

Research on the Strategies of Improving Digital Literacy of Teachers

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ABSTRACT

The 20th National Congress of the Communist Party of China also clearly proposed promoting education digitalization, so that the comprehensive digital transformation of education became something that every teacher has to face. With the application of the internet and artificial intelligence in modern education, teachers' digital literacy has become a key factor in the development of China's education digital transformation. This paper introduces the background of digital education in China and analyzes the definition of digital literacy. Based on the interpretation of Digital Literacy of Teachers officially released by the Ministry of Education in 2022, the paper proposes the strategies for improving and developing teacher digital literacy.

Keywords: Digital literacy, "Digital Literacy of Teachers", Digitalization strategy, Digitization of education.

1. INTRODUCTION

The National Education Work Conference in January 2022 proposed the implementation of the Education Digitalization Strategy, which has become an important breakthrough in opening up new tracks for education development and shaping new advantages in education development. Building a national intelligent education public service platform has become an important way to accelerate the digital transