

## Article

# Research on the Core Competencies and Enhancement Pathways of Digital Leadership for University Education Administrators in the Context of Digital Transformation

Sidi Chen <sup>1,\*</sup><sup>1</sup> Hainan Vocational University of Science and Technology, Haikou, China

\* Correspondence: Sidi Chen, Hainan Vocational University of Science and Technology, Haikou, China

**Abstract:** In the digital intelligence era, the ecology of higher education is undergoing profound changes, and the role connotations and work paradigms of university administrators are facing reconstruction. Digital leadership, as a core competency for university education administrators to adapt to digital transformation and enhance the effectiveness of ideological and political work, has become an urgent issue of our time. This study takes the digital leadership of university education administrators as a starting point, analyzes its four core competencies, and elaborates on the current practical dilemmas in the development of digital leadership among university education administrators. Based on this, a series of targeted enhancement pathways are proposed, aiming to provide theoretical support and practical guidance for the digital transformation of university education management.

**Keywords:** Digital transformation; University education administrators; Digital leadership; Core competencies; Enhancement pathways

## 1. Introduction

One of the core strategies of the national "Fifteenth Five-Year Plan" is to accelerate digital development and build a digital China. This is not only a technological upgrade but also a foundational project for promoting high-quality development [1]. Universities, as important bases for talent cultivation and technological innovation, increasingly see the digital leadership of their education administrators becoming a critical element affecting the high-quality development of education. For this reason, strengthening the development of digital leadership among university education administrators is imperative [2].

## 2. Core Competencies of Digital Leadership for University Education Administrators

The core competencies of digital leadership for university education administrators manifest as the organic unity of four major dimensions. Technological insight and learning ability is grounded in the characteristics of the digital age, reflected in keenly grasping the trends of educational technology development and actively exploring new technology application models [3]. It serves as the foundational support for digital leadership. Data analysis and decision-making ability focuses on the scientification of management decisions, emphasizing the use of data thinking to interpret educational management phenomena and optimizing management plans based on data models. Innovative thinking and change ability focuses on organizational development, requiring administrators to break through traditional thinking patterns and promote innovation in educational management models with an open and inclusive vision [4]. Communication, coordination, and teamwork ability is based on the practical needs of digital transformation, focusing on key aspects such as cross-departmental communication, resource integration, and team building. These four core competencies are

