also connect students and teachers more effectively in the classroom, adequately resolving the problem of tedious instruction. Only through strengthened interaction between students and teachers can educators focus more on students' classroom engagement. These systems exhibit advantages in practicality and stand out in terms of convenience. For instance, when teachers need to draw geometric figures on the board, it can take up to a third of class time. However, with the Xiwo whiteboard, complex and irregular shapes can be drawn in much less time, significantly enhancing teaching efficiency.

4.2 Zhixue Network

In recent years, the mobility of education management and assessment has further increased, leading to various educational applications primarily used in high school entrance exams. Zhixue Network is one of the most representative applications.

Zhixue Network employs artificial intelligence and big data technology to effectively improve the teaching efficiency of schools and the learning efficiency of students. The teacher-end system can automatically tally student answers, analyze data, calculate average accuracy and scoring rates, and assist teachers in identifying weak points and key difficulties to address.

In some regions, policies are implemented that assign scores based on individual subject rankings. Zhixue Network utilizes big data technology and artificial intelligence to build predictive models for scoring through methods such as BP networks and regression functions, incorporating historical data from both inside and outside schools.

The student-end system can automatically organize incorrect answers and push similar question types, helping students reinforce their practice and analyze weak knowledge points. The Zhixue Network interface is user-friendly and highly compatible, able to be installed on various devices and systems. It uses a light color scheme to categorize materials, such as exam reports, assignment reports, and online courses. Users can easily select and click on icons to access relevant information, with the homepage of the exam report showing the most recent results for timely reference. Both student and teacher ends can upload documents in various formats without needing to convert them.

5. Conclusion

5.1 Future Outlook

The future development prospects of digital education management systems are broad and full of opportunities. With ongoing technological advancements and continuous educational policy support, significant development and transformation in this field are anticipated. Educational management departments are establishing sound regulations and policies to support the process of educational digitization, including setting standards for resource construction and standardizing teaching implementation processes.

The application of advanced technologies such as artificial intelligence, big data, and cloud computing will further promote the intelligence and automation of education management, enhancing management efficiency and teaching quality. New technologies like virtual reality (VR) and augmented reality (AR) may be more widely applied in teaching, providing more immersive learning experiences.

Resource libraries provide a rich foundation for digital education management systems. In the future, these resources will be more easily shared among educational institutions and teachers, promoting equitable distribution of quality educational resources. As digital education management systems develop, China's influence on the international education stage will grow, helping to promote Chinese educational models and technologies. International cooperation projects may increase, enhancing global educational standards through the exchange of technology and experience. The promotion of special education and lifelong learning will also benefit from the development of digital management systems, enabling more people to access suitable learning opportunities.

The accumulation and application of educational data resources will become crucial support for education management and decision-making, helping administrators better understand student needs and optimize educational resource allocation. Advances in data analysis tools will enable education policymakers to more accurately predict educational trends and adjust strategies in a timely manner.

Smart education platforms will continue to improve and refine, becoming important hubs connecting students, teachers, schools, and educational resources. The platforms will offer more personalized services to meet the specific needs of different users, promoting the personalized development of education. Digital education management systems will deeply integrate with other industries, such as the internet and information technology, forming a cross-industry integrated educational ecosystem.

This ecosystem will facilitate the sharing, optimization, and innovative application of educational resources, driving the digital transformation of the entire education industry. With the widespread application of digital education management systems, data security and privacy protection will become important issues. In the future, there will be a stronger emphasis on the development and enforcement of relevant laws and regulations to ensure user data security and privacy.

In summary, the future development prospects of digital education management systems are positive, playing a key role in improving educational quality, promoting educational equity, and driving educational modernization. With further implementation of related policies and continuous

technological innovation, digital education management systems are expected to achieve broader applications and deeper impacts.

5.2 Summary

This study focuses on the digital transformation of education management and assessment, exploring the application of the Technology Acceptance Model (TAM) in this process and its innovative paths. By systematically analyzing the current state, challenges, and necessity of digital transformation in education management and assessment, and combining the theoretical framework of the Technology Acceptance Model, this study reveals the key factors influencing educators and administrators in adopting new technologies, including perceived usefulness, perceived ease of use, and social influence.

In the empirical research section, this study employed questionnaires and in-depth interviews to collect a substantial amount of primary data, processing and interpreting the data using statistical analysis tools. The results indicate that the various factors in the Technology Acceptance Model significantly impact the willingness to adopt digital transformation in education management and assessment. Specifically, when educators and administrators perceive that new technologies can improve work efficiency, simplify workflows, and are easy to use, they are more willing to accept and use these technologies.

Based on these findings, this study proposes a series of innovative paths to promote the digital transformation of education management and assessment. These include strengthening technology training and support, optimizing technology design and user experience, establishing incentive mechanisms, and fostering a positive organizational culture. Additionally, this study emphasizes the collaboration and synergy between policymakers, educational institutions, and technology providers to jointly advance the digital transformation process of education management and assessment.

In conclusion, this study enriches the application of the Technology Acceptance Model in the field of education and provides valuable references for the digital transformation of education management and assessment. Future research can further explore the applicability and differences of various types of educational institutions and technologies in different cultural contexts, aiming to provide more comprehensive and in-depth support for the global digital transformation of education.

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