WHIOCE PUBLISHING PTE. LTD.
PROVIDING
FIRST-CLASS SCIENTIFIC INFORMATION
FOR TOP SCHOLARS

2025 Volume 3, Issue 4
Contemporary Education Frontiers
ISSN (Online): 3029-1860 ISSN (Print): 3029-1879

Research on the Path of Enhancing Teachers' Digital Competence in Private Colleges and Universities under Digital Transformation

Hua Dai
Prospect College, Chongqing College of Mobile Communication, Chongqing 401120, China

Copyright: © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract: With the in-depth development of the scientific and technological revolution and industrial change, the digital transformation of education has become an important trend in the field of global education. The purpose of this paper is to explore the strategies to enhance the digital competence of teachers in private colleges and universities in China in the context of digital transformation. Through literature review, policy analysis and field research, this study analyzes the current deficiencies in the application of digital technology by teachers in private colleges and universities, and explores the feasible paths to enhance teachers' digital competence in this type of colleges and universities in light of the characteristics of private colleges and universities, with the aim of providing new research perspectives for academics and providing practical guidance for the digital transformation of education in private colleges and universities. The results of the study are not only of great significance for enhancing the digital competence of teachers in private colleges and universities, but also provide a reference for the digital transformation of higher education and the improvement of talent cultivation quality in China.

Keywords: digital transformation of education; private colleges and universities; teachers' digital competence; strategy research;

Online publication: May 26, 2025

1. Introduction

The ongoing technological revolution and industrial transformation are entering a more advanced stage, fostering an accelerated pace of global digital transformation. With the widespread application of emerging technologies like artificial intelligence and big data in the education sector, educational digitalization has become a new hot topic in the field and is also the primary direction for future educational reform practices. According to the research findings on "Digital Transformation in Higher Education" jointly released by the UNESCO Center for Higher Education Innovation and the Institute of Education at Tsinghua University, in terms of curriculum and teaching, it is necessary to integrate digital technology into curriculum and teaching, thereby significantly expanding the scope of curriculum objectives, students, curriculum content, teaching activities, learning assessment and feedback, teachers, and teaching environments, while also comprehensively expanding the relationships among these elements.

In recent years, China has implemented an educational digitalization strategy. Currently, China's higher education digitalization is at a critical stage of transition from teaching transformation to smart education. Therefore, China urgently

needs a high-quality teaching staff to cultivate high-level digital economy talent. Therefore, contemporary university teachers must master certain information technologies, learn to utilize online media to access and mobilize various learning resources, and develop and use new technologies to enhance classroom teaching quality, thereby truly improving their digital competence. In the context of digital transformation, how university teachers integrate information technology into teaching and bridge the "digital divide" with students have also become urgent issues to address in the era of smart education. However, many university teachers, especially those in private universities, have misconceptions about information-based teaching and have not truly integrated information technology into classroom instruction. In terms of application, due to a lack of relevant training, teachers lack the necessary skills. Therefore, how to enhance university teachers' digital competence is one of the significant challenges facing private universities in the context of digital education reform.

To achieve this goal, all elements involved in course teaching—including educational content, teaching models, evaluation methods, teacher capabilities, and learning environments—must undergo adaptive adjustments during the digital evolution process to achieve coordinated development. However, university teachers currently face shortcomings in the application of digital technology, such as disadvantages in knowledge acquisition, transmission, analysis, and application. Many teachers' digital literacy remains at the theoretical understanding level, and their digital competence requires further enhancement. This has led to issues in university course teaching, including insufficient digital literacy mechanisms, lagging digital competence, inadequate digital application, and a lack of digital innovation capabilities. While there have been numerous research findings on enhancing university faculty members' digital competency in recent years, few studies have explored this topic from the perspective of private universities, a unique category of higher education institutions. As a faculty member with extensive experience in teaching at private universities, the researcher of this study aims to contribute new insights and value to existing academic research in this field.

