DIGITAL MANAGEMENT OF TEACHERS HIGHER VOCATIONAL COLLEGES IN HAINAN UNDER THE BACKGROUND OF EDUCATIONAL DIGITALIZATION

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Abstract

Amid the accelerated advancement of educational digitalization and the development of the Hainan Free Trade Port, digital management of teachers in higher vocational colleges plays a crucial role in enhancing education quality and promoting regional development. This paper thoroughly analyzes six major challenges faced by digital teacher management in Hainan's vocational colleges: outdated management philosophies, insufficient data governance, lack of evaluation and incentive mechanisms, imperfect training systems, weak technical support, and inadequate industry-education integration. In response, six optimization strategies are proposed: reforming management philosophies, improving data governance systems, optimizing evaluation and incentive mechanisms, establishing multi-level training frameworks, strengthening technical support capabilities, and deepening industry education integration. The paper aims to provide theoretical foundations and policy recommendations to advance the modernization of higher vocational education in Hainan and strengthen digital governance of teachers.

Keywords: educational digitalization, teacher management, higher vocational college

Introduction

Since the 21st century, the rapid development of new generation digital technologies such as artificial intelligence, big data, and cloud computing has accelerated the global transition into the digital age (Wu et al., 2023). Against this backdrop, education systems are undergoing profound structural transformations, and educational digitalization has become an irreversible trend. The report of the 20th National Congress of the Communist Party of China explicitly proposed the strategic task of "advancing educational digitalization," marking its elevation to a major national policy direction (Xi, 2022). A vital frontier of China's reform and opening-up, Hainan Province must fully recognize the profound impact of the digital economy on economic growth and social progress, actively respond to national strategies, and accelerate the digital transformation of higher education particularly vocational education. The construction of the Hainan Free Trade Port identifies "digital trade","marine technology",and "international tourism" as key industries (Hainan Provincial People's Government & National Development and Reform Commission, 2020), which places unique demands on higher vocational colleges not only to cultivate technically skilled talents with digital literacy but also to train interdisciplinary professionals who can meet the needs of industrial digital transformation. As the main base for cultivating technical and skilled personnel, higher vocational colleges play a critical role in this transition (Chen, 2025).

Teachers, as the organizers and implementers of educational activities, form the foundational support for the digital transformation of vocational institutions. Enhancing

teachers'digital capabilities requires more than individual effort; it necessitates continuous professional development,a supportive educational environment,and crucially,a well-organized, structured system of digital faculty management to ensure the effective integration of technology into education (Yadav,2024). This includes management philosophy, data governance, and support systems, including training mechanisms, evaluation and incentive systems, digital teaching environments, and educational resources. Effective digital management of teachers is essential for advancing the overall digital transformation of institutions and improving educational quality (Fatimah et al.,2024). Its success directly impacts teacher development efficiency, the quality of talent cultivation, and the coordinated development of regional economies and societies.

This paper, under the broader context of educational digitalization, examines the current issues in teacher digital management in Hainan's higher vocational colleges and proposes targeted optimization strategies. The goal is to enhance management efficiency, improve teacher development, and strengthen regional educational service capabilities, thereby contributing to Hainan's high-quality socio-economic development.

Existing Theories on Digital Management of Teachers

The core of educational digital transformation lies in reforming management models (Dacholfany et al., 2024). Administrators' digital governance mindsets directly shape teacher management strategies (Alde,2024). Persistent traditional bureaucratic thinking hinders genuine digital transformation, even with advanced technologies (DEMİREL,2024). As management thinking evolves, data governance becomes a key support. Despite its potential to improve performance management (Cheng, 2024), higher vocational colleges still face issues like data silos and inconsistent standards, limiting efficiency (Zhou, 2024).However, mindset shifts and data governance optimization alone are insufficient; systematic institutional support is essential. Many higher vocational colleges lack comprehensive digital training systems, with programs often short and lacking diversity, failing to meet teachers' varied needs (Chen, 2025). Customized digital skills training can significantly improve adaptability (Bączkowska, 2024). In evaluation and incentives, some institutions underemphasize digital teaching achievements in assessments and have weak feedback mechanisms, reducing motivation. Integrating digital outcomes into evaluations and strengthening feedback can better encourage continuous development (Ran & Jiang, 2025). Improving digital teaching environments, such as upgrading online platforms, also provides crucial technical support for effective management (Masinambow et al., 2025).

