

Strategies and Practices in Building an Informationized Ecological System for Higher Education Administrative Management

Teng Ma¹, Zhidong Qu^{1,*}, Jiaqi Fan², Qian Liu³

¹Baotou Open University, Baotou, Inner Mongolia, China

²Inner Mongolia Open University, Hohhot, Inner Mongolia, China

³Inner Mongolia University of Science & Technology, Baotou, Inner Mongolia, China

*Corresponding author

Keywords: Higher education management; informationized ecological system; technological integration; security and privacy

Abstract: With the rapid development of information technology, higher education administrative management faces increasingly complex challenges and opportunities. This paper discusses the strategies and practices in constructing an informationized ecological system for higher education administrative management. It analyzes current issues in the process of informatization and proposes corresponding optimization strategies. Through in-depth exploration of technological integration, security and privacy protection, and management philosophy and talent development, the aim is to provide theoretical support and practical guidance for the informatization of higher education management.

1. Introduction

The rapid development of informationization in higher education administrative management is not only an inevitable requirement to improve management efficiency and service quality but also a crucial means to meet new challenges in education. The widespread application of information technology has profoundly transformed the mode and methods of higher education management, shifting from traditional manual operations to digitized and networked management approaches. As the process of informationization advances, universities face various issues and challenges such as uneven technological application, security and privacy protection, and management philosophy and talent development. This paper aims to analyze the characteristics and existing problems of informationization in higher education administrative management, explore optimization strategies, and propose relevant recommendations to provide references and guidance for the further development and practical implementation of informationization in higher education management.

2. Characteristics of Constructing an Informationized Ecological System for Higher Education Administrative Management

2.1 Demand Analysis for Informatization

The demand analysis for informatization in higher education administrative management forms the foundation of the entire construction of the informationized ecological system. With the increasing complexity of educational management and the development of information technology, the urgency of informatization in universities is growing. The demand for informatization originates from diverse needs in educational management, including but not limited to student management, faculty management, and financial management. Efficient information systems are required to support information sharing among different departments, the coordinated utilization of educational resources, and the precise analysis and application of data at various stages of the educational process [1].

Informatization plays a crucial role in enhancing the efficiency of educational management and the quality of services. Through informatization, the digitalization, networking, and intelligentization of educational management processes can be achieved, facilitating rapid information flow and precise responses, reducing redundant operations and error rates, and improving work efficiency and management standards. For instance, through a student information management system, schools can real-time monitor students' learning progress, behavioral performance, and personalized needs, thereby conducting targeted educational management and service provision. Demand analysis for informatization also needs to consider the rapid evolution of information technology and the changing requirements of application. With the advancements in technologies such as artificial intelligence, big data, and cloud computing, higher education management systems also need continuous adjustment and upgrading to adapt to the application of new technologies and future development trends. Thus, demand analysis for informatization is not only about meeting current needs but also about preparing for the future, maintaining the continuous development and innovation of systems [2].

2.2 Technological Foundation and Platform Construction

The technological foundation and platform construction for informatization in higher education administrative management are crucial to supporting the operation of the entire informationized ecological system. The technological foundation encompasses aspects such as hardware facilities, software systems, and network environments, while platform construction involves system integration and application optimization based on this foundation. Constructing the technological foundation requires ensuring the stability and reliability of hardware facilities. Higher education informatization systems necessitate large-scale data storage and processing capabilities to handle increasing data volumes and complex application scenarios. Security is also a critical consideration in hardware facility construction to safeguard the security and privacy of educational data [3].

The selection and customization of software systems are core to platform construction. Different educational management needs require corresponding software support, such as student information management systems, faculty performance evaluation systems, and financial management systems. These systems need to integrate and share information effectively to enhance management efficiency and service quality. The construction of a network environment directly influences the stable operation of informatization systems and user experience. Universities need to establish high-speed, secure networks to support online application and remote access of educational management systems, ensuring smooth information flow and data security. Technological foundation and platform construction are not merely technical issues but also fundamental guarantees for constructing the

overall informatized ecological system. Through scientific planning and effective management, universities can establish an informatization technological foundation and platform system adaptable to future development needs^[4].

2.3 Management System and Process Optimization

Informatization profoundly impacts the optimization of management systems and processes in higher education administrative management. Traditional management systems often face issues such as delayed information retrieval and imprecise decision-making, whereas informatization applications can reconstruct management processes through digitalization and networking to enhance management efficiency and decision-making capabilities. Informatization reconstructs the basic framework and processes of educational management by establishing unified information platforms and standardized data systems, enabling interconnection among different departments to avoid information silos and enhance the scientific and holistic nature of management decisions^[5].