2. Literature Review

In recent years, the issue of digital transformation in higher education has attracted significant attention from countries around the world and scholars. Governments worldwide have begun to prioritize the impact of information technology and digital technology on higher education. Among these, Western countries have taken the lead in both theoretical research and practical implementation of digital education (see **Figure 1**).

Framework (Year)	Dimensions of Educators' Digital Competence
EU "Digital Competence Framework for Educators" (2017)	Includes six areas of the digital competence framework for educators and a developmental stage model
USA "National Educational Technology Plan" (Higher Education Edition) (2017)	Proposes "reimagining the role of technology in higher education", exploring technology's role in student-centered higher education systems from five aspects: learning, teaching, assessment, infrastructure & systems, and leadership
UK "Framework for Digital Teaching" (2018)	Includes seven key areas: teaching planning, teaching methods, student employability, subject teaching, assessment, accessibility, inclusivity, and self-development
Norway "Professional Digital Competence Framework for Teachers" (2017)	Includes three dimensions (knowledge, skills, and abilities) and seven competence areas
Spain "Common Digital Competence Framework for Teachers" (2017)	Includes five areas (information & digital literacy, communication & collaboration, digital content creation, digital security, problem-solving) and 21 competencies

Figure 1. Digital Competence Frameworks for Educators

Digital transformation in education, as a key initiative for cultivating innovative talent and enhancing international competitiveness at the national level, has also received significant attention and widespread development in China. The digital transformation of higher education has achieved notable results in both theoretical research and practical application.

In terms of theoretical research, scholars have explored the impact of digital transformation on higher education from the following three aspects: Regarding the coupling of digital transformation and high-quality development in higher education, Wang Xingyu (2023) argues that "both are inevitable choices for higher education in the new development stage and share the same strategic implications" [1]. Xiao Guangde and Wang Zhehe (2022) argue that "digitalization has become the key driving force for educational reform in the new era, with educational demand guiding the direction of educational digital transformation" [2]; Regarding the relationship between digital transformation and higher education reform, Xu Xiaofei and Zhang Ce (2022) argue that "the digital society has accelerated the process of higher education digitalization, while higher education digitalization has endowed higher education reform with new content and corrected its direction" [3]; Regarding the challenges posed by digital transformation to traditional education, Li Ming and other scholars (2022) argue that "digital technological innovations have triggered systemic changes in higher education's talent cultivation philosophy, methods, and governance systems, yet the higher education system has yet to find adequate measures to address these changes" [4].

Based on the current state of research both domestically and internationally, leveraging digital transformation to lead and drive innovation in higher education has become the future trend and mainstream direction for the development of higher education worldwide. It is also a necessary pathway for China's higher education system to achieve high-quality development and educational modernization.

3. The Concept and Model of Digital Competence

The concept of "digital competence" was first proposed by the European Union in 2006. It encompasses confident, critical, and responsible use of digital technologies, as well as their application across various aspects of life, including learning, employment, and social participation. Digital competence is defined as a combination of knowledge, skills, and attitudes, which are essential for effectively navigating the digital domain [5]. In 2011, the EU launched the "Digital Literacy Project" and initially established five digital literacy frameworks. In 2012, the EU published a report titled "Digital Competence in Practice: A Framework Analysis," expanding the concept of digital competence into a system comprising 15 analytical frameworks [6]. In 2013, the EU released the "EU Citizens' Digital Competence Framework" and has continuously updated and improved it, evolving to version 2.2 by March 2022. This framework systematically outlines the five core "competence domains" that EU citizens should possess, including information literacy, communication and collaboration, digital content creation, digital safety awareness, and problem-solving skills [7]. In 2017, the EU introduced the "EU Digital Competence Framework for Educators (DigCompEdu)" (see **Figure 2**), providing a universal reference framework [8].

In 2022, the Chinese Ministry of Education researched and formulated the Teacher Digital Literacy Standard (see **Figure 3**) for the training and evaluation of teachers' digital literacy [9].