Received: 18 June 2025

Revised: 10 August 2025

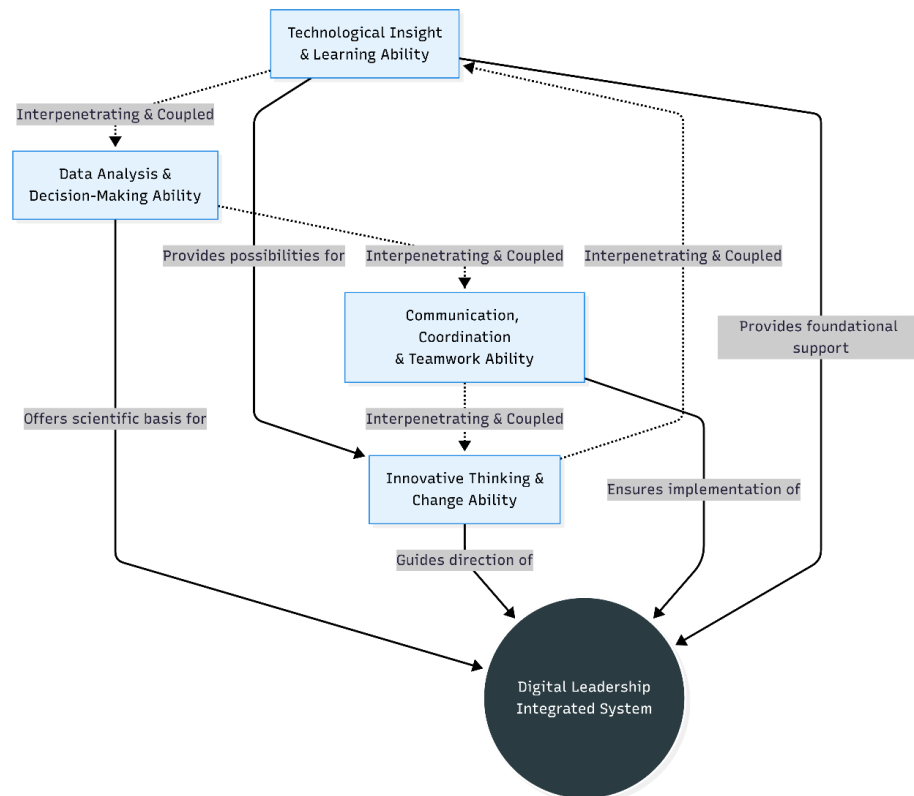
Accepted: 24 August 2025

Published: 31 August 2025



**Copyright:** © 2025 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

interpenetrating and dynamically coupled, constituting an integrated system. From a practical perspective, technological insight provides possibilities for innovation and change, data analysis offers a scientific basis for management decisions, innovative thinking guides the direction of organizational change, and teamwork ensures the effective implementation of change initiatives. Only by organically integrating these competencies can administrators play a leading role in the digital transformation process (As shown in Figure 1).



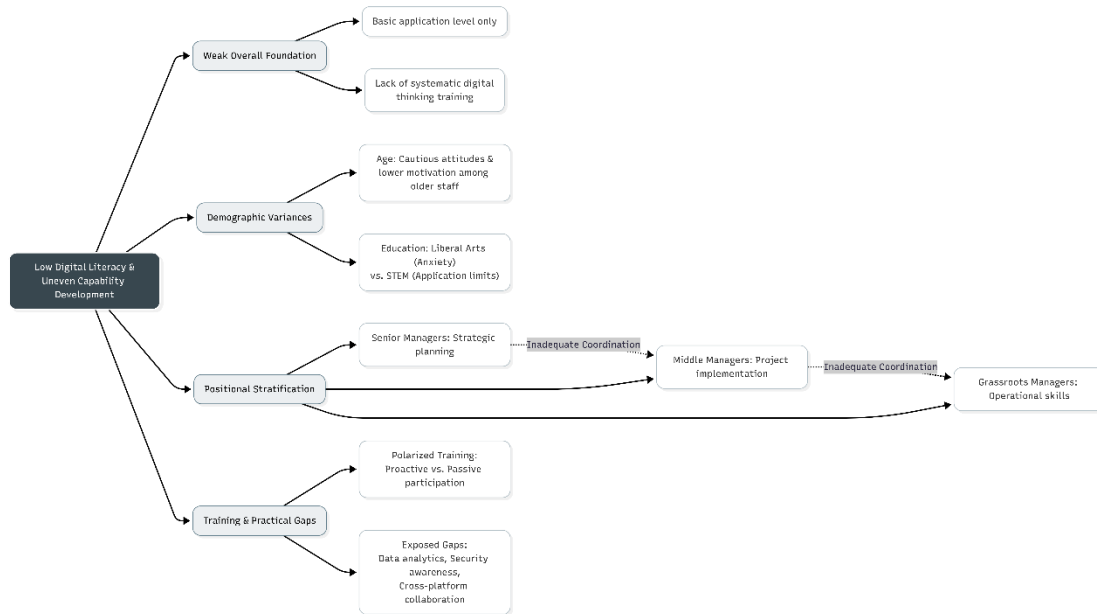
**Figure 1.** The Integrated System of Digital Leadership Core Competencies for University Administrators.

### 3. Current Practical Dilemmas in the Development of Digital Leadership for University Education Administrators

#### 3.1. Low Individual Digital Literacy and Uneven Capability Development

The digital literacy levels of current higher education management personnel vary significantly, with a relatively weak overall foundation [5]. Most management personnel's understanding of digital technology remains at the basic application level, having not received systematic digital thinking training [6]. Age structure differences create stratified digital acceptance capabilities, with older managers often adopting cautious attitudes toward new technologies and lacking strong learning motivation. Different positional levels create vastly different capability requirements: senior managers focus on strategic planning abilities, middle managers emphasize project implementation capabilities, and grassroots managers concentrate on operational skill mastery, with inadequate effective coordination between levels [7]. Meanwhile, diverse educational backgrounds influence the foundational formation of digital literacy. Management personnel from liberal arts backgrounds exhibit technological anxiety, while those with science and engineering backgrounds possess technical understanding advantages, yet their ability to complete application transformation in educational management contexts remains limited [8]. Training participation shows a polarized trend, with proactive learners demonstrating high enthusiasm while passive participants achieve poor learning outcomes. Capability gaps exposed in digital work practices cover a wide range, including lack of data

