

The Improvement Path of Teacher Digital Literacy under the Background of Industry Standards for Teacher Digital Literacy

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Abstract: *In the context of the development of digital education, teachers' digital literacy has become a key factor affecting the effectiveness of education. The release of the industry standard "Digital Literacy for Teachers" conforms to the requirements of the digital era for educational development, and proposes new industry standards for teachers to adapt to digital change and the future of education. In this context, conducting a systematic study on the value connotation, challenges, and improvement paths of teachers' digital literacy is undoubtedly an era proposition with strong theoretical and practical significance.*

Keywords: *Education digitization, Digital literacy of teachers, Upgrade Path*

1. Introduction

Promoting the digitization of education is an important requirement put forward in the report of the 20th National Congress of the Communist Party of China to achieve the goal of high-quality development in education. In the current context of "promoting the construction of a strong education country through digital transformation", ^[1]promoting the digitization of education has become an important component of the current development of education, and promoting the digital literacy development of teachers has important practical significance. In February 2023, the Chinese Ministry of Education officially released the industry standard "Digital Literacy for Teachers" ^[2]at the World Education Conference. This standard provides a framework for teachers' digital literacy from five dimensions: digital awareness, digital technology knowledge and skills, digital applications, digital social responsibility, and professional development. It provides guidance for the development of teachers' digital literacy in education departments and also provides a basis for future training and evaluation of teachers' digital literacy. Digital literacy can be said to be a continuation of information literacy in the context of digital transformation, but different eras emphasize different qualities and skills. With the continuous advancement of digital transformation, digital technology will deeply penetrate the education system, promoting digital transformation in all fields, processes, and elements. The requirements for teachers have unprecedentedly increased, so digital literacy has become a necessary key literacy for teachers in the digital era.^[3]

2. The Connotation of Digital Literacy for Teachers

Digital literacy of teachers refers to the awareness, ability, and responsibility of teachers to appropriately utilize digital technology to acquire, process, use, manage, and evaluate digital information and resources, discover, analyze, and solve educational and teaching problems, optimize, innovate, and transform educational and teaching activities. The industry standard "Teacher Digital Literacy" released in November 2022 divides the framework of teacher digital literacy into 5 primary dimensions, 13 secondary dimensions, and 33 tertiary dimensions. Among them, the first level dimensions include: digital awareness, digital technology knowledge and skills, digital applications, digital social responsibility, and professional development.^[4]

2.1 Concept Transformation: Lifelong Learning and Professional Development

With the development trend of digitalization, informatization, and intelligence in education, digital technology is driving the transformation and transformation of education, and the professional development of teachers is also facing huge challenges. The professional development of teachers not only means the mastery of the subject's professional level, but also includes the comprehensive dimension of improving concepts, knowledge, and skills. Under the traditional educational learning paradigm, completing a fixed period of learning and gradually achieving further education is the main task of teachers. In the current context of digital education, the integration of digital learning methods and educational resources not only enhances students' initiative in learning, but also enhances teachers' autonomy in learning, cultivates teachers' lifelong learning ability, and promotes their professional development. Guided by the concept of lifelong learning, we actively respond to the new requirements of digital education, continue to pay attention to, understand, and learn about the new development of digital technology, grasp the main characteristics and application scenarios of digital technology, and integrate it with classroom teaching, actively adapting to the new situation of education and professional development in the current information society.^[5]