Most existing digital competency frameworks are developed for teachers in basic education. However, in higher education, there is no consensus on digital literacy standards or digital competencies for teachers. In 2023, Tondeur et al. addressed this issue by developing and validating a digital competency framework for higher education teachers (see **Figure 4**) and testing it with practitioners [10].

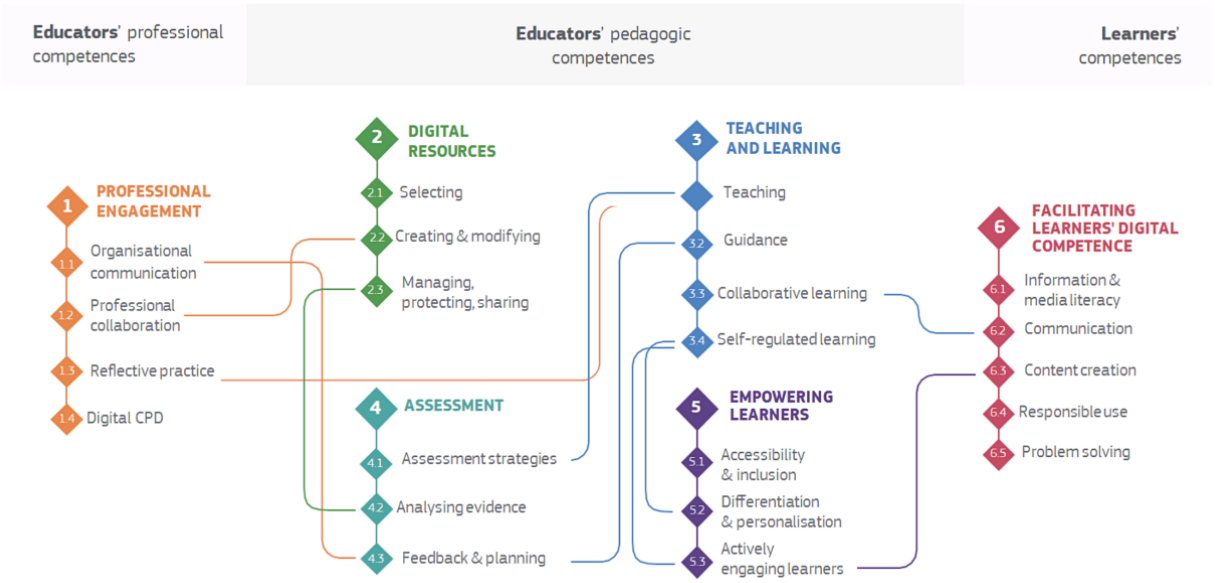

Figure 2. Overall framework of the EU Digital Competence Framework for Educators (DigCompEdu) [8]

Digital Awareness	Digital Knowledge & Skills	Digital Application	Digital Social Responsibility	Professional Development
-Digital Literacy -Digital Willingness -Digital Attitude	- Digital Technical Knowledge - Legal and Ethical Norms - Digital Teaching Learning & Training - Digital Technical	- Digital Teaching Design -Digital Teaching Implementation -Digital Academic Assessment -Digital Collaborative Education	- Legal and Ethical Norms -Digital Safety and Protection	-Digital Teaching Learning & -Training Digital Teaching Research & Innovatic

Figure 3. Teachers' Digital Literacy[9]

