

Paths to Enhance Teacher Digital Literacy Under Educational Digital Transformation in China

XU Qing, GUO Jing

Krirk University, Bangkok, Thailand, 10220

In the context of the digital transformation of education in the new era, digital literacy for teachers is a new requirement for professional development. Teacher digital literacy encompasses four main aspects: attitudinal literacy, knowledge and skills literacy, instructional application literacy, and innovation and development literacy. Currently, there are several issues with teacher digital literacy, such as a lack of digital responsibility, insufficient digital knowledge and skills, weak digital application skills, and low digital innovation capability. Enhancing teachers' digital literacy is a complex and critical task. Based on the current state of teachers' digital literacy, this paper proposes the following approaches: (1) adherence to digital norms; (2) development of a robust training mechanism; (3) improvement of the evaluation system; (4) strengthening of digital innovation.

Keywords: educational digitalization, teacher digital literacy, enhancement pathways

1. Introduction

The “Overall Plan for the Construction of Digital China 2023” explicitly calls for the implementation of a digital education strategy. Digital technology has become an inevitable requirement of the times.¹ At the World Conference on Digital Education, which concluded on February 13, 2023, it was clearly stated that there is a need for digital transformation, enhancing the digital literacy of teachers and students. Thus, improving teachers' digital literacy is seen as a key step in accelerating the national digital transformation.² Enhancing teachers' digital literacy is a crucial force in pushing the digital transformation of education and is a necessary requirement for high educational development. Improving teachers' digital literacy should not only be theoretical but also applied in teaching, making digital technology a cornerstone for teachers' lifelong learning and professional development. Therefore, in this context, it is vital to continually enhance the digital literacy of the teaching staff, making teachers a key driving force in the digital transformation of education, thereby advancing the strategy for digital educational actions.

XU Qing, Ph.D. Candidate, Lecturer, Department of Chinese Language and Culture, Krirk University.

GUO Jing, Ph.D., Professor, Department of Chinese Language and Culture, Krirk University.

¹ The Central Committee of the Communist Party of China & the State Council. (2023, February 28). The “Overall Plan for the Construction of Digital China”. *People's Daily*.

² International Society for Chinese Language Teaching. (2020, August 26). Professional Competency Standards for International Chinese Teachers [EB/OL]. Retrieved from <http://www.ttbz.org.cn/upload/file/20220826/6379712643978012801366380.pdf>

2. Connotations of Teacher Digital Literacy

Teacher digital literacy, as a new requirement for teachers' professional qualities in the new era, can be specifically divided into the following five dimensions: digital awareness, digital technology knowledge and skills, digital application, digital social responsibility and ethics, professional innovation and development.³

2.1 Digital Awareness

2.1.1 *Understanding of digital technology*

A correct attitude is a prerequisite for establishing comprehensive digital literacy. Teachers should understand that the development of "digital technology" is unstoppable and that traditional educational ideas can no longer adapt to the new era. Establishing modern educational ideas is an important guarantee for realizing the digitalization of education. Teachers must recognize that digital technology can bring entirely new developments to education, and is urgently needed to push forward educational reforms under the digital transformation.

2.1.2 *Willingness to learn digital technology*

Digital literacy has become a new requirement for teachers in the digital age. It is essential both to meet the developmental needs of education under digital transformation and as an optimal opportunity for personal enhancement. Some teachers view digital technology as the "patent" of professionals in the field, reluctant to deepen their own digital knowledge and skills. Teachers can only enhance their knowledge reserves by continuously mastering new technologies and new knowledge, which allows them to solve a variety of problems as they arise. Therefore, teachers should not passively wait but instead break free from traditional thinking, actively learn, explore, innovate, and practice to lay a solid foundation for conducting digital education effectively.

2.1.3 *Proper digital ethics awareness*

Digital ethics are the norms and standards of behavior for information generation and dissemination in the internet environment. As digital technology continues to evolve and spread in our society, many ethical issues emerge. In the context of big data, teachers should always maintain awareness of digital security and the copyright of digital resources, understand how to use digital resources appropriately, uphold correct values, respect the rights of others, regulate their personal behavior in digital activities, and contribute to creating a green and equitable online environment.