2.2 Capability Change: Accepting and Utilizing Digital Technology

Faced with complex and massive internet information, teachers are required to be able to identify, analyze, and access key information and resources, laying the groundwork for further processing and integration of information. Information literacy refers to a teacher's ability to process and utilize information resources, also known as digital ability or digital literacy.^[6] The concept of teacher information literacy is diverse, multi-level, and comprehensive, which dynamically changes with the development of the information age and has different specific requirements at different stages. The composition of teacher information literacy should not only include a keen awareness of information, innovative ability in information, good information ethics, modern educational concepts, and the ability to integrate information technology with teaching.^[7] It also means promoting digital literacy in the dimension of teacher competence through professional digital participation.^[8] Among them, information awareness mainly refers to the initiative and sensitivity of obtaining, distinguishing, and applying information, including information cognition, information emotion, and information will.^[9] In terms of perception and utilization ability, improving the usability of cutting-edge digital technology equipment and teachers' perception of its usefulness is beneficial for providing students with more precise and suitable digital learning resources, and thus has a positive promoting effect on teachers' digital teaching practice activities, such as micro courses, rain classrooms, virtual simulation classroom training, and other digital teaching practice models.^[10] In order to be competent in new digital teaching scenarios, teachers should use information technology to continuously enhance their ability to use digital technology for teaching design and activities, and actively carry out curriculum practice exploration activities based on new technologies. Especially for theoretical courses with strong academic rationality and high degree of abstraction, teachers can use virtual reality technologies such as VR to effectively integrate course knowledge and digital education resources, embed teaching scenarios composed of matching knowledge, and provide opportunities for students to engage in experiential and situational learning through digital practice.^[11]

2.3 Value embodiment: integration of classroom knowledge, information technology, and value

In the context of digital education, with the introduction of digital technologies such as virtual reality, traditional classroom organization has been changed. Multimedia organizations such as text, images, and animations have become dynamic and interesting teaching contexts, and teaching effectiveness has been optimized. Facing the main body of the classroom, while maintaining the freshness brought by the introduction of information technology into the classroom, truly leveraging the educational value of intelligent technology and realizing the value of cultivating morality and talent is the key to digital education. Whether it is the specific teaching context, the specific strategies for organizing classroom teaching, and the appropriate use of digital resources, all are aimed at more effective transmission of course knowledge and value dimensions. Only by improving the adaptability and integration of subject value goals and digital technology can we truly achieve digital curriculum reform. Under the overall arrangement of the "Opinions on Strengthening the Application and Management of Online Open Courses in Higher Education Institutions"^[12] issued by the Ministry of Education, large-scale construction of online open courses began in 2015. This measure urges teachers to consolidate and use digital course resources such as lesson plans, courseware, and teaching videos. This includes various

short and concise MOOCs in online courses, as well as highly systematic high-quality online open courses at the school, provincial, and national levels. As of the end of February 2022, the number of online MOOCs in China has exceeded 50000, with nearly 800 million course takers and over 300 million students receiving MOOCs credits. Both the number of MOOCs and the number of students studying have ranked first in the world.^[13]

3. The Challenges Faced by the Development of Digital Literacy for Teachers

3.1 Insufficient understanding of teachers' digital literacy

Although China officially promulgated the industry standard for teacher digital literacy in 2022, how to implement it in all stages and links of teacher talent cultivation process and ensure the effectiveness of teacher digital literacy cultivation is still an urgent problem to be solved. At present, schools do not provide sufficient training on teachers' digital literacy, the training content is too structured, and the training methods are single, which makes the improvement of teachers' digital literacy level not effective enough. Moreover, teachers do not have a correct understanding of the relationship between improving their own digital literacy and teachers' professional growth, and their awareness of self-learning is insufficient. The weak concept of lifelong learning and the lack of cooperation awareness have become important factors hindering teachers' professional growth.

3.2 Insufficient digital teaching ability

In the digital environment, teachers not only need to have the most basic digital technology skills, but also need to have digital literacy such as critical thinking, innovative thinking, and problem-solving awareness. They should be able to use digital tools and technologies to create knowledge and innovative processes to solve problems in the digital environment.^[14] However, in the real environment, teachers' digital problem-solving and innovative application abilities are still relatively lacking. Most teachers cannot fully utilize digital tools to innovate teaching methods, improve teaching design, and optimize classroom teaching modes. When conducting online teaching, they still habitually apply offline teaching modes and methods, and cannot effectively adapt to the characteristics and requirements of online teaching. Especially senior teachers find it difficult to quickly adapt to the changes in the digital environment and master modern digital teaching technologies, such as micro lesson recording and statistical analysis of learning outcomes. They habitually follow traditional educational and teaching methods and find it difficult to adapt to the changing digital environment.