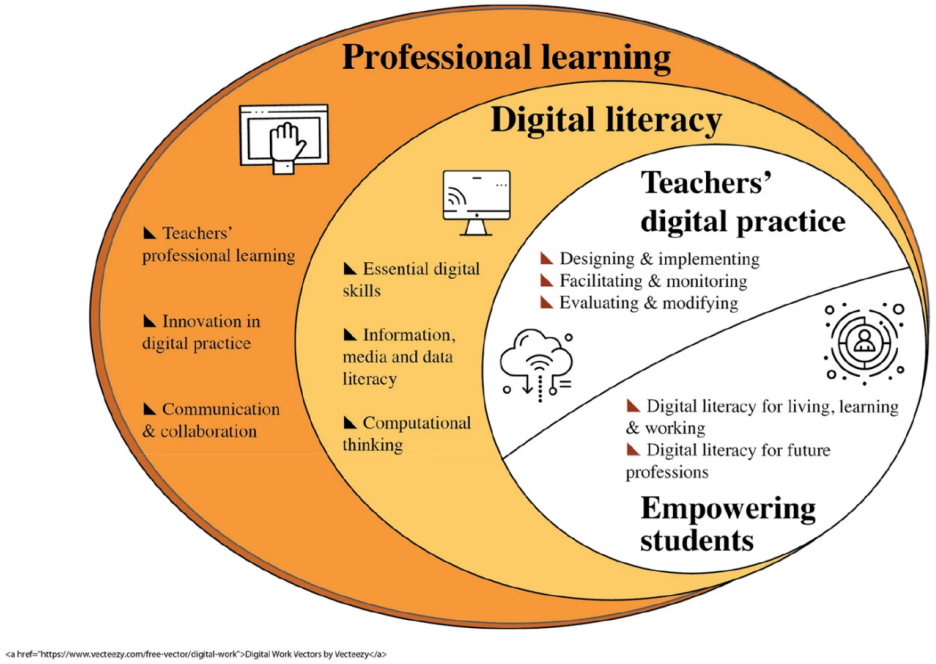

Figure 4. Higher Education Digital Competence (HeDiCom) Framework [10]

4. Research Methods

4.1. Research Design

This study will begin with the basic theory of digital competence, utilizing methods such as literature analysis, case studies, and questionnaire surveys. Following the logical sequence of understanding digital competence, enhancing digital competence, and assessing digital competence, the research will explore the digital competence of university faculty members.

4.2. Data Collection

The questionnaire on digital competence among university faculty members was modified based on the items in the "EU Framework for Digital Competence of Educators" (hereinafter referred to as the "Framework") issued and implemented by the EU in 2017, and then translated into Chinese. The questionnaire consists of three parts: 1) Personal Profile, 2) Application of Digital Competence, and 3) Strategies for Enhancing Digital Competence. Except for the first part, the rest are multiple-choice questions. The research team conducted a questionnaire survey among faculty members at the Vision College of Chongqing Yitong University from May to June 2024. The questionnaire was distributed online via a QR code on the "QuestionStar" platform, and a total of 30 questionnaires were collected, all of which were valid, resulting in a 100% response rate.

4.3. Research Results and Discussion

The survey participants were primarily middle-aged and young teachers, with a significant proportion of female teachers (83.33%). Most had less than 10 years of teaching experience (86.67%), with the majority holding the title of lecturer (63.33%). All participants held a master's degree (100%). This demographic profile indicates that young teachers are the main force driving digital transformation and should theoretically have a higher level of technological acceptance. However, their actual digital competence performance falls short of expectations.

This study systematically analyzed the current state of digital competence among teachers at private universities based on the six dimensions of the EU Digital Competence Framework. The findings reveal: In terms of professional engagement, teachers demonstrate a strong demand for building professional communities but exhibit low actual participation rates and over-reliance on school-provided training; digital resource development capabilities are generally strong but lack personalized adaptation; teaching applications exhibit a pronounced "tool-oriented" tendency, with most teachers remaining at the technology selection level, while only a few can design blended learning environments; in terms of assessment and feedback, real-time feedback is well-applied, but the cultivation of student self-assessment is weak; The weakest performance was observed in the dimension of empowering learners, with only a small portion effectively promoting student collaboration; digital literacy exhibited a polarized distribution, with most teachers demonstrating strong information discernment capabilities but lagging in tracking new technologies. These findings reveal structural contradictions in the development of digital competence among teachers at private universities, providing important basis for targeted training initiatives.