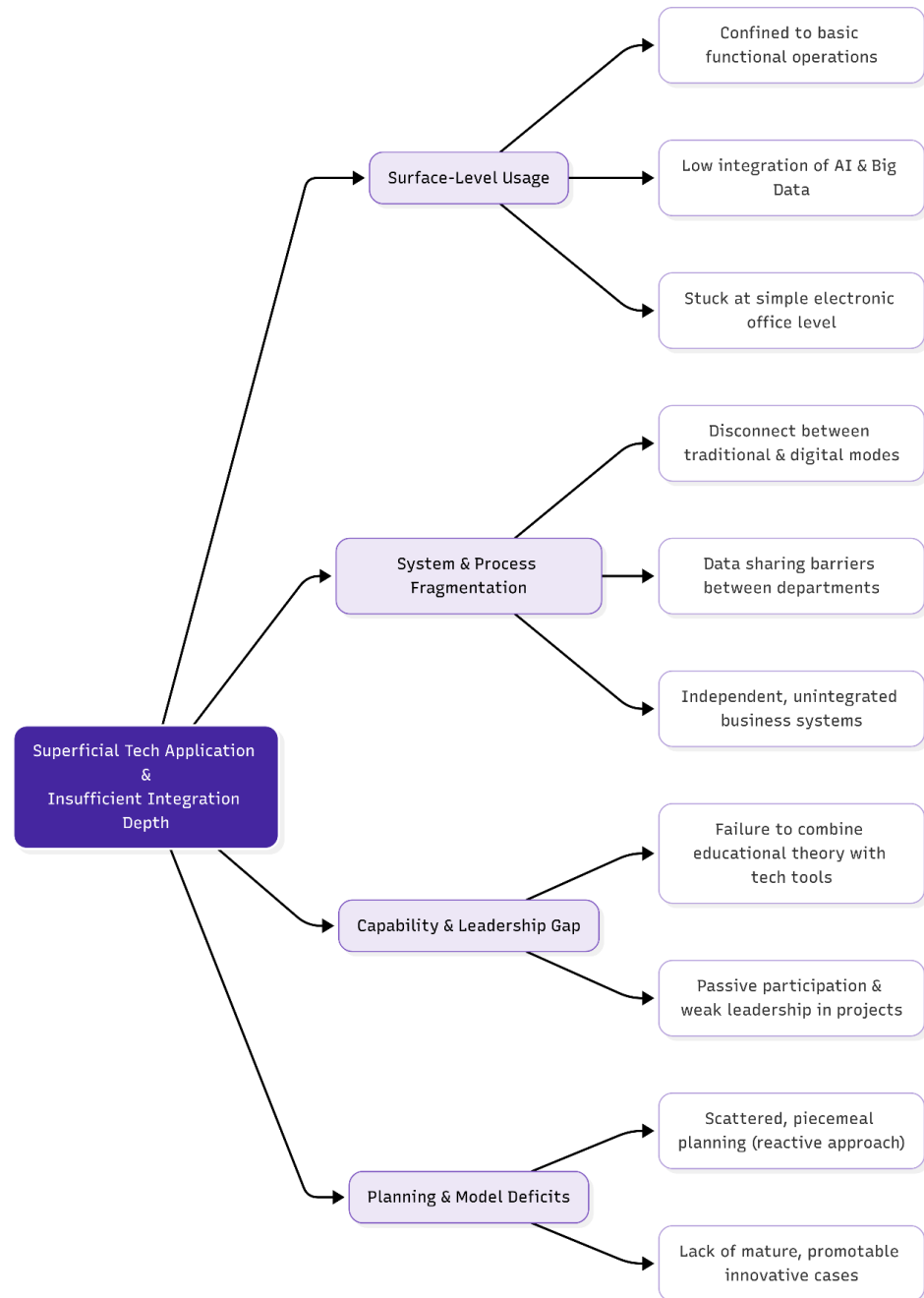
analytical thinking, weak information security awareness, and insufficient cross-platform collaboration abilities, problems that are also prevalent (As shown in Figure 2).



