

Research on Pathways for Enhancing Digital Literacy among Students in Private Higher Education Institutions in the Context of Educational Digitalization

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Abstract: *Against the backdrop of the nation's digital education strategy, enhancing students' digital literacy in private universities has become a critical component of transforming higher education quality. This paper identifies core challenges in digital application, information processing, content creation, self-directed learning, and educational provision through analyzing the structure of student digital literacy and conducting a current status survey. Based on a four-dimensional cyclical framework—"Awareness-Access-Practice-Evaluation"—a systematic enhancement pathway is constructed, emphasizing the coordinated advancement of precise assessment, curriculum restructuring, self-empowerment, and institutional safeguards. Moving forward, private universities must deepen educational digitalization reforms, optimize resource allocation and teaching systems, and establish long-term mechanisms supporting the comprehensive development of students' digital literacy. This will enable a high-quality transformation in talent cultivation and a leap in educational adaptability for the digital era.*

Keywords: *Digital Education; Students in Private Higher Education Institutions; Digital Literacy*

1. Introduction

With the rapid advancement of information technology, digitalization has become a vital pillar supporting the modernization of China's governance system and capacity. In March 2025, the "Opinions on Accelerating the Advancement of Education Digitalization" issued by the Ministry of Education and eight other departments explicitly stated that education digitalization should serve as the strategic engine for building China into an education powerhouse. It calls for systematically constructing a new educational ecosystem centered on the National Smart Education Platform to achieve the goal of "learning for all, learning everywhere, learning anytime." This strategy reshapes educational philosophies, teaching models, and pedagogical approaches while imposing higher demands for digital transformation on higher education.

Within the higher education system, private universities have emerged as a vital component experiencing rapid growth in recent years. However, they also face practical challenges such as uneven distribution of educational resources, low levels of teaching digitization, and disparities in the development of information literacy among both faculty and students. Particularly against the backdrop of deepening digital transformation, student digital literacy has become a key indicator for evaluating the quality of talent cultivation and the level of informatization development in higher education institutions. For private institutions, enhancing student digital literacy is not only crucial for educational equity and quality improvement but also a core variable driving the institutions' intrinsic development and differentiated competitiveness.

2. Literature Review

Digital literacy, as a core competency in the digital age, has seen its essence, structure, and development pathways become hot research topics. Alkalai (1994) first introduced the concept of digital

literacy, emphasizing its integration of technical, cognitive, and socio-emotional competencies^[1]. Gilster (1997) highlighted critical information literacy and effective application^[2]. Eshet-Alkalai (2004) established a five-dimensional model encompassing imagery, recreation, branching, information, and socio-emotional dimensions, laying the theoretical foundation^[3]. Internationally, the EU Digital Competence Framework (2011) defined five domains: information processing, communication and collaboration, content creation, safety, and problem solving^[4]; JISC (2014) focused on its supportive role in learning and research; UNESCO (2018) released the Global Framework for Digital Literacy, emphasizing information ethics and career orientation, and promoting the formation of a global higher education digital literacy assessment system^[5].

Domestic research has gradually deepened since the 2000s. Xiao Junhong (2006) emphasized the equal importance of technical, cognitive, and social adaptation^[6]; Ke Ping (2011) highlighted the importance of information search, filtering, and expression from a learning capability perspective^[7]; Li Chunhui (2017) proposed a three-dimensional framework integrating technical skills, ethical awareness, and cybersecurity within the higher education context^[8]. More recently, Wu Di et al. (2023) developed a multidimensional integrated evaluation system^[9], while Liang Qin et al. (2025) identified gaps in university students' digital content creation and professional application skills^[10]. Overall, domestic research has focused on conceptual and indicator development, lacking systematic exploration of generative mechanisms and enhancement pathways within educational practice.

In summary, while well-established theoretical and assessment frameworks exist globally, research specifically targeting students in private universities remains notably insufficient. Against the backdrop of educational digitization, examining the structural characteristics, influencing factors, and enhancement pathways of digital literacy among private university students holds not only theoretical significance but also practical value for promoting educational equity and quality improvement.

3. Analysis of the Current State of Digital Literacy Among Students in Private Higher Education Institutions

3.1 Digital application skills are unevenly developed, with weak practical abilities

Currently, students at private universities exhibit structural imbalances in their digital application skills. Research findings indicate that students demonstrate relative proficiency in digital communication, social media utilization, and information retrieval, with average scores exceeding the overall average. This suggests they have largely developed the adaptability required for digital living. However, their capabilities in practical skills—such as hardware operation, specialized software application, and data processing and analysis—remain generally low. This reveals a structural issue of “superficial proficiency coupled with deep-seated weakness,” reflecting a developmental gap and lack of clear objectives in students' digital skill advancement.

3.2 Insufficient depth in information processing capabilities, coupled with weak awareness of information security and ethics

Against the backdrop of highly pervasive digital environments, college students' information acquisition capabilities have become a key indicator of their digital literacy. Surveys indicate that most students at private universities demonstrate strong proficiency in fundamental operations such as information retrieval and web browsing, enabling them to quickly locate resources with a certain level of operational fluency. However, their depth and logical rigor in information processing remain notably inadequate, revealing a widespread issue of “easy access but difficult processing.”

At the advanced level of information literacy, students often remain stuck in the “browse-copy” phase, lacking the ability to evaluate information sources and assess authenticity. This hinders their capacity for effective structured expression and knowledge internalization. Regarding information security and ethical awareness, some students lack data protection consciousness, frequently disclosing personal information casually on social or learning platforms, and demonstrating insufficient understanding of privacy protection and online protocols. In terms of cyber civility and digital ethics, their comprehension of copyright, citation, and public discourse responsibility remains vague, with instances of improper reposting or dissemination of false information occurring.

3.3 Relatively weak in digital creation and expression skills, with room for improvement in integrated generation and innovation capabilities

In the context of a digital society and knowledge economy, the creation and expression of digital content have become key indicators of individual digital literacy and are crucial for students' future career competitiveness. However, survey results indicate that students at private universities score significantly below the overall average in the “content creation” dimension, revealing a notable gap in their digital creation and expression capabilities. Students generally lack the ability to utilize diverse digital tools for creative purposes, such as graphic design, audio-video editing, data visualization, and interactive displays. Their proficiency often remains at the level of “familiarity with tools” or “basic operations,” lacking in-depth understanding and comprehensive application of functionalities. Consequently, they struggle to transform digital technologies into effective means for creative expression.

3.4 Learning Path Dependence School-Dominated, Insufficient Self-Directed Development of Digital Literacy Competencies

Digital literacy, as a complex and evolving competency, relies both on external educational resources and the learner's capacity for self-directed learning and personal growth. However, research indicates that most students lack initiative and intrinsic motivation. Their learning process heavily relies on teacher arrangements, overemphasizing formal educational channels such as course instruction, teacher guidance, and in-school training. They have yet to establish a learning loop encompassing “self-diagnosis—goal setting—path selection—process regulation—outcome reflection.” Students tend to focus on passively acquiring skills rather than actively building competencies, resulting in fragmented and superficial understanding of digital literacy.

3.5 There exists a structural mismatch between the education supply mechanism and the development of students' digital literacy

Against the backdrop of educational digitization, enhancing students' digital literacy depends not only on individual motivation and capability but also on comprehensive support from universities in areas such as curriculum systems, resource provision, faculty capacity, and technological infrastructure. However, private universities commonly exhibit structural shortcomings in their educational delivery mechanisms, resulting in a significant mismatch between available resources and student needs. Digital course offerings lack systematic planning, unified design, and logical coherence, making it difficult to establish a progressive system spanning foundational knowledge to practical innovation. Faculty digital teaching competencies vary widely. Constrained by training systems and technology adoption rates, many educators struggle with instructional design and tool utilization. They often treat digital tools as supplementary aids, relying on traditional teaching methods that lack interactivity and generativity. This approach undermines student engagement and learning motivation.

4. Building Pathways for Digital Education to Empower Students' Digital Literacy Development

In the digital age, the digital literacy of students at private universities is no longer merely a reflection of technical proficiency but also a crucial foundation for their comprehensive learning abilities, innovative capabilities, and social adaptability. This paper proposes a pathway framework (as shown in Figure 1) grounded in the realities of private universities and student development needs. It is structured around four dimensions: “foundational diagnosis,” “curriculum empowerment,” “student-led initiatives,” and “support systems.” This framework aims to achieve a comprehensive enhancement of students' digital literacy within the context of educational digitization. The following sections outline specific strategies and implementation logic for constructing this pathway across these four dimensions.

4.1 Precise Identification and Classification Modeling

Enhancing the digital literacy of students in private universities requires a scientific diagnosis and precise identification of their current status. Institutions should integrate the DigComp2.2 framework, UNESCO's digital literacy dimensions, and China's “Five-Force Model” to develop an assessment system applicable across disciplines and academic levels. This system should encompass cognitive self-assessment and scenario-based task evaluations—such as data processing, multimodal expression, and tool operation—to enhance the authenticity and practicality of assessments.

Based on assessment outcomes, a tiered classification model can be developed according to major, grade level, and learning foundation to identify competency disparities and structural gaps among different groups. Leveraging behavioral data from learning management systems and online platforms, data mining techniques can generate student digital profiles to dynamically track changes in digital skills, information processing, and communication abilities, forming personalized competency trajectories.

Simultaneously, student digital literacy growth portfolios should be established and integrated into talent development quality assessment systems, serving as critical references for designing personalized learning pathways. Differentiated support should be implemented for vulnerable groups, including tailored resource recommendations, specialized tutoring, and task-driven learning, forming a closed-loop mechanism of “diagnosis-monitoring-feedback-intervention.” This approach enables precision and data-driven management in digital literacy cultivation.

4.2 Curriculum System Restructuring and Competency Module Integration

The systematic construction of the curriculum framework is a key enabler for enhancing students' digital literacy in private universities. In traditional teaching, digital literacy content is often fragmented and treated as an afterthought, lacking systematic planning and clear objectives. To overcome this bottleneck, the curriculum should be restructured around a three-dimensional integration concept of “general education—professional studies—practical application,” achieving synergy between content structure and competency development.