Informatization drives the intelligence and optimization of management processes. For example, through big data analysis and artificial intelligence technologies, precise predictions of student learning outcomes and personalized guidance can be provided, optimizing the allocation of educational resources and scheduling of teaching plans to enhance the personalized and refined level of educational services. Informatization also promotes the updating and innovation of management philosophies. Managers can obtain real-time data and market information through informatization systems to promptly adjust management strategies and business processes, thereby improving their ability to respond to market changes and competitive challenges. The informatization optimization of management systems and processes is not only a requirement for modernizing educational management but also a crucial pathway for universities to achieve sustainable development and enhance competitiveness. Through continuous optimization and innovation, universities can achieve comprehensive improvement in educational management efficiency and continuous enhancement in service quality^[6].

3. Challenges in Constructing an Informationized Ecological System for Higher Education Administrative Management

3.1 Imbalanced Technological Application and Information Silos

In the process of informatization in higher education administration, challenges such as uneven technological application and information silos are prevalent. There are significant disparities in the informatization levels and technological applications among different departments and colleges. Some colleges may invest heavily in informatization, possessing advanced management systems and technical support, while others lag behind due to limitations in funds, manpower, or technical capabilities. This imbalance results in uneven overall informatization levels, affecting the uniformity and consistency of management efficiency and service quality.

The issue of information silos manifests as data isolation and poor interoperability between different information systems. Each college or department may independently develop its own information systems, which differ in data formats, standards, and interfaces, making it difficult to achieve information sharing and exchange. The key to addressing the uneven technological application and information silo issues lies in promoting informatization integration and resource sharing. Universities can achieve this by formulating unified informatization development plans and standardized technical architectures, guiding coordinated planning for informatization construction across departments. Establishing cross-departmental, cross-system data interfaces and standards to facilitate interconnectedness is crucial to breaking down information silos. Universities can also

enhance the cultivation of information technology talents and build technical support systems, providing a unified technical service platform and support mechanism for all colleges and departments to promote balanced technological advancement.

3.2 Security and Privacy Issues

As the process of informatization advances, higher education institutions face increasingly severe security and privacy issues in educational management. These systems involve a large amount of sensitive data, including students' personal information, faculty work records, financial expenditures, and more. Unauthorized access or data breaches could severely impact the school's reputation and trust, potentially leading to legal liabilities and public relations risks. The complexity of information security threats is growing, encompassing network attacks, virus infections, and data leaks. Due to their large scale and numerous users, educational management systems often become prime targets for hackers and malicious software.

The key to addressing security and privacy issues lies in enhancing information security awareness and technical protection capabilities. Universities need to establish robust information security management systems, including strict data security policies and operational standards, and strengthen security education and training for faculty and administrators. Adopting advanced security technologies and encryption methods to safeguard data transmission and storage in educational management systems is crucial. Establishing regular security audits and vulnerability patching mechanisms to promptly identify and mitigate security risks are essential measures for ensuring information security. Addressing security and privacy issues requires not only technical support but also comprehensive strategies involving all personnel and systematic management, ensuring the secure and sustainable development of higher education management informatization processes.

3.3 Management Philosophy and Inadequate Talent Development

In today's rapidly advancing era of informatization, higher education management faces unprecedented challenges and demands for adjustment. There are significant differences between traditional management concepts and modern information management, necessitating comprehensive transformation and enhancement of managers' ideologies and capabilities. Traditional educational management often emphasizes the enforcement of rules and administrative orders, with managers typically relying on personal experience and interpersonal relationships to solve problems. In contrast, information management stresses data-driven and scientifically informed decision-making, requiring managers to possess stronger awareness of informatization and proficiency in data analysis.

Managers need to shift from transactional management to strategic and data-driven management models, which not only involve the application of technological tools but also pose a comprehensive challenge to decision-making abilities and leadership. There is a high demand in higher education for information technology talents who are proficient in various areas such as big data analysis, artificial intelligence applications, and information security. Currently, the overall informatization literacy among university faculty and staff is generally low, exacerbating the sharp contradiction between supply and demand in the information technology talent market. Universities face significant challenges in attracting and cultivating information technology talents, necessitating the establishment of robust training mechanisms and continuous technological updating plans.