3.3 Insufficient integration of curriculum and digital technology

The main application scenario of current digital teaching is offline classroom teaching, where most of the time various digital teaching resources are interspersed in regular classrooms, and a few are expressed in the form of blended online and offline courses that integrate some online teaching. Online and offline blended teaching can leverage both online and offline advantages, fully unleashing the enormous energy of digital teaching resources. The theoretical community generally believes that it may become the mainstream mode of classroom teaching in the post pandemic era.^[15] Due to the fact that online and offline teaching are two vastly different teaching modes in terms of presentation and course content, they cannot be naturally integrated in the process of promoting blended online and offline teaching. Most schools have relatively clear construction guidelines and mature construction experience in creating traditional high-quality courses or online high-quality courses. The former is mainly offline, while the latter is mainly online. However, the implementation of mixed online and offline courses is relatively difficult, especially in universities where each course has several clear teaching contents, which teaching contents are suitable for utilizing and which digital resources are the details. How to intersperse appropriate digital resources in the classroom to achieve better teaching results is a great challenge for independent individual teachers.

4. The path to improving teachers' digital literacy

4.1 Transforming Concepts and Improving Teachers' Digital Awareness

By changing teachers' concepts, updating teaching concepts, enhancing digital thinking, cultivating teachers' sensitivity to educational digitization, accepting the changes brought by information technology

to the original teaching mode, actively incorporating information technology into teaching design, and forming a good teaching ecology. With the help of information technology equipment, choose appropriate teaching content and fully utilize the maximum effectiveness of information technology in classroom teaching. Fully grasp the relationship between good people and technology, as well as between the classroom and the use of technology, fully adhere to the main guiding role played by teachers in the classroom, use information technology methods reasonably and appropriately to carry out educational and teaching practices, and ensure that students become qualified newcomers of the times and establish correct worldviews, outlooks on life, and values.

4.2 Improve training mechanisms and enhance digital technology capabilities

Fully considering the latest development of digital technology and the progress of educational informatization, combined with the career development plan of teachers in China, with more detailed and precise training, we will build a "trinity" support system for the government, schools, and individual teachers, and jointly improve teachers' digital technology capabilities. At the local government level, it is possible to develop an overall framework for teacher digital literacy, clarify the basic concepts and skills of teacher digital literacy, develop a plan and implementation plan for teacher digital literacy development, select a group of digital education experts with high levels of digital literacy to provide guidance to schools, and carry out teacher digital literacy training, seminars, and exchange activities. At the school level, teachers' digital literacy improvement is planned and systematically incorporated into school activities, and incentive mechanisms are formulated to stimulate teachers' internal drive to learn and further improve teachers' digital literacy. At the individual level of teachers, establish the concept of lifelong learning, clarify their own digital literacy development goals and needs, strengthen their mastery of digital technology, and be proficient in operating various teaching tools. They can screen and manage various educational resources, optimize classroom teaching, and fully utilize various high-quality shared resources provided by the government, society, and schools to comprehensively improve digital literacy.^[16]

4.3 Strengthen platform construction and promote the application of digital technology

The improvement of teachers' information literacy requires support from the government and schools in terms of policies, funding, and other aspects. The government should ensure policy and financial support for improving teachers' information literacy. In terms of policy, schools should be encouraged to carry out various activities to improve teachers' information literacy. In terms of economy, schools should be provided with financial support for digital construction and teacher training. Strengthen the construction of digital platforms, including teaching resources, resource management platforms, and online teaching support platforms. Teaching resources include online courses, audio-visual materials, electronic lesson plans, digital material libraries, etc. in various disciplines, which can help teachers better learn from successful experiences and absorb materials that are conducive to their own teaching; The resource management platform can keep up with the current development of digital education and timely introduce, update, and manage teaching and learning resources; The online support platform can provide communication between teachers and students, as well as a place for teachers to develop and publish new courses.