**Figure 2.** Manifestations and Causes of Uneven Digital Literacy among University Administrators.

### 3.2. Superficial Technology Application with Insufficient Professional Integration Depth

Most universities' digital applications remain at the tool usage level, with educational management personnel having limited depth in applying various advanced technologies [9]. Information system usage is largely confined to basic functional operations, while cutting-edge technologies such as big data analysis and artificial intelligence have low integration with daily educational management practices. Existing management process digitalization is incomplete, with disconnections between traditional work modes and digital operation requirements. Data sharing barriers persist between different departments, with various business systems operating independently without effective integration [10]. Innovation in technology applications across educational management scenarios is limited, with most applications remaining at simple electronic office levels, failing to fully release the transformative potential of digital technology [11]. The integration level between professional knowledge and technical tools is low, as management personnel cannot effectively combine educational theory and management experience with digital tools. Technology applications lack comprehensive systematic planning, predominantly adopting scattered application modes—a piecemeal approach of addressing issues as they arise. During digital project advancement, management personnel participation is low with weak leadership roles, mostly participating passively as recipients. Currently, there are few promotable innovative application cases, lacking mature successful experiences and referenceable practical models (As shown in Figure 3).



**Figure 3.** Manifestations of Superficial Technology Application in Educational Management.

### 3.3. Imperfect Institutional Mechanisms and Absent Organizational Cultural Atmosphere

The university administrators I studied a total of 1,250 people from 85 institutions face problems when it comes to digital transformation. The way universities evaluate their administrators does not consider skills and only 11.2% of universities include digital leadership in their formal Key Performance Indicators. In the universities that do this digital capability is only worth 3.5% of the score. This means that being good with things does not help administrators get ahead in their careers. In fact 92.4% of the time administrators who got promoted in the 36 months did not have to show they were good with digital things [12].

This is a problem because universities do not allow administrators to try new things and make mistakes. 87.6% Of administrators are afraid to try digital tools because they are afraid of being punished if they fail. 8.5% Of universities have a special budget for trying new digital things and 74.2% of the time new ideas are stopped before they even

start. This is partly because different departments in the university do not work together. In universities without a governance board it takes an average of 18.4 days to get permission to share data between departments and 43.1% of the time the request is denied.

The culture of universities is also not good for transformation. When I asked administrators how much they thought ways of doing things conflicted with digital ways the average answer was 4.12 out of 5. This shows that there is a disagreement between the two. This is made worse by the fact that senior leaders do not pay attention to digital things. They only spend an average of 4.5 hours per quarter on initiatives. This lack of attention means that universities do not prioritize hiring administrators with skills and they do not invest much in training administrators to be good with digital things. In fact 7.8% of job descriptions require digital skills and universities only spend an average of \$45 per person, per year on digital leadership training (As shown in Table 1).

**Table 1.** Quantitative Assessment of Institutional and Cultural Ecosystems (N = 1,250)

<b>Assessment Dimension</b>	<b>Specific Variable / Construct</b>	<b>Mean (M) / Pct (%)</b>	<b>SD / Range</b>
Performance & Evaluation	Institutions with formal digital KPIs	11.2%	N/A
	Weight of digital competency in annual appraisals	3.5%	1.2%
	Promotions decoupled from digital proficiency checks	92.4%	N/A
Innovation & Risk Climate	Fear of penalization deterring digital innovation	87.6%	N/A
	Universities funding "safe-to-fail" testing sandboxes	8.5%	N/A
	Innovation abandonment rate at conceptual phase	74.2%	N/A
Structural Coordination	Institutions lacking central digital governance boards	68.4%	N/A
	Average processing time for cross-departmental data requests	18.4 days	4.2 days
	Inter-departmental API/data integration rejection rate	43.1%	N/A
Cultural Mindset (1-5 Scale)	Perceived conflict: Traditional vs. Digital paradigms	4.12	0.85
	Executive leadership engagement in digital oversight	2.80	1.10
Resource Allocation	Administrative job postings mandating digital skills	7.8%	N/A
	Annual per capita investment in digital leadership training	\$45.00	\$12.50
	Proportion of total training budget allocated to digital skills	2.3%	0.8%

### 3.4. Deficient Resource Investment and Fragmented Support Systems

When we look at how institutions spend their money it becomes clear that they are not investing enough in the things that are necessary for digital leadership. Even though they are spending money on things like computers and other technology they are not spending enough on the people who will be using these things. When we look at the budgets of universities we see that only a small part of the money that is meant for digital transformation is actually being used to help the people who work there get better at their jobs. On average each person who works at a university gets \$120 per year for training, which is much less than the \$850 that they would need to get the kind of training that would really help them.