2.2 Digital Technology Knowledge and Skills

2.2.1 *Theoretical knowledge of digital technology*

Possessing theoretical knowledge of digital technology is a fundamental prerequisite for teachers to conduct effective instruction. This knowledge primarily includes the basic features, technical principles, and development of big data, the internet, computers, and artificial intelligence, as well as the functional uses of common office software, micro-lecture software, and smart platforms. The first step for teachers to enhance their digital literacy is to deepen their theoretical understanding of digital technologies and products, make reasonable use of digital teaching equipment, and effectively advance teaching work to improve educational quality.

³ Ministry of Education. (2022, November 30). Digital Literacy for Teachers [EB/OL]. Retrieved from <https://www.gov.cn/zhengce/zhengceku/2023-02/21/5742422/files/284e9526cd-2c4076ac2479a88e02a555.pdf>

2.2.2 Operational methods of digital technology

In the context of educational digitalization, multimedia and other digital devices have become the mainstream tools for school teaching. Digital technology proficiency should extend beyond basic computer operations to include mastery of Office software and understanding the basic operational norms of online teaching platforms like Tencent Meeting and DingTalk. Teachers should learn how to retrieve valuable data and information via the internet, create videos and images to enrich classroom teaching, and leverage digital information as a key leverage point for their professional development prospects.

2.3 Digital Application

2.3.1 Digital instruction design and implementation capability

Facing a completely open, intelligent, and automated teaching environment and educational resources, teachers should start with the actual needs of the classroom, fully explore, and utilize high-quality digital education resources. Before initiating educational instruction, teachers use digital technology for learning assessments, understanding course progress, and analyzing students' knowledge reserves and learning abilities. According to the objectives of the course, they collect digital resources from multiple channels and integrate them into their teaching. Teachers proficiently use digital technologies and digital software to create high-standard digital instructional content that meets learners' needs, optimize the teaching process, and achieve a deep integration of digital technology with teaching to enhance instructional effectiveness.

2.3.2 Digital teaching evaluation capability

Having excellent digital teaching evaluation capabilities not only enhances a teacher's work but also monitors students' academic performance. In teaching, teachers can use digital evaluations to supervise their own teaching activities and performance, allowing timely adjustments to their teaching methods. In educational evaluations, digital tools can also be used to assess students' classroom performance, learning progress, and academic quality. Teachers selectively choose digital tools to analyze students' academic outcomes scientifically and systematically.

2.4 Digital Social Responsibility and Ethics

The concept of digital social responsibility and ethics has emerged as a critical aspect of teacher digital literacy. This encompasses the responsibilities that educators must uphold in their professional and personal interactions involving digital technologies. As the gatekeepers of knowledge and as influential figures in the lives of students, teachers are expected to exemplify ethical behavior in the digital domain, which includes safeguarding data privacy, ensuring equity in access to digital resources, and promoting responsible online interactions.

2.4.1 Safeguarding data privacy

Educators have a fundamental duty to protect the privacy of their students' data in an increasingly digital world. This involves not only securing sensitive information from unauthorized access but also educating students about the importance of privacy settings and the potential risks of data sharing. Teachers must stay informed about the latest data protection laws and school policies, implementing these rigorously in their daily digital interactions and when using educational technologies, ensuring a secure learning environment for all students.

2.4.2 Ensuring equity in access to digital resources

Equity in access to digital resources is essential for providing all students with fair opportunities to succeed in a technologically driven world. Teachers should advocate for and facilitate equal access to technology and

digital content within their schools. This includes working towards the provision of devices and internet access for underprivileged students and adapting digital tools to meet diverse learning needs and disabilities, thus ensuring that no student is left behind due to technological barriers.

2.4.3 Promoting responsible online interactions

Promoting responsible online interactions is critical in educating students about digital citizenship. Teachers should model and teach appropriate online behaviors, such as respecting others' opinions, avoiding cyberbullying, and understanding the impact of their digital footprints. By integrating digital ethics into the curriculum, educators can foster a classroom environment that encourages students to think critically about how they engage with others online and the consequences of their actions in the digital space.