To address the mismatch between management concepts and talent development, universities can implement a series of effective measures to enhance managers' awareness and capabilities in informatization. This includes organizing theoretical seminars on information management, sharing practical case studies, and offering interdisciplinary training courses to guide managers in updating their ideologies and cultivating data-driven decision-making skills. Establishing a comprehensive

mechanism for training information technology talents is also crucial. Universities can enhance faculty and staff's informatization capabilities and professional competence through methods such as bringing in external experts, establishing partnerships with industry enterprises, conducting internal training, and promoting technological exchanges.

Furthermore, universities need to comprehensively upgrade their institutional construction and management systems. This involves redesigning management processes, integrating informatization management tools, and optimizing organizational structures to meet the requirements of information management. Only through these comprehensive efforts can universities truly advance the continuous improvement of informatization management levels and quality, thereby providing solid support for the modernization and development of the education sector. Information management poses new challenges to higher education administration, requiring managers to update their ideologies, enhance their capabilities, and establish sound mechanisms for training information technology talents. Universities should actively respond to these challenges by implementing systematic reforms and innovations, achieving a modern transformation of management models, and injecting sustained vitality and momentum into future educational development.

4. Optimization Strategies for Constructing an Informationized Ecological System in Higher Education Administrative Management

4.1 Integration Strategy for Technology and Platforms

To address the uneven technological application and information silos in higher education administrative management, it is imperative to formulate and implement effective strategies for integrating technology and platforms. This approach not only enhances the overall efficiency of informatization systems but also optimizes resource allocation and management efficiency. The key lies in establishing unified informatization development plans and standardized technical architectures. Universities need to conduct comprehensive surveys and needs analyses to clarify the informatization requirements of various departments and colleges, and based on this information, establish unified technical standards and platform architectures. For instance, establishing unified data interfaces and standardized data formats facilitates data interoperability and integration between different information systems.

Promoting the integration and platformization of information systems is a crucial component of integration strategies. Universities can leverage modern integration technologies and platform services to establish unified informatization platforms, including student management systems, financial management systems, and faculty management systems. This ensures that these systems can achieve data sharing and business coordination. Through a unified platform, managers can facilitate cross-departmental and cross-system information exchange and collaboration, thereby enhancing management efficiency and the scientific basis of decision-making. Integration strategies for technology and platforms also require strengthening support for and cultivation of information technology talents. Universities can establish dedicated technical support teams responsible for platform operation and technical support, promptly responding to users' technical needs and issues.

By conducting information technology training and skills enhancement programs, universities can improve the informatization literacy and application capabilities of faculty and managers, enabling them to better utilize the integrated informatization platform for educational management and decision support. The key to technology and platform integration strategies lies in coordinated planning, standardized construction, and talent cultivation, to achieve efficient operation of information systems and overall enhancement. Only through comprehensive technological integration and platform construction can universities effectively address uneven technological application and information silos, and promote comprehensive improvement in the informatization

level of educational management.

4.2 Security and Privacy Protection Strategy

Against the backdrop of rapid informatization, higher education administration faces increasingly complex and severe challenges in security and privacy protection. As information technology advances rapidly, the digitization of educational management systems continues to increase. However, simultaneously, security threats have become more severe, posing unprecedented risks to user data privacy. To effectively address these challenges, universities urgently need to formulate and implement comprehensive security and privacy protection strategies to safeguard the security of educational management systems and protect user data privacy. Establishing a robust information security management system is crucial. Universities can develop stringent information security policies and operational guidelines, specifying rules for data acquisition, usage, and storage, and regulating the information security behaviors of faculty and managers. For instance, enhancing user permission management and access control ensures that sensitive information is accessed and used only by authorized personnel, effectively preventing the risk of internal data leaks.

Adopting advanced security technologies and encryption methods is essential for ensuring the security of data transmission and storage in educational management systems. Universities can implement multi-layered protection measures such as network security devices, firewalls, and intrusion detection systems to mitigate various network attacks and threats of data leakage. Conducting regular security vulnerability scans and assessments, and promptly addressing system vulnerabilities, are critical steps to enhancing system resilience against attacks and ensuring stability. In addition to technical measures, strengthening user security awareness education and training is also a vital component of protection strategies. Universities should regularly conduct information security training and emergency drills to enhance faculty and student capabilities in recognizing and responding to security threats, thereby bolstering overall security vigilance.