This is a problem because the people who work at universities are not getting the help they need to do their jobs well. There are not people who can help them with technical problems and the people who are supposed to be helping them are often not very good at their jobs. For example there is usually one person who can help with technical problems for every 145 people who work at a university and this means that many people are not getting the help they need. Also there are few people who are actually trained to teach others about digital management, which means that people are not getting the kind of training they need to be good at their jobs.

Another problem is that the technology that is being used at universities is often not very good. Even though the universities are spending money on technology many people are still having problems with things like slow internet and old computers. This makes it hard for them to do their jobs well.

We also have a problem with the way that training is being done. Many of the training programs that are being offered are not very good. They do not really help people learn what they need to know. For example many of the training programs are generic tutorials that do not take into account the specific needs of the people who are working at universities. This means that people are not getting the kind of training they need to be good at their jobs.

The biggest problem of all is that there is no plan for how to make sure that digital leadership is sustainable. Most universities do not have a plan for how they will continue to support leadership in the future and this means that they are not able to make sure that they have the resources they need to be successful. Instead they are relying on short-term grants that may not be available in the future, which means that they are not able to plan for the term. Digital leadership is very important. Universities need to make sure they have a plan, for how to support it. Digital leadership is necessary for universities to be successful and they need to make sure they are investing in leadership (As shown in Table 2).

**Table 2.** Quantitative Analysis of Resource Allocation and Support System Deficits

Resource Dimension	Specific Metric / Evaluation Variable	Measured Value / Pct	Target / Benchmark
Financial Investment	Proportion of IT budget allocated to admin training	4.8%	> 15.0%
	Average annual training expenditure per administrator	\$120.00	\$850.00
Human Resources	Ratio of dedicated technical support to admin staff	1 : 145	1 : 40
	Universities employing specialized digital leadership trainers	6.2%	N/A

	Dissatisfaction rate regarding timely technical guidance	72.6%	< 20.0%
Infrastructure	Staff experiencing workflow bottlenecks due to legacy hardware	64.3%	N/A
Resource	Redundancy rate in inter-departmental training programs	38.5%	< 10.0%
Integration	Training materials consisting of generic/non-customized content	89.1%	N/A
Curriculum	Relevance		
Strategic	Institutions with funded, multi-year (3-5 yr) digital roadmaps	14.5%	N/A
Planning	Funding discontinuation rate for short-term training projects	61.0%	N/A

#### 4. Systematic Enhancement Pathways for the Digital Leadership of University Education Administrators

##### 4.1. Constructing a Tiered Training System to Strengthen Individual Digital Literacy

The cultivation of digital leadership among university education administrators should adhere to the principle of tiered and categorized training, setting differentiated training content based on different positions and levels. For senior managers, the focus should be on strengthening their digital strategic planning and decision-making abilities, offering specialized courses such as digital transformation trend analysis, organizational change management, and digital ecosystem construction to enhance their macro-control and strategic leadership capabilities. For middle-level managers, training should focus on the implementation of digital projects and team building, covering modules such as data analysis methods, application of intelligent management tools, and project management innovation, with emphasis on cultivating their cross-departmental collaboration and resource integration abilities. For grassroots managers, training should emphasize practicality and applicability, offering practical courses such as digital office skills, information system applications, data collection, and processing to solidify their foundational digital work skills. In terms of training formats, innovation and diversity are key, combining online and offline methods and integrating theoretical learning with case studies and project practice. Teaching methods such as micro-courses, scenario simulations, and task-driven approaches can be introduced to enhance the appeal and effectiveness of training. A training credit system and certification framework can also be established, linking training outcomes to career development. Cross-university exchange and study activities can be organized to promote the sharing of excellent experiences and mutual learning, fostering an atmosphere of continuous learning.

