Exploration of the Improvement Paths of University Informatization Project Management Under the Background of Digital Campus

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Abstract: This study focuses on the optimization paths of university informatization project management under the background of digital campus. By analyzing the key problems and challenges such as poor management systems and mechanisms, insufficient depth of technology application, and resource integration dilemmas, and based on the whole-life cycle management theory and the mixed management concept of "rigid framework and flexible execution", a systematic four-dimensional improvement path framework of "system integration - intelligent drive - flexible management - security governance" is proposed. Research shows that the management foundation is reconstructed through system integration and data governance, process reengineering is driven by intelligent technology, and the unification of standardization and flexibility in project management is realized relying on improved management mechanisms. Meanwhile, a solid implementation support system is constructed from three dimensions: organization, system and technology, providing multi-faceted support for the digital transformation of project management. The research results provide theoretical and practical support for the reform of the digital governance paradigm of university informatization projects, and have important reference value for promoting universities to achieve high-quality digital transformation.

Keywords: Educational digitalization; Informatization project management; Whole-life cycle; Data Governance; Improvement paths

1. Introduction

1.1. Research background and significance

Amid the global wave of educational digital transformation, China has successively issued landmark documents such as the "Planning Outline for Building an Educational Power (2024—2035)" and "China Education Modernization 2035", clearly emphasizing the strategic task of "promoting the renewal of educational concepts, model reform, and system restructuring". The promotion of higher education digital transformation has become a core driving force for reshaping university governance systems and talent training models, and the

improvement of informatization project management is a key breakthrough in this reform. The level of university informatization project management is directly related to the effectiveness of digital transformation [1].

1.2. Domestic research progress

Research on university informatization project management in China presents the characteristics of "practice-led and theory-following". Tsinghua University took the lead in proposing a whole-life cycle-oriented project management system, including bidding, execution, and customer feedback [2]. Dalian University of Technology implemented the overall management idea of "project warehousing and three-year rolling", realizing the overall planning of the three-year construction cycle through rolling management of the project library [3]. Ji Ya [4] explored the architectural design of informatization systems using database technology and constructed an informatization management model suitable for university needs. Sun Qiang, Wang Shixian, et al. [5-6] analyzed the existing problems and their causes in the informatization construction of universities, and put forward suggestions and measures for the construction of systems and mechanisms to promote the scientific management of university informatization projects. Li Jiangjing [7] proposed a multi-participation strategic improvement strategy for university digital transformation by analyzing the opportunities and challenges brought by new technologies such as artificial intelligence to university informatization construction. These practices indicate that domestic research is transforming from decentralized construction to integrated governance, but the construction of the theoretical system is still insufficient.

1.3. Foreign research progress

The exploration of improvement paths for university informatization project management by foreign scholars and practical institutions is characterized by strategic focus, technology integration, and deepened governance. Research shows that effective university informatization project management relies on a hierarchical and collaborative governance structure and dynamically iterative strategic planning. Princeton University has established the IT Strategic Advisory Group (SAGIT) led by the provost as the highest decision-making body, with three domain committees for administration, teaching, and scientific research, forming an IT governance system structure of top-level overall planning and multi-subject collaboration [8]; universities such as Harvard University and Yale University are shifting from static multi-year planning to dynamically adjusted agile planning. In addition, the application of artificial intelligence has brought new opportunities for university informatization project management, such as Harvard University's "AI Sandbox" and Stanford University's "AI Playground" projects [9]; the European Union has proposed a series of digital measures for university project management to achieve information sharing and business process collaboration adaptation for the sustainable development of higher education digitalization [10]. The Joint Information Systems Committee (JISC) of the United Kingdom proposes making decisions based on data and evidence and conducting regular reviews to ensure rapid adaptation to changes. These studies collectively reveal that foreign university informatization project management is evolving towards strategic leadership, technology empowerment, agile iteration, and in-depth collaboration.

2. Problems and challenges in university informatization project management

2.1. System isolation and lack of data governance

Current university informatization project management faces severe challenges of system fragmentation and data separation. Each department independently builds business systems without a unified management platform

and interface standards, resulting in serious "data silos" and "process breakpoints", leading to fragmented user experience and low efficiency [11]. At the data level, there is a lack of a systematic governance framework, with inconsistent data standards and missing sharing mechanisms. The value of data assets is difficult to realize, making it impossible to achieve business collaboration and overall visual management, which directly affects the scientificity and management efficiency of project decisions.