In summary, the modernization of management concepts, the enhancement of data governance, and the establishment of support mechanisms have been identified as common challenges in the implementation of digital teacher management across various types of higher education institutions. Existing literature, though primarily focused on general universities and macro-level governance structures, provides a solid theoretical basis for addressing these shared issues.

Practice Challenges in the Digital Management of Teachers in Higher Vocational Colleges in Hainan

Under the dual backdrop of advancing educational digitalization and the development of the Hainan Free Trade Port, higher vocational colleges in Hainan have made initial efforts in the digital management of teachers. However, significant challenges remain, which are primarily reflected in the following aspects.

Outdated management philosophy

Although Hainan is actively promoting large-scale initiatives such as digital government and smart education (National Development and Reform Commission,2020； Hainan Provincial Department of Education,2022), some administrators in higher vocational colleges still lack a comprehensive understanding of digital management. They believe that traditional administrative approaches are sufficient, without recognizing the need to leverage big data technologies to drive innovation and optimization in educational management (Lin,2024). During the construction of digital campuses, they often fail to define clear objectives, pathways, and tasks from a systemic perspective. As a result, the development lacks strategic direction, with thinking remaining at a superficial level without elevating digital management to a core component of institutional governance reform and teacher professional development (Wu & Reyes,2024). This limitation hinders its ability to effectively support the construction of a high-quality education system aligned with the goals of the Hainan Free Trade Port.

Insufficient data governance capacity

The province is actively promoting data platforms such as "One Network" and "One Cloud"to support integrated digital governance (Hainan Provincial People's Government,2022). However, higher vocational colleges face significant challenges in internal digital governance, especially unclear responsibility divisions.Departments have ambiguous functional boundaries;business units lead digital development while IT departments provide only technical support, causing fragmented goals and lack of strategy. Cross-department coordination is weak, limiting sharing of teaching and research resources. Disparate systems for academic affairs, research, and training lack unified standards, creating “information silos”that hinder data interoperability and reduce governance effectiveness (Barbu et al., 2024). Data security and privacy also face challenges. Sharing involves personal data of faculty and students, but universities often lack proper data security protocols, anonymization standards, and supervision, posing risks to information security and privacy (Zhou, 2024).

Outdated evaluation and incentive systems

The teacher evaluation system plays a crucial guiding role in faculty promotion, job advancement, and applications for talent programs, with the weighting of various indicators directly influencing resource allocation and incentive effectiveness(Si,2024). Currently, some higher vocational colleges in Hainan fail to adequately recognize teachers’ achievements in digital teaching, platform development, and resource creation within formal evaluation frameworks such as professional title assessments and performance appraisals. This lack of institutionalized incentives leads to a disproportion between teachers’ efforts in digital teaching and their actual rewards, thereby dampening their motivation. Moreover, the existing evaluation systems are themselves inadequate, lacking comprehensive and objective assessments of digital teaching effectiveness, and failing to provide targeted feedback or actionable suggestions for improvement. These issues collectively hinder the digital transformation of the teaching workforce(Ran & Jiang, 2025).

Lack of a systematic training mechanism

Currently, digital competency enhancement for teachers in higher vocational colleges mainly relies on short-term external training or standardized internal sessions, with overall approaches remaining traditional and lacking systematic planning and personalized support. Many teachers,especially newly hired young faculty show limited digital awareness and weak intrinsic motivation, hindering their active engagement in digital professional development (“Enhancing Professional Development for Teachers’ Digital Literacy in the Age of Technological Advancement”, 2024).Most teachers’ skills are confined to basic office and

multimedia tools, with little ability to integrate advanced technologies like AI-assisted instruction, big data analytics, or virtual simulation into teaching. This often leads to a sense of "technological dizziness",limiting the deep application of digital tools in pedagogy (Yang & Li, 2024). Furthermore, existing training programs are overly theoretical, lacking differentiated and hierarchical designs that address diverse teaching needs. Crucially, they fail to align with emerging disciplines linked to Hainan's key industries,such as tourism, tropical agriculture, and cross-border e-commerce,resulting in a mismatch between teachers' digital teaching capacity and regional talent development goals of the Hainan Free Trade Port.