As can be seen from the above, the main challenges in enhancing the digital competence of teachers in private universities are as follows: First, the level of digital competence among teachers in private universities varies greatly, with most teachers lacking a correct understanding of digital competence and effective training pathways. Second, teachers have weak awareness of digital technology application and lack integration capabilities: in educational applications, many teachers lack professional information technology operational skills, unable to truly implement information-based teaching effects in instructional design, and lack practical exploration and experience in information-based teaching. Finally, related training is inadequate, and teachers lack intrinsic motivation. When faced with the vast amount of data resources available online, teachers have not mastered the ability to analyze and extract data resources. Additionally, insufficient training efforts by schools have led to teachers being unwilling to actively experiment with using information technology in the classroom. Therefore, to effectively achieve the project's overall objectives, it is necessary to conduct an in-depth and

comprehensive analysis of the current state, existing issues, and underlying causes of teachers' digital competencies in private universities, in order to propose targeted strategies and recommendations.

5. Practical Exploration of Enhancing Digital Competency Among Teachers at Private Universities

To effectively achieve the project's overall objectives, the project team will implement a practical approach to enhancing digital competency among teachers at the Vision College under Chongqing Yitong University, providing a solid factual basis for the final policy recommendations.

Optimizing the top-level design for cultivating digital competency and formulating a comprehensive strategy to enhance digital skills are essential steps toward building a digitally empowered workforce. In the process of comprehensively building the top-level design for teacher digital competency development, optimizing the top-level design for digital competency cultivation is a critical step. First, private universities should establish an overall strategy for enhancing digital competency, clearly defining specific goals, implementation steps, expected outcomes, and evaluation mechanisms within the strategy. Second, universities should create an open and inclusive digital environment, including providing necessary hardware facilities, software resources, and network support, and encouraging teachers and students to explore and utilize digital technologies. Institutions should also review and update their existing curriculum to ensure that course content reflects the latest developments in digital technology and meets students' digital literacy needs. Additionally, institutions should regularly organize seminars, workshops, and online forums to promote collaboration and knowledge sharing among faculty. Finally, institutions should establish a systematic monitoring and evaluation mechanism to conduct regular assessments of faculty digital literacy development. At the same time, effective incentive measures should be implemented, such as providing professional development opportunities, teaching rewards, and career advancement paths, to motivate teachers to improve their digital competence. Through these measures, universities can build a comprehensive, coordinated, and sustainable top-level design for teacher digital competence, providing necessary support for teachers and students to adapt to the needs of the digital age.

Also, It is important to strengthen the theoretical foundation and provide targeted training to enhance awareness of digital competence. The project team has already conducted training related to digital competence, including systematic learning of foundational theoretical knowledge and in-depth training on the digital competence framework. Through this training, teachers will be able to understand the core elements of digital competence, master the basic principles of applying digital technology in teaching, and recognize its importance in modern education. The training content will cover multiple aspects, including the use of digital tools, the creation of digital content, the protection of information security, and ethical issues in digital environments.

Furthermore, conducting practical training is essential for improving teachers' digital competence. The project team organized practical training to enhance teachers' digital competence, focusing on a combination of reverse teaching design workshops and practical operations to help teachers design digital teaching strategies based on learning objectives, and solve the current problems of "tool-oriented application" and "weak student-centered concepts." Training content includes: developing lightweight digital lesson plans based on a reverse design framework, creating interactive courseware using open-source tools, conducting learning data analysis training, and organizing "technology roulette" simulation activities to cultivate multi-technology hybrid application skills to meet teacher needs. Participating teachers are required to bring real course units to the training, with the final output including backward design logic diagrams and digital lesson plans. This enables a capability leap from "technical operation" to "teaching innovation" under the resource conditions of private universities. This training model directly addresses the three major contradictions identified in the questionnaire: the gap between willingness and capability, the disconnect between individual development and system support, and the separation between tool application and instructional design. It provides a practical and actionable path for enhancing the digital competency of teachers in private universities.