##### 4.2. Building Collaborative Innovation Platforms to Promote Technology-Profession Integration

Universities can leverage existing information technology infrastructure to plan and establish digital innovation laboratories, integrating high-quality internal and external resources to conduct management innovation practices. Innovation laboratories should be based on specific scenarios of educational management operations, focusing on key areas such as admissions and employment, talent cultivation, and research management, to promote cross-departmental collaborative innovation. Universities can establish in-depth cooperative relationships with leading technology enterprises in the industry, introducing advanced technological ideas and solutions. In the platform construction process, emphasis should be placed on leveraging the agency of administrators, encouraging them to actively participate in the planning and design of digital projects,

thereby transforming practical experience into innovation momentum. Application demonstrations should be carried out according to the actual needs of universities, using typical cases to drive overall improvement. An incubation fund for innovation projects can be established to provide necessary financial support for excellent digital management innovation proposals. Administrators should be organized to regularly conduct technology seminars and experience-sharing sessions, fostering a favorable atmosphere for collaborative innovation. Inter-university exchange and cooperation should be promoted through the platform, facilitating the dissemination and replication of best practices. An evaluation system for digital management innovation outcomes should be established, incorporating the effectiveness of innovation practices into the assessment system. Strengthening the operation and maintenance of the platform is crucial to ensure its sustainable effectiveness. Regular participation of administrators in seminars and workshops on digital transformation should also be organized to enhance their technology application capabilities.

#### *4.3. Improving Institutional Safeguard Mechanisms and Optimizing the Organizational Cultural Environment*

Establishing a comprehensive evaluation standard system for digital leadership is the primary task. The key lies in incorporating digital capabilities and performance into job assessment indicators and formulating scientific, reasonable, and practical evaluation rules. Requirements for digital leadership should be strengthened in professional title evaluations and position promotions, creating an institutional orientation that encourages administrators to actively adapt to digital transformation. To promote reform and innovation, universities need to optimize incentive and error-tolerance mechanisms, providing key support to personnel who demonstrate excellence in digital management innovation while encouraging grassroots exploration of new digital management models. At the organizational structure level, it is crucial to clarify the division of responsibilities among departments related to digital transformation and establish cross-departmental coordination and linkage mechanisms. Cultivating the cultural atmosphere is also not to be underestimated. Universities should focus on creating an open, inclusive, and innovation-daring organizational environment, guiding administrators to break away from traditional thinking patterns. The exemplary role of university leadership is indispensable. Emphasizing the concept of digital transformation on key occasions can effectively drive the formation of organizational consensus on the importance of enhancing digital capabilities. By establishing typical cases of digital management and building experience exchange platforms, administrators can learn from and reference each other, driving organizational cultural change from points to areas. When improving the assessment and evaluation mechanisms, attention should be paid to examining the application ability of digital tools while also focusing on cultivating data thinking and innovation capabilities, ultimately forming a comprehensive institutional support system.

#### *4.4. Expanding Diverse Funding Channels to Ensure Sustained Resource Investment*

Sustained investment of financial resources is the fundamental guarantee for improving the digital leadership of university education administrators. In terms of funding sources, universities can actively seek support from government special funds, incorporate digital talent cultivation into the planning of key construction projects, and explore new models of university-enterprise cooperation. By leveraging corporate technology and capital resources, they can jointly build digital talent cultivation bases. Establishing digital construction development funds open to social forces can attract alumni donations and social investment, further broadening funding sources. Regarding fund management, universities need to coordinate and optimize internal budget allocation mechanisms, set up special funds for digital leadership enhancement, build a multi-level funding system, and formulate long-term, stable investment plans. To improve the efficiency of fund utilization, innovative funding usage methods can be

adopted, such as project-based management models, and fund supervision and performance evaluation should be strengthened. At the implementation level, departments and schools should be encouraged to independently carry out digital construction, integrating high-quality internal and external resources to form a situation of multi-stakeholder participation and multi-channel support for resources.