Deficiencies in Digital Infrastructure and Technical Support

In the era of educational digitalization, effective teacher management depends on robust support from both digital teaching environments and instructional resources (Chen,2025). However, higher vocational colleges in Hainan confront significant challenges, including outdated hardware, limited network bandwidth, insufficient smart devices, and underutilized online platforms, which collectively impede the fulfillment of basic digital teaching and management requirements. Furthermore, organizational support is inadequate, characterized by shortages of specialized personnel in teacher development and IT services, and a dearth of expertise in technical consultation, data analytics, and platform operations, thereby limiting the efficacious application of big data in educational management (Luo, 2025). The development of digital teaching resources also lags, marked by scarcity of high-quality content, infrequent updates, and poor alignment with pedagogical needs. Given that high-quality digital resources are essential for fostering integration and sharing across temporal and spatial dimensions to enhance teaching and learning efficiency (Ran & Jiang, 2025), these persistent deficiencies constrain the deep integration of digital technologies within teacher management, impeding both implementation effectiveness and sustainable development.

Deficiencies in the Industry Education Integration Mechanism

Amid the digital transformation of teacher management in Hainan's higher vocational colleges, the absence of an effective industry-education integration mechanism has become a significant constraint on supporting regional industrial development. Administrative departments often lack a deep understanding of industry collaboration, resulting in a disconnect between academic programs and digital labor market demands. Outdated curricula and weak college-enterprise cooperation hinder talent cultivation aligned with industrial upgrading, exacerbating the structural imbalance between talent supply and market needs (Yang, 2025). Additionally, many higher vocational college teachers are research-focused with limited industry experience, possessing strong theoretical knowledge but lacking practical guidance skills relevant to industry requirements, causing a gap between training outcomes and enterprise expectations (Liu&Wu,2024). Teacher management practices frequently lack industry orientation and fail to align with sectoral standards. There is no established mechanism linking teacher development with key regional industries such as marine economy, healthcare, and tourism. The lack of clear pathways for industrial engagement restricts management flexibility and diminishes the capacity of teaching teams to contribute effectively to local economic and digital transformation.

Improving Digital Management of Teachers in Hainan's Higher Vocational Colleges

In light of the outdated management concepts, insufficient data governance, and lack of institutional support currently affecting the digital management of teachers in higher vocational colleges in Hainan, and considering the context of the Hainan Free Trade Port

development and the region's educational realities, a systematic optimization should be promoted through the following key approaches.

Reforming Management Philosophy

With the concurrent development of the Hainan Free Trade Port and the deepening digital transformation of education, higher vocational colleges must abandon traditional administrative mindsets and proactively embrace digital and intelligent reforms. Administrators should integrate advanced technologies into educational strategies, shift from experience-based to data-driven management, and adopt concepts such as platform thinking, service orientation, and systemic governance. Digital teacher management must align with the institution's overall development and broader educational modernization frameworks (Zhang & Zhou, 2023). Furthermore, school leaders need to improve their digital literacy and adopt a problem-solving mindset to accelerate top-level design in educational digitalization. This includes formulating strategic plans, refining regulations, restructuring organizational frameworks, and building smart education ecosystems through enhanced data governance and digital empowerment (Yu et al.,2025). By establishing dedicated task forces, conducting governance training, and promoting regional best practices, institutions can transform management teams, modernize administrative thinking, unify digital governance awareness, and ultimately strengthen governance foresight and support for high-quality regional development.

Improving the Data Governance System

Relying on the achievements of Hainan's "One Network Across the Province, One Cloud for All" initiative in digital governance and education system construction, higher vocational colleges should actively build a teacher data governance system that aligns with and supports the development of regional smart education platforms. By integrating multidimensional data,such as teaching activities, research outputs, and industry collaboration,a dynamically updated and precisely identifiable teacher development database can be established to provide intelligent support for key areas such as teacher profiling, performance evaluation, professional title promotion, and competency enhancement (Chen, 2025).At the same time, efforts should be made to standardize data formats, enhance interdepartmental coordination, and ensure platform security management. Breaking down internal "data silos" will promote the intelligent and refined development of higher education management, thereby contributing to the digital transformation and high-quality development of educational administration in colleges and universities (Luo, 2025).