At the general education level, foundational courses in information literacy, data ethics, cybersecurity, and artificial intelligence cognition should be established to cultivate students' digital citizenship awareness and technological cognitive frameworks. Courses can reinforce critical thinking and ethical judgment through case studies and scenario-based teaching, such as information security drills and AI copyright discussions. At the major-specific level, digital skills should be deeply integrated into core curricula, building a dual-dimensional “major + technology” system. For instance, journalism and communication programs should integrate digital storytelling and visualization; business curricula should incorporate data analysis and programming; and art and design courses should introduce virtual reality and AI-driven creation, emphasizing the alignment of disciplines with technological applications. At the practical level, interdisciplinary project-based courses, innovation bootcamps, and digital workshops should be developed. Adopting problem-based learning (PBL) and project-driven models, initiatives like “Data-Driven Social Analysis” and “Digital Story Design,” fostering students' comprehensive abilities through collaboration and innovation. Concurrently, blended learning, flipped classrooms, and MOOC+SPOC models should be promoted to enhance course flexibility and scalability. Evaluation systems must be refined to emphasize process-oriented and competency-based assessments, focusing on knowledge transfer, technology application, and collaborative communication skills.

4.3 Diverse Learning Mechanisms and Pathways for Self-Directed Growth

Enhancing students' digital literacy requires establishing diverse learning mechanisms and autonomous growth pathways. Currently, students at private universities often rely heavily on teachers and course schedules, lacking self-directed planning and sustained motivation. An ecosystem supporting independent learning should be developed to facilitate a shift from passive reception to active knowledge construction.

Online and offline resources can be integrated to create a tiered digital literacy learning map. Core modules—including information literacy, technology application, content creation, and ethical safety—should be structured in phases, complemented by personalized resource packages and learning tools to enhance students' autonomy in selection and planning. Leveraging a digital literacy self-assessment system, students can be guided toward a cyclical learning path of “cognition-action-reflection-improvement.”

Simultaneously, it is necessary to establish campus digital literacy communities that foster collaborative learning and knowledge co-creation through interest groups, project-based practices, and innovation competitions, enable students to apply digital expression and technology in real-world scenarios, transforming skill mastery into innovative expression and create platforms for showcasing achievements and maintaining competency portfolios to visualize learning outcomes and trace growth trajectories.

Regarding feedback mechanisms, it should introduce diverse evaluations including teacher guidance,

peer review, and AI-driven dynamic feedback to strengthen self-monitoring and continuous improvement capabilities. Regular outcomes exhibitions and competitions stimulate learning interest and achievement motivation, fostering a self-driven, continuous growth model.

4.4 Redesigning Educational Supply Systems and Support Mechanisms for Digital Literacy Development

Enhancing the digital literacy of students in private universities requires both proactive learning on the part of students and optimized supply-side resources and institutional safeguards from the universities. Currently, most institutions face challenges in digital education resource provision, including fragmented content, weak mechanisms, and insufficient faculty. Systematic and collaborative reforms are urgently needed. Schools should establish Student Digital Literacy Development Centers to coordinate internal and external resources. By partnering with academic affairs offices, information centers, secondary colleges, and corporate platforms, they can build multi-stakeholder collaboration mechanisms. Tailored training programs should be developed to create unified, systematic pathways for competency development.

Faculty capacity building is central to supply quality. Regular training should enhance capabilities in digital course design, tool application, and data-driven teaching, establishing a closed-loop cycle of “training-practice-evaluation-refinement.” Innovative incentive mechanisms should drive the transformation of teaching approaches from experience-oriented to data-empowered. Infrastructure investment provides material support. Universities must enhance smart classrooms, multifunctional practice spaces, and cloud platform systems. They should also promote resource sharing among universities, research institutions, and high-quality online platforms to overcome siloed development, enabling digital resource circulation and collaborative innovation. Institutional safeguards ensure reform implementation. Digital literacy should be integrated into talent development objectives and teaching quality assessments, with clear competency metrics established. This creates a closed-loop system spanning top-level design, instructional execution, and learning outcomes. A three-pronged mechanism combining policy, resources, and performance evaluation dynamically aligns educational offerings with student needs.

5. Conclusion

Against the backdrop of deepening educational digitization, enhancing the digital literacy of students in private universities is not only a practical necessity for adapting to contemporary developments but also a critical pathway to achieving educational equity and high-quality development. Through research and analysis of the current state of student digital literacy, this paper identifies prominent issues in areas such as competency structure, learning approaches, and resource access. Building upon this foundation, a competency enhancement pathway centered on “fundamental diagnosis—curriculum empowerment—student-led learning—systemic support” is proposed. This framework emphasizes the organic synergy of precise identification, systematic construction, autonomous growth, and institutional safeguards. Moving forward, private universities should continuously optimize their educational offerings to establish a student-centered digital literacy ecosystem, thereby driving comprehensive improvements in talent cultivation quality and student holistic development.

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