#### *4.5. Establishing Assessment and Feedback Mechanisms to Drive Continuous Improvement and Development*

Establishing a scientific and reasonable digital leadership assessment model is the core element in ensuring the effectiveness of digital leadership enhancement. Universities can develop multi-dimensional and multi-level assessment indicator frameworks that incorporate core elements such as technology application capabilities, data analysis proficiency, innovative practice outcomes, and team collaboration effectiveness. They can establish regular assessment systems using various approaches including self-evaluation, peer evaluation, and third-party assessment to understand the development status of management personnel's digital leadership. Universities can also leverage big data technology to build dynamic monitoring platforms that track management personnel's learning progress, skill improvement trajectories, and work performance changes in real time. By establishing feedback and improvement pathways, they can promptly collect problems and difficulties encountered by management personnel during digital practice and dynamically adjust cultivation strategies and methods. Additionally, digital leadership development profiles can be created for each management personnel member to record individual capability growth processes and support the implementation of personalized development plans. Regular compilation of cultivation effectiveness and summarization of practical experiences should be conducted to identify replicable and scalable practice models.

## **5. Conclusion**

In summary, with the deepening advancement of the digital wave, the digital leadership of university administrators has become a key factor in ideological and political education innovation in the new era. Strengthening the cultivation of core digital leadership competencies requires the coordination of resources from all parties, the establishment of mechanisms for systematic enhancement, and the creation of an organizational cultural environment supportive of innovation. Only in this way can management effectiveness be effectively improved, promoting the high-quality development of university education and injecting new momentum into the modernization of education.

**Funding:** 2024 University-level Research Project: "Research on the Construction of Digital Leadership and the Application of Digital Intelligence Technology for Managers under Educational Digital Transformation" (Project Number: HKKY2024-BS)

## **References**

1. Edwards, "Enhancing teaching and learning through distributed leadership: A case study in higher education (Doctoral dissertation, University of Warwick)," 2014.
2. Z. Jing, X. Guo, Z. Wu, Z. Yang, and X. Wang, "Higher education digital academic leadership: Perceptions and practices from Chinese university leaders," *Education Sciences*, vol. 15, no. 5, p. 606, 2025. doi: 10.3390/educsci15050606
3. Terania, "A review on developing digital leadership: assessing strategies and implications to generate links for promoting digital leadership in higher education institutions," *Journal of Interdisciplinary Perspectives*, vol. 1, no. 4, 2023. doi: 10.69569/jip.2023.0028
4. Ahlquist, "Digital leadership in higher education: Purposeful social media in a connected world," Routledge, 2023.
5. C. Antonopoulou, O. Halkiopoulou, O. Barlou, and G. N. Beligiannis, "Leadership types and digital leadership in higher education: Behavioural data analysis from University of Patras in Greece," *International Journal of Learning, Teaching and Educational Research*, vol. 19, no. 4, pp. 110-129, 2020. doi: 10.26803/ijlter.19.4.8

6. V. I. Bond, C. Marín, S. Dolch, S. Bedenlier, and O. Zawacki-Richter, "Digital transformation in German higher education: student and teacher perceptions and usage of digital media," *International Journal of Educational Technology in Higher Education*, vol. 15, no. 1, p. 48, 2018. doi: 10.1186/s41239-018-0130-1
7. K. Crawford, J. Butler-Henderson, B. Rudolph, B. Malkawi, M. Glowatz, R. Burton, and S. Lam, "COVID-19: 20 countries' higher education intra-period digital pedagogy responses," *Journal of Applied Learning & Teaching*, vol. 3, no. 1, pp. 9-28, 2020.
8. D. Ehlers and S. A. Kellermann, "Future skills: The future of learning and higher education (pp. 2-69)," Karlsruhe, 2019.
9. B. Laufer, A. Leiser, B. Deacon, P. Perrin de Brichambaut, B. Fecher, C. Kobsda, and F. Hesse, "Digital higher education: a divider or bridge builder? Leadership perspectives on edtech in a COVID-19 reality," *International Journal of Educational Technology in Higher Education*, vol. 18, no. 1, p. 51, 2021. doi: 10.1186/s41239-021-00287-6
10. N. Jameson, M. Rummyantseva, M. Cai, M. Markowski, R. Essex, and I. McNay, "A systematic review and framework for digital leadership research maturity in higher education," *Computers and Education Open*, vol. 3, p. 100115, 2022. doi: 10.1016/j.caeo.2022.100115
11. Selwyn, "Education and technology: Key issues and debates," Bloomsbury Publishing, 2021.
12. Williamson, "Big data in education: The digital future of learning, policy and practice," 2017. doi: 10.4135/9781529714920

**Disclaimer/Publisher's Note:** The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of Publisher and/or the editor(s). Publisher and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.