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Current status and countermeasures of smart campus construction: a case study of Sichuan University of Arts and Science

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Abstract. In today's digital era, a sweeping wave of informatization is transforming the education sector. It is imperative to advance educational informatization and to improve the quality of teaching and learning. Over the past two years, guided by an innovation-driven, service-oriented philosophy, the institution has steadily promoted practical applications of educational information systems and explored effective approaches to deeply integrate informatization with pedagogy, yielding a series of notable achievements. The smart campus system has served as a platform for teacher–student connectivity, and the institution continues to innovate its information models. While smart campus systems offer significant advantages in streamlining and integrating information, data security remains a critical issue that cannot be overlooked in campus operations. This paper examines the current status of the smart campus and provides a comprehensive analysis along with constructive recommendations for future informatization development strategies.

Keywords: educational informatization, smart campus system, data security

1. Introduction

In the present era, information technology has surged like a tidal wave, profoundly transforming virtually every sector of human society—including education.

The origins of educational informatization trace back to the early days when computer technology was first introduced into schools. At that time, computers—then a novel technology—were cautiously adopted by schools, primarily to support instruction and administrative tasks. Teachers began experimenting with computers to develop simple courseware, presenting dry text and abstract concepts in visually enriched formats—an unquestionable innovation in pedagogy that increased student curiosity and classroom engagement. Simultaneously, school administrators used computers for basic data-processing tasks—grade tabulation, student records management, and the like—realizing substantial efficiency gains over manual methods.

The subsequent rise of the Internet added powerful momentum to educational informatization: by breaking the constraints of time and space, it enabled the aggregation and sharing of vast educational resources. Online learning platforms emerged, delivering high-quality courses from around the globe and allowing students to transcend geographic barriers to access learning opportunities. Teachers used networks to exchange pedagogical insights and instructional resources, driving continual renewal of teaching philosophies and methods. Internal administration also became more efficient as campus networks enabled rapid information flow—so that notices, announcements, and teaching schedules could be communicated promptly and accurately—progressively elevating the informatization of campus management.

The development of a smart campus represents a critical advancement built upon the deeper maturation of educational informatization. It is not merely the application of information technologies on campus, but their deep integration with pedagogy to form a comprehensive, multi-layered intelligent educational ecosystem.

In this regard, Xu [1] characterizes a smart campus as a system for data governance and sharing that includes an informatized management platform for educational assessment, enabling procedural collection, classification, governance, storage, and sharing of evaluative data to enhance academic, asset, and research administration. Gao et al. [2] advocate integrating 5G with AI to enable personalized and interactive instruction, intelligent management and services, and enhanced decision-making.

Improving teachers' information literacy after smart campus deployment is also vital; Ma and Yang [3] recommend regular IT training and incentive mechanisms to foster active use of information technology in teaching.

Hao [4] outlines a data-governance roadmap—including architecture planning, standard-based modeling, data cleansing, construction of data zones, and governance-anchored lifecycle management—while Du [5] highlights the expanding need for robust data-security management across network security, data-hub applications, and management-system construction. Finally, Liu [6] proposes an AI-integrated command center for campus information and data management, arguing that deep AI applications are reshaping campus service paradigms.

2. Current status of the smart campus

The university has actively advanced smart campus development, harnessing innovative technologies to empower education. The smart campus system integrates multiple subsystems—including academic affairs, student registration, graduation management, library services, and faculty administration—to achieve seamless interconnectivity and enhance staff efficiency. Faculty members can use the platform to check real-time availability of smart classrooms, facilitating scheduling and reservations, while also engaging in diverse interactive teaching activities. During lessons, features such as real-time quizzes and on-screen commentary enhance classroom engagement, significantly boosting the level of instructional interaction. The platform further incorporates approval workflows for leave requests, classroom applications, and related tasks, all processed online, thus streamlining administrative procedures for faculty and staff.

A mobile "campus card" application offers additional convenience by enabling access control, cafeteria payments, and library borrowing via smartphone. Intelligent lighting systems have been deployed in teaching buildings and dormitories, automatically adjusting to ambient light and occupancy, thereby enhancing comfort while reducing energy consumption.

These interim achievements have laid a solid foundation for the university's pursuit of high-quality development. Looking ahead, the institution aims to deepen its application of frontier technologies such as artificial intelligence and the Internet of Things, fostering a new smart teaching ecosystem that delivers tailored instructional content and meets diverse student learning needs. At the same time, the university is working to improve its data governance system, break down data silos to strengthen evidence-based decision-making, and reinforce cybersecurity measures to safeguard campus operations, thereby advancing the smart campus to a higher level.

3. Innovation in informatization services

To promptly resolve issues arising from the use of digital teaching resources and equipment, the university has established an informatization hotline and an online Q&A platform. Technical staff are scheduled on duty to provide timely assistance via telephone and online chat, improving the convenience and efficiency of digital tool use for faculty and students.

4. Problems in smart campus development

4.1. Insufficient awareness of informatization

(1) Some faculty members have not fully recognized the strategic significance of educational digitalization. They still regard educational informatization merely as an auxiliary tool, without realizing its fundamental role in transforming teaching models, promoting educational equity, and improving teaching quality.

(2) Teachers' acceptance of informatized teaching varies considerably. Some, especially senior faculty members, are constrained by traditional teaching concepts and remain resistant to informatized teaching, believing traditional methods to be more reliable. They often lack motivation and willingness to learn and apply new informatized tools and methods. Younger teachers, though more familiar with digital technologies, often struggle to deeply integrate them into teaching content or optimize teaching processes, resulting in underutilization of the advantages of informatized instruction.