Optimizing Evaluation and Incentive Mechanisms

Under the guidance of the "Double High Plan" and the high-level talent strategy of the Hainan Free Trade Port (Hainan Provincial People's Government Office,2025;Hainan Provincial People's Government, 2024), higher vocational colleges should restructure their teacher evaluation and incentive systems by incorporating digital teaching performance into frameworks such as professional title appraisal, performance assessment, and recognition mechanisms (Ran & Jiang, 2025). Centered on key outcomes such as smart classrooms, digital resource development, virtual simulation training, and industry-education collaborative teaching, a diversified, dynamic, and quantifiable evaluation system should be established to promote a performance-oriented mechanism driven by teaching innovation and digital transformation. Through positive incentives, teachers' enthusiasm and creativity in participating in digital teaching reform can be enhanced, thereby facilitating a deep transformation in teaching paradigms and talent cultivation models (Chen, 2025).

Establishing a Multi-Level Training System

In response to the current disparities in digital competence among faculty members and the insufficient integration with industry, a tiered and categorized digital training system should be established to align teacher capacity building with regional industrial development (Ran & Jiang, 2025). Through university-enterprise collaboration, industry-education integration, and platform sharing, high-quality educational resources,such as those from Hainan Open University and Sanya University,can be leveraged to implement a three-stage training model: "basic skills – job-specific enhancement – industry-oriented expansion" .Emphasis should be placed on incorporating practical cases and tasks from Hainan's key industries,such as tourism services, healthcare, and cross-border e-commerce,to enhance teachers' intercultural communication, digital tool application, and project-based teaching capabilities. This approach aims to achieve effective alignment between teachers' digital literacy and the practical demands of industry scenarios (Chang, 2025).

Enhancing Technical Support and Infrastructure Capacity

A robust technical support system is essential for the efficient operation of digital teacher management. Higher vocational colleges should leverage educational construction funding and platform resources available in Hainan to continuously optimize digital campus infrastructure, expand the functionality of online teaching platforms, and improve network environments and terminal equipment (Chang, 2025). Moreover, dedicated technical teams should be established, with sufficient professional staff to ensure platform operation, provide technical support, and develop technical standards, thereby offering comprehensive and customized digital teaching and management services for faculty (Yu et al.,2025). By building an efficient support system, institutions can enhance implementation capacity and teacher satisfaction with digital tools, laying a solid foundation for digital governance.

Deepening Industry-Education Integration

To better meet the urgent demand of the Hainan Free Trade Port for high-quality, versatile technical and skilled personnel, higher vocational colleges should adopt a regional industry-oriented approach and establish a teacher development mechanism centered on industry standards. It is essential to promote the joint construction of digital teaching teams by schools and enterprises, and to explore a dual-mentor model involving both industry mentors and college teachers. This approach encourages teachers to participate in industrial practices, enterprise projects, and the development of industry standards, thereby enhancing their practical orientation and job competency (Deng et al., 2024). At the same time, industry demand orientation and evaluation standards should be incorporated into teacher management, and a digital management system closely aligned with key sectors,such as the marine economy, tropical agriculture, tourism services, and cross-border e-commerce should be established to achieve a high level of integration between higher education teaching resources and regional industrial strategies (Xu, 2025).

Conclusion

Against the dual backdrop of educational digitalization and the development of the Hainan Free Trade Port, the digital management of teachers in higher vocational colleges is essential not only for enhancing educational quality but also for improving the capacity to serve regional industries and socio-economic growth. This paper finds that the current challenges facing Hainan's vocational institutions stem from a misalignment between management systems and regional development needs. In response, it proposes comprehensive strategies that address institutional mindsets, technical infrastructure, governance structures,

and industry alignment. It is hoped that by leveraging local industrial characteristics and supportive policies, efforts will be made to accelerate the construction of digital infrastructure, strengthen cross-departmental data collaboration, and deepen the integration of education and industry. These measures will help realize the high quality development of digital teacher management and provide a solid talent foundation for the regional digital economy.

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