2.5 Innovation and Development Literacy

2.5.1 Innovation in digital teaching capabilities

The current society encourages teachers to become “innovative talents.” In terms of teaching models, teachers can break through traditional classroom concepts, utilize digital characteristics to design diverse teaching plans, and increase interaction between teachers and students as well as among students, innovating in teaching content. Teachers also need to become developers of resources, using digital tools to meet students' needs and enrich their learning content. In teaching methods, teachers must carefully consider how to combine online teaching with traditional teaching and how to use information technology to change teaching methods and enhance student learning efficiency.

2.5.2 Innovation in digital research capabilities

Digital research refers to the digital research knowledge, skills, and innovative thinking that teachers possess, which interact and support each other. The development of digital education requires teachers to continuously blend theoretical knowledge with practical experience and explore new ideas. Digital research capabilities mean that teachers need to be aware of problems, address new issues and needs of the digital age, integrate their existing digital knowledge, and delve into, study, and summarize the content of digital research. One person can inspire a group, leading teachers to focus on, and love, research, creating a learning community around digital research. This approach uses digital research as a lever to enhance the quality of digital education and teaching.

3. Current State of Teacher Digital Literacy

3.1 Need for Enhancement in Digital Responsibility of Teachers

Digital social responsibility refers to the responsibilities that teachers bear in the digital age, reflecting their moral standards and behavioral norms. In recent years, with the rapid development of digital technology in China, issues such as data security and social ethics have become frequent, including privacy leaks, internet fraud, and the spread of rumors. Some teachers have a superficial understanding of the online environment and lack strong cybersecurity awareness, leading to frequent incidents such as computer virus infections, information leaks, and violations of information intellectual property rights. In this rapidly evolving information society, teachers may engage in erroneous behaviors that could bring irrevocable consequences to schools and students. Therefore, teachers must lead by example, constantly be mindful of their actions, adhere to digital norms, strengthen their digital security awareness, and prevent digital security risks.

3.2 Insufficiency in Digital Knowledge and Skills of Teachers

Theoretical digital knowledge is a prerequisite for teachers to conduct a range of digital teaching activities. Whether teachers understand the essence of digitalization and the significance of digital technology greatly affects the outcomes of their educational teaching. Many teachers have only a superficial understanding of digitalization and can only perform basic computer operations. However, as the educational digital transformation progresses, there is a rapid increase in societal expectations for teachers' digital literacy, yet their digital knowledge is noticeably lacking. For instance, handling images, producing or editing videos, and processing audio are areas that require further deepening of knowledge. Insufficient skills in data processing software and digital knowledge inevitably diminish the quality and outcomes of educational teaching, making it crucial for teachers to enhance their digital knowledge and skills.

3.3 Weakness in Digital Application Capabilities of Teachers

Digitalization is becoming a mainstream trend in future teaching, and the nation is investing substantial funds to improve educational facilities aimed at enhancing teaching quality through digital education and accelerating the educational digital transformation. However, current digital teaching among teachers is still superficial and fragmented. Some schools still have older teachers who do not know how to use multimedia and online teaching equipment during classes. Teachers' unfamiliarity with digital technology and lack of practical experience prevent them from fully utilizing modern technologies to enhance students' learning outcomes and engagement.

3.4 Lacking Innovation Capabilities in Digitalization for Teachers

As information technology rapidly advances, digital courses, online learning, and cloud-based teaching have become the new trends in education. Currently, China's education digitalization is primarily at the application stage. Schools are equipped with some basic digital resources, but teachers often fail to leverage the advantages of digital technology in redesigning teaching designs, contents, and methods for personalized student instruction. In terms of educational research, teachers generally have weak problem awareness and need to keep pace with digital developments while integrating their own teaching directions. They must utilize digital research methods to grasp the current state of research, discard traditional educational concepts, and adopt a lifelong learning mindset. Only by continuously learning new concepts can teachers adapt to the development of the times and sustain their creativity.