Finally, a comprehensive assessment and incentive mechanism should be established to effectively support and enhance teachers' digital competence. The project team will establish a comprehensive assessment and incentive mechanism for teachers' digital competence. This mechanism aims to provide teachers with personalized development recommendations through regular assessments of their digital competence levels and offer corresponding incentives based on the assessment results. The assessment will employ diversified methods, including self-assessment, peer evaluation, student feedback, and analysis of teaching outcomes. The incentive mechanism may include professional development opportunities, teaching resource support, honorary recognition, and rewards to encourage teachers to continuously enhance their digital competence.

6. Conclusions

With the advent of the digital age, the digital competence of university teachers has become a key factor in educational quality. This study found that the digital competence of university teachers not only concerns the development of individual abilities but also reflects the educational system's ability to adapt to digital transformation. Teachers' digital competence directly impacts students' learning outcomes, particularly in terms of information acquisition, processing, and innovative application. The study emphasizes the central role of teachers in cultivating students' digital literacy and the significant impact of teachers' own digital literacy on their teaching methods and outcomes. This study reviews and summarizes the competency model for teachers at private universities and proposes four cultivation strategies. Through the implementation of these strategies, it is anticipated that teachers at private universities will achieve significant progress in digital competency, thereby providing robust support for students' comprehensive development and offering new methods and strategies for digital literacy cultivation efforts at other universities.

Funding

2023 Chongqing Municipal Education Commission Higher Education Teaching Reform Project "Research on the Improvement of Digital Competence of Teachers in Private Colleges and Universities under Digital Transformation" (Project No. 234136)

Disclosure statement

The author declares no conflict of interest.

References

[1] Wang Xingyu. Digital Transformation and High-Quality Development of Higher Education: Coupling Logic and Implementation Pathways [J]. Social Sciences Frontline, 2023, (01): 236-244.

[2] Xiao Guangde, Wang Zhe. Key Areas, Content Structure, and Practical Pathways for Digital Transformation in Higher Education [J]. Chinese Higher Education Research, 2022, (11): 45-52. DOI: 10.16298/j.cnki.1004-3667.2022.11.06.

[3] Xu Xiaofei, Zhang Ce. Elements and Pathways of Digital Reform in China's Higher Education [J]. Chinese Higher Education Research, 2022, (07): 31-35. DOI: 10.16298/j.cnki.1004-3667.2022.07.06.

[4] Li Ming, Han Xibin, Li Meng, et al. Vision, Challenges, and Countermeasures for the Digital Transformation of Higher Education Teaching [J]. Chinese Journal of Educational Technology, 2022, (07): 23-30.

[5] Ren Youqun, Sui Xiaoxiao, Liu Xinyang. A Study on the EU Digital Literacy Framework [J]. Modern Distance Education Research, 2014(05): 3-12.

[6] Zheng Xudong. A Study on the Construction and Application of a Digital Competence Model for Primary and Secondary School Teachers in China [D]. Shanghai: East China Normal University, 2019: 36.

[7] Qingyi, W. (2023). A Study of the Improvement of Digital Literacy from the Perspective of DigComp 2.2: The Digital Competence Framework for Citizens. Library Journal, 42(383), 97.

[8] DigCompEdu SELFIE for TEACHERS. (n.d.). European Commission. Retrieved May 16, 2023, from https://unevoc.unesco.org/up/2023_05_16_DigCompEdu_SfT.pdf

[9] Lan Guoshuai, Guo Qian, Zhang Yi, et al. The EU Digital Competence Framework for Educators: Key Points and Implications [J]. Modern Distance Education Research, 2020, 32(06): 23-32.

[10] Ministry of Education of the People's Republic of China. Notice on the Release of the Industry Standard for Teachers' Digital Competence [EB/OL]. (2021-12-02)[2022-11-30]. http://www.moe.gov.cn/srcsite/A16/s3342/202302/t20230214_1044634.html

[11] Tondeur, J., Howard, S., Van Zanten, M., Gorissen, P., Van der Neut, I., Uerz, D., & Kral, M. (2023). The HeDiCom framework: Higher Education teachers' digital competencies for the future. Educational technology research and development : ETR & D, 71(1), 33–53. https://doi.org/10.1007/s11423-023-10193-5

Publisher's note

Whioce Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.