4.2. Inadequate hardware facilities

Some campus hardware is outdated and not upgraded in time. With the rapid development of educational informatization, integrated classrooms and digital equipment installed in earlier stages now suffer from performance degradation and outdated software versions. The lag in equipment renewal cannot meet current needs for high-definition video transmission or the operation of complex teaching software, thereby affecting instructional effectiveness.

4.3. Insufficient utilization of resources

The construction of digital teaching resources lacks systematic planning and targeted design. Although abundant resources exist online, high-quality resources that align with the school's actual teaching needs and curriculum standards remain relatively

scarce. In addition, many resources are not updated or maintained in a timely manner, with some becoming obsolete and unable to effectively support teaching.

4.4. Weak informatization competence of teachers

(1) A gap exists between training content and actual needs. Current informatization training programs for teachers often emphasize technical operations—such as office software use or courseware design—while providing insufficient guidance on how to integrate information technology with specific subjects or innovate teaching methods through informatization. As a result, teachers struggle to apply what they have learned effectively in practice.

(2) Lack of a sustainable and effective training mechanism. Teacher training in informatization is often delivered through short-term intensive programs, which are too limited in duration to ensure comprehensive skill acquisition. Moreover, there is a lack of follow-up guidance and practical support after training. When teachers encounter problems in real applications, they cannot obtain timely solutions, which undermines the consolidation and improvement of training outcomes.

4.5. Incomplete information security system

(1) Weak network security protection. As the degree of informatization increases, the risks of cyberattacks also rise. Some of the school's network security devices are outdated and technologically insufficient to counter increasingly sophisticated threats.

(2) Inadequate security management mechanisms. The school's information security management systems have flaws in implementation, such as lax user access control and incomplete backup and recovery mechanisms. In addition, insufficient awareness of digital security among teachers and students makes them prone to errors in system use, which can easily lead to security incidents.

5. Future development strategies

5.1. Strengthening awareness and understanding of informatization

(1) Enhance informatization training for faculty and staff. Regularly organize specialized workshops on educational informatization, inviting experts and scholars to interpret national policies, share advanced experiences, and present successful cases from China and abroad. This will help teachers better understand the strategic significance of educational digitalization.

(2) Promote teacher training and exchange on informatized teaching concepts. By hosting lectures on digital teaching concepts, classroom observation activities, and case-sharing seminars, teachers can be guided to shift their teaching perspectives. These activities emphasize the advantages of informatized instruction in stimulating student interest, fostering creativity, and cultivating practical abilities. Teachers are encouraged to actively explore new models of informatized teaching, creating a positive atmosphere for digital learning.

5.2. Optimizing hardware facilities and resource development

(1) Increase investment and upgrades in hardware infrastructure. Secure government financial support and social funding, and develop a phased plan for updating campus hardware. Gradually replace outdated equipment with high-performance integrated classroom devices, computers, servers, and other facilities to ensure that the digital teaching environment meets evolving instructional needs.

(2) Strengthen the development of digital teaching resources. Establish a school-wide mechanism for co-construction and sharing of digital teaching resources by integrating the expertise of faculty across disciplines. At the same time, enhance cooperation with educational resource providers to introduce high-quality digital teaching content. A resource review and evaluation system should be implemented to ensure timely updates and optimization, thereby improving both quality and applicability.

5.3. Enhancing teachers' informatization competence

Refine the training system for teachers' digital competence. Based on differing needs and proficiency levels, design tiered and categorized training programs. Beyond technical skills, training should focus on the integration of information technology with subject teaching, innovative pedagogical strategies, and instructional design in digital contexts. Training should adopt a blended approach that combines online and offline formats, as well as centralized workshops and distributed practice, to enhance flexibility and effectiveness.

5.4. Improving the information security system

(1) Strengthen network security infrastructure. Increase investment in protective technologies by updating firewalls, intrusion detection systems, and related devices. Adopt advanced measures such as encryption and identity authentication to improve security capabilities. Conduct regular vulnerability scans and risk assessments to promptly identify and resolve security risks.

(2) Improve information security management mechanisms by clarifying departmental and individual responsibilities in digital security. Strengthen user access control to strictly regulate permissions. Establish robust data backup and recovery mechanisms, ensuring the security and reliability of critical information. Enhance security awareness among faculty and students through lectures, training sessions, and awareness campaigns, thereby improving their ability to prevent risks and respond effectively in emergencies.

6. Conclusion

In recent years, the university has achieved remarkable results in the practice of educational informatization, and its innovative initiatives have injected new vitality into the field. Nonetheless, several challenges remain. Looking ahead, the school will continue to prioritize the advancement of educational informatization by strengthening awareness, optimizing infrastructure, enhancing teacher competence, and safeguarding information security. Through these sustained efforts, the integration of informatization with education and teaching will deepen, contributing to the cultivation of high-quality talent suited to the needs of the times and promoting the high-quality development of education.

References

[1] Xu, A. (2025). Planning and implementation of smart campus construction in universities: A case study of Dehong Normal University. *Digital Technology & Application*, 43(8), 117–119.

[2] Gao, J., Zhou, H., & Sun, J. (2025). Smart campus solutions based on 5G+AI. *China Construction Informatization*, (16), 66–69. https://doi.org/10.26955/j.cnki.2096-0824.2025.16.016

[3] Ma, Y., & Yang, L. (2025). Strategies to improve teachers' information literacy based on the construction of digital smart campuses. *China Educational Technology Equipment*, (3), 21–23.

[4] Hao, H. (2024). Analysis of data security control strategies in smart campuses. *Electronic Technology*, 53(12), 364–365.

[5] Du, J. (2025). Research on data security management mechanisms in universities under the background of smart campuses. *Network Security Technology & Application*, (9), 88–90.

[6] Liu, L. (2025). Exploration on the construction planning of an AI-integrated smart campus information data management and command center platform. *Digital Technology & Application*, 43(8), 27–29.