2.2. Traditional processes and low approval efficiency

Traditional project management processes rely on manual processing, lack intelligent support, and have significant efficiency bottlenecks. Redundant process nodes lead to long approval cycles, seriously affecting project progress [12]. There is a lack of intelligent process engine tools, making it impossible to realize flexible circulation methods such as automatic condition triggering and intelligent jumping. At the same time, insufficient mobile terminal support and imperfect message reminder mechanisms prevent precise push and real-time response. This inefficient process management is difficult to adapt to the rapidly developing needs of university informatization construction [13].

2.3. Rigid management mechanisms and insufficient collaboration

The university informatization project management mechanism has not yet achieved effective coverage of the whole-life cycle and refined classification management. On the one hand, project management mostly stays at the two ends of project approval and acceptance, lacking process supervision and dynamic regulation, leading to execution deviations and resource waste; on the other hand, the "one-size-fits-all" management model is common, failing to implement differentiated control according to project scale and type, making it difficult to balance compliance and flexibility [14].

3. Corresponding solutions for improving university informatization project management

3.1. System integration and reconstruction of data governance foundation

First, construct a comprehensive management platform for informatization construction projects with a unified entrance and user-perceived transparency, connect interfaces between related business systems, and realize data interoperability through in-depth integration of multiple systems. All relevant file data of projects can be viewed on the management platform, making the operation of informatization projects across the university clear at a glance [15]. In-depth system integration includes: integration with unified identity authentication to realize single sign-on and permission management; integration with public data platforms to support automatic acquisition of project data; connection with financial systems to synchronize project settlement information and fund status in real time; connection with asset management systems to realize linkage of asset accounting, etc. Second, breaking data silos requires the governance and classification reconstruction of educational data. Educational data can be classified into five dimensions: achievement data, management data, shared data, behavioral data, and resource data, transforming data management from passive response to active planning.

3.2. Intelligent-driven process reengineering

Traditional informatization project management processes face the problem of low efficiency, requiring the introduction of intelligent process engines to innovate and reengineer project management processes. First, based

on a low-code platform, quickly and flexibly develop process forms for informatization project management on demand, customize business process links and circulation rules through graphical tools, covering links such as application, approval, procurement, construction, acceptance, and settlement. The platform adopts "drag-and-drop form design" to reduce technical thresholds, allowing business departments to independently configure simple processes, while the Information Technology Center retains the right to review technical specifications. Second, AI empowers intelligent supervision, introducing automatic triggering mechanisms to support intelligent circulation methods such as time triggering and conditional jumping, reducing unnecessary waiting time for process circulation. At the same time, by building a large model of informatization projects, intelligently analyze and evaluate the informatization project documents submitted by users, intelligently circulate and accurately deliver approvals, and improve the efficiency of project processing and circulation. Third, implement multi-terminal and multi-channel intelligent reminders, integrate with a unified messaging system, and support the push of to-do reminders and scheduled reminders through short messages, DingTalk, WeChat, emails, etc. Driving the reengineering of the informatization project management processes through intelligent means helps shorten the average approval and processing cycle of projects and improve the efficiency of project management and processing.

3.3. Improve and optimize management mechanisms

Improve and optimize the informatization project management mechanism to achieve both standardization and flexibility in project management. First, establish a whole-life cycle management mechanism for informatization projects, including the entire process management from project application, expert approval demonstration, fund allocation, project procurement, contract registration, project implementation, project modification, project acceptance, project payment and settlement, project asset accounting and warehousing, project commissioning and operation, to project decommissioning.

Second, implement dynamic management of the project library: adopt a three-level library classification of "application - reserve - approval", with a validity period of 2 years for projects in the reserve library, which need to be re-demonstrated after expiration. Third, implement classified project control: adopt flexible and differentiated control for projects of different scales and types. The classified control model not only ensures the quality of key projects but also respects the autonomy of colleges and departments, achieving a management balance of "rigid framework and flexible execution".

Fourth, strengthen the control of key nodes: focus on the management of five key nodes in the management process, including expert approval demonstration, project procurement, project implementation, project acceptance, and project payment and settlement, and set quality red line indicators. Fifth, construct a "grid member system", where the Information Technology Center assigns full-time technical personnel to each informatization project construction unit. Grid members are responsible for guiding the writing of project application forms, technical communication and coordination, pre-review of acceptance materials, etc. This system effectively bridges the gap in technical capabilities of business departments and builds a collaborative link between "management and construction".