4. Pathways for Enhancing Teacher Digital Literacy

4.1 Adhere to Digital Norms and Lead by Example

Teachers play a leading role in education, hence they should enhance their digital ethics awareness, rectify digital morals, standardize digital applications, and form a scientific view of digital technology values. They should rationally examine the effectiveness and limitations of digital technology in education and, based on this understanding, properly manage the relationship between digital technology, teaching, and society. This ensures that digital technology does not lead to alienation in education due to its misapplication. In the vast digital environment, where negative digital resources exist, teachers must remember the moral standards of digital norms, ensure the appropriateness of content provision and use, and the security of information access and application, thus

becoming maintainers and practitioners of a healthy online environment. By leading through their actions, they guide students and society to jointly advance digital education and the construction of a digital China.

4.2 Strengthen Training Mechanisms, Enhance Pre-service and In-service Training for Teachers

As societal demands for digital technology in teachers continue to increase, precise training is essential to meet these needs and improve the quality of teacher training. Firstly, during pre-service training, universities should introduce students to digital education policies, the basic essence of digital technology in the new era, and relevant knowledge, equipping them with fundamental digital skills such as collecting, retrieving, applying, summarizing, and organizing. This prepares them for future teaching roles. Secondly, for in-service training, schools should establish a standardized digital technology training system to enhance teachers' digital literacy. Schools could offer digital technology training courses tailored to different types of teachers or establish a dedicated center for digital training for teachers, culminating in a uniform assessment to verify whether teachers meet digital literacy standards.

4.3 Improve the Evaluation System, Stimulate Teachers' Intrinsic Motivation for Learning

First, schools should implement regular monitoring of teachers throughout the entire process of digital literacy education. Furthermore, all school staff must sincerely participate and view digital literacy education as a key measure to enhance their competence in educational work. By solidly carrying out education management work and achieving tangible results, schools can effectively enhance teachers' engagement and performance in digital literacy.

Secondly, schools need to implement an evaluation system for teachers that includes digital literacy as part of the professional competency assessment criteria. It's essential that schools do not rely solely on outcome-based assessments for evaluating teachers' digital proficiency. Instead, a coordinated approach that combines both outcome-based and process-oriented evaluations should be employed. This integration into every aspect of teaching allows for the development of continuous, standardized, objective, and diverse evaluation standards.

Lastly, to ensure that teachers continuously engage in exploring digital literacy and maintain sufficient motivation for learning, schools should refine the evaluation system and enhance the reward mechanisms. This would stimulate teachers' intrinsic motivation towards digital literacy and continually reinforce their learning outcomes.

4.4 Strengthen Digital Innovation, Promote Lifelong Learning in Digital Technology

As digital education evolves rapidly and digital transformation occurs swiftly, teachers need to maintain an attitude and capacity for lifelong learning. They must keep up with new technologies and concepts, embrace changes, and adapt to the constantly evolving digital environment. Teachers should utilize online resources to continually learn new knowledge and skills and apply these in their teaching practices. By using online resources and teaching platforms, teachers can engage in teaching case analyses, methodological research, and classroom innovation explorations, and share these findings with other teachers to foster a positive environment for collaborative learning. Therefore, teachers should persistently explore new processes in digital education and, through continuous innovation and practice, achieve lifelong learning and sustainable development.

Conclusion

The digital literacy of teachers is a critical factor in the modern educational landscape, where digital transformation is not just an option but a necessity. This paper has outlined the current state of digital literacy among teachers, which reveals significant areas for improvement including digital responsibility, knowledge and skills, application capabilities, and innovative competencies. Despite the growing infusion of digital technology into education, many teachers remain inadequately prepared to fully utilize these tools to enhance teaching and learning. Key pathways have been identified to enhance teachers' digital literacy. These include adhering to digital norms, leading by example, implementing comprehensive and continuous evaluation systems, and providing both pre-service and in-service training tailored to the evolving demands of digital education. Additionally, by fostering a culture of lifelong learning and promoting digital innovation, teachers can be better equipped to meet the challenges and opportunities presented by digital education. Enhancing the digital literacy of teachers is imperative for the development of a more effective, responsive, and innovative educational environment. Schools, educational authorities, and policymakers must prioritize investment in teacher training, provide robust support systems, and encourage a culture of continuous professional development. Through these efforts, the education sector can make significant strides in achieving the goals of digital transformation and ultimately, improve the quality of education delivered to students.

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