Only through a combination of technological measures and personnel education can universities effectively address the increasingly complex security challenges and protection needs. Security and privacy protection strategies must comprehensively consider factors such as technology, management, and personnel development to construct a robust information security defense line, safeguarding the security of educational management systems and user data privacy rights. On the path of informatization development, universities should continually optimize security strategies, allocate necessary resources and efforts to cope with future, more complex and diversified security challenges, thereby ensuring the steady advancement of educational informatization construction and reliable protection of data security for students and faculty alike.

4.3 Management Philosophy and Talent Development Strategy

As the mode of informatized management deepens, higher education administration needs to adapt to new management concepts and technological requirements. Developing effective management philosophies and talent cultivation strategies is crucial to enhancing the capabilities of managers in informatized management and overall management levels. Universities can achieve this by conducting training and exchange activities on informatized management philosophies, guiding managers to update their management concepts to meet the demands of informatized management. Traditional administrative management emphasizes directive management and paper-based document circulation, whereas informatized management emphasizes data-driven and scientific decision-making. Managers need to possess an informatized mindset, utilizing data analysis and information technology to optimize management processes and decision-making effectiveness.

Strengthening the cultivation and recruitment of information technology talents is the core content

of management philosophy and talent cultivation strategies. Universities can establish specialized teams of information technology professionals, recruiting individuals with high-level technical backgrounds and practical experience to provide technical support and assurance for informatized management. Conducting regular information technology training and professional certification can enhance the informatization literacy and technical skills of existing faculty and staff, enabling them to proficiently use information technology tools and systems. Universities can establish interdisciplinary and interdepartmental teams for informatized management to promote cross-disciplinary exchange and collaborative cooperation of informatized management philosophies. Through interdisciplinary team collaboration, various resources and professional knowledge in educational management can be better integrated, collectively promoting the improvement and innovative development of informatized management levels. The effective implementation of management philosophy and talent cultivation strategies can not only enhance the informatized management capabilities of higher education administrators but also promote comprehensive improvement and long-term development of overall management levels. Through continuous learning and practice, universities can adapt to the new requirements of informatized management, making positive contributions to the modernization and sustainable development of the education sector.

5. Summary

Building the ecological system of informatization in higher education management is a complex and ongoing process that requires systematic strategy design and comprehensive implementation plans. Through the in-depth discussions in this article on aspects such as technology and platform integration, security and privacy protection, and management philosophy and talent development, several conclusions can be drawn. The strategy of technology and platform integration is crucial for breaking information silos and optimizing management efficiency. It necessitates unified planning and standardized construction, along with enhanced training and support for information technology professionals. The strategy for security and privacy protection should comprehensively consider technological means, management norms, and user education. Establishing a robust information security management system is essential to ensure the security of educational management systems and the privacy protection of data. The strategy for management philosophy and talent development is a key factor for the successful management of informatization, requiring guidance for managers to update their concepts and enhance their skills to meet the new requirements and challenges of informatized management. Through effective optimization strategies, universities can achieve continuous improvement and enhancement in educational management informatization, laying a solid foundation for improving educational quality and comprehensive school development.

Acknowledgements

Fund project: The paper is one of the research achievements of the self-raised scientific research project of Inner Mongolia Open University in 2024 (No.IMRTVU-ZCR2408).

References

- [1] Tang, C. C. *Construction of the Informationized Ecological System for Student Management in Universities under the Background of "Double First-Class" Construction*. *Industry and Technology Forum*, 2022.
- [2] Gao, C. B., Wang, Y., Li, X., et al. *Construction and Practical Path of Smart Education Ecological System Framework*. *Modern Educational Management*, 2022(7):10.
- [3] Qin, Y. *Construction and Practice of Smart Classroom Ecosystem for Business English in Universities under the Informatization Background*. *China New Communications*, 2023, 25(1):206-208.

- [4] Yu, D. M. *Research on Construction and Balance Strategy of Intelligent Education Ecosystem in Universities*. *Computer Knowledge and Technology*, 2023, 19(16):164-167.
- [5] Dou, Y. F. *University Entrepreneurship Education Ecosystem: Conceptual Model, Evolution Mechanism, and Construction Strategy*. *Heilongjiang Higher Education Research*, 2022, 40(6):7.
- [6] Wen, L. *Development and Evaluation System Construction of Informatization in Higher Education Management*. *Journal of Jilin Agricultural University*, 2023, 32(5):30-34.