4. Implementation support for the digital transformation of university informatization project management

4.1. Organizational support

The organizational structure of the informatization project management should be reorganized and governed,

and a special leadership team responsible for digital transformation should be established from a university-wide perspective. The team needs to have a high level of professional literacy and overall planning capabilities to ensure the smooth progress of digital transformation work. At the same time, a three-level organizational structure should be established. The core of this system is a network information leading group headed by university leaders, which is mainly responsible for scientific decision-making on major matters. Next, the Information Technology Center undertakes the task of overall coordination, transforming high-level decisions into specific implementation plans, and reasonably allocating and scheduling resources. Finally, the specific implementation work is completed by the secondary informatization construction departments of the university. These secondary departments directly connect with the needs of teachers and students, and can flexibly adjust implementation strategies according to actual conditions, ensuring that the entire digital transformation process is both efficient and in line with actual needs. Through such a three-level system, seamless connection from decision-making to execution is achieved, providing a solid organizational guarantee for the university's digital transformation.

4.2. System support

A comprehensive system framework, including project management, data management, and security management, should be constructed. First, the "Measures for the Management of Informatization Projects" should be formulated, which will specify the entire life cycle management process of informatization projects, including specific operational norms for each link, such as project application, approval, procurement, implementation, acceptance, and post-evaluation, to ensure that the project can proceed in an orderly manner and achieve the expected goals. Formulate the "Data Standard Specifications", which will uniformly define data formats, coding rules, exchange methods, etc., involved in the system, providing a solid foundation for data interoperability and sharing across departments and systems. At the same time, formulate the "Measures for the Management of Informatization Data Resources", clarifying the management requirements for the collection, storage, use, sharing, and destruction of informatization data resources, thereby improving the utilization efficiency of data resources and ensuring data security and integrity. In addition, the "Measures for Network Information Security Management" should be issued, covering network security protection, information security management, emergency response mechanisms, etc., aiming to build a more sound network information security guarantee system, prevent various potential security risks, and ensure the stable operation of informatization systems. The formulation of the above management measures and specifications will provide strong institutional support for the organization's informatization construction.

4.3. Technical support

University informatization project management needs to rely on a multi-level technical support system to ensure the smooth progress and long-term operation of the project. First, cloud computing and virtualization technology are the basic support. Through private cloud or hybrid cloud platforms, elastic allocation and intensive management of computing and storage resources are realized, reducing infrastructure costs. Second, big data and data analysis technology are crucial. By building a data middle platform, the interconnection between the data middle platform and API gateway is realized, breaking data silos between various business systems, achieving unified identity authentication and business process collaboration, and supporting decision optimization and personalized services. In addition, software development and integration technologies (such as microservice architecture) can realize modular development of systems and compatibility with existing systems, improving system scalability and maintainability. Network security technologies include unified identity authentication,

access control, and threat monitoring to ensure the security of campus networks and sensitive information. Finally, project management and collaboration tools (such as low-code platforms) can accelerate the development of lightweight applications, meet personalized needs, and assist team collaboration, progress tracking, and process automation. In summary, these technologies collectively build an end-to-end support from underlying infrastructure to top-level applications, promoting the development of university informatization towards intelligence, collaboration, safety, and reliability.

5. Conclusion

The digital transformation of university informatization project management is a systematic project in the process of education modernization. Focusing on the core issue of improving the efficiency of university informatization project management in the background of educational digital transformation, this study systematically analyzes the current key challenges such as poor management systems and mechanisms, insufficient depth of technology application, and resource integration dilemmas. Based on the whole-life cycle management theory and the mixed management concept of "rigid framework and flexible execution", it proposes a systematic solution path and a guarantee system. This study not only provides an operable practical framework for university informatization project management but also enriches the connotation of educational digital governance at the theoretical level, which has important reference value for promoting universities to achieve high-quality digital transformation. Future research can further explore the application of educational large models in project risk assessment and the school-based practice of digital ethics frameworks. Only through continuous theoretical innovation and practical iteration can university informatization project management be continuously optimized in dynamic adaptation, constructing a new paradigm of informatization project management that is both in line with the laws of higher education and highly efficient, and truly empowering the construction of a high-quality education system.

Disclosure statement

The authors declare no conflict of interest.

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