The digital trend is sweeping across all walks of life, and the teaching profession is also undergoing rapid changes in the direction of digitization. The teaching profession must proactively adapt to the requirements of the digital age, build a lifelong learning, full-process, systematic, and multi-dimensional digital literacy training system in accordance with the characteristics and trends of teachers' professional development and combined with the cutting-edge trends of digital technology to continuously improve teachers' digital literacy.

References

- [1] Ministry of Education of China. *Promoting the Construction of an Education Power through Digital Transformation - A Review of Positive Results in China's Education Digitalization Work* [EB/OL] [2023-02-13] http://www.moe.gov.cn/jyb_Xwfb/s5147/202302/t202302131044102.html
- [2] Ministry of Education of China. *Notice on Issuing the Education Industry Standards for "Digital Literacy of Teachers"* [EB/OL] http://www.moe.gov.cn/srcsite/A16/s3342/202302/t20230214_1044634.html

- [3] Mou Yanna. *Interpreting the Standard of "Digital Literacy for Teachers" - Interview with Professor Wu Di, Expert of the Standard Compilation Group*[J]. *Digital Teaching in Primary and Secondary Schools*.2023.8.
- [4] Ministry of Education of China. *Notice on Issuing the Education Industry Standards for "Digital Literacy of Teachers"* [EB/OL] http://www.moe.gov.cn/srcsite/A16/s3342/202302/t20230214_1044634.html
- [5] Ranni Zhang. *The Connotation Characteristics and Development Path of Digital Literacy of Teachers in the Perspective of Digital Education* [J]. *Continuing Education Research*. 2023.8
- [6] Xinfeng Gao, Li Chen. *Contextual Analysis of Information Literacy, Digital Literacy, and Network Literacy Use—Content Analysis Based on Domestic Government Documents and International Organization Reports* [J]. *Modern Distance Education*, 2021 (2): 70-80
- [7] Shuxiao Xie. *The Composition and Cultivation Approaches of Information Literacy of University Teachers* [J]. *China Modern Education Equipment*, 2015 (8)
- [8] Punie, Y. & C. Redecker. *European Framework for the Digital Competence of Educators: Dig Comp Edu* [M]. *Luxem bourg: Publications Office of the European Union*, 2017
- [9] Min Chen, Chi Zhou, Di Wu. *Research on the Evaluation Index System of Information Literacy for Primary and Secondary School Teachers* [J]. *China Electronic Education*, 2020 (8): 78-85
- [10] Chen Xi, Shu Dingfang, Zhu Yan. *Investing in service foreign language teachers' beliefs about using information and communication technology* [J]. *Asia Pacific Education Research*, 2021 (1): 59-70
- [11] Ranni Zhang. *The Connotation Characteristics and Development Path of Digital Literacy of Teachers in the Perspective of Digital Education* [J]. *Continuing Education Research*. 2023.8
- [12] The Ministry of Education of China. *Opinions on Strengthening the Application and Management of Online Open Curriculum Construction in Higher Education Institutions* [R]. https://www.gov.cn/xinwen/2015-04/28/content_2854089.htm?from=groupmessage&isappinstalled=0
- [13] Miaomiao Liu. *Director of the Higher Education Department of the Ministry of Education, Wu Yan: Building a New Form of Higher Education through Digitalization* [J]. *Outlook*, 2022 (31)
- [14] *European Mission DigComp into Action: Get in spun, Make It Happen A User Guide to the European Digital Competence Framework EB/OL* (May 22, 2018) [November 16, 2022] [Https://publications JRC.ec.europa.eu/repository/handle/JRC110624](https://publications.jrc.ec.europa.eu/repository/handle/JRC110624)
- [15] Haidong Li, Hao Wu. *Research on the Quality Evaluation System of Blended Teaching Based on the Whole Process - Taking National Level Online and Offline Blended First Class Courses as an Example* [J]. *China University Teaching*, 2021 (5)
- [16] Chunhua Zhang, Shimei Han, Xiaojing Bai. *Digital Literacy and Its Cultivation Strategies for Future Development: A Study Based on the "New Media Alliance Horizon Project Digital Literacy Strategy Briefing"* [J]. *China Distance Education*, 2019 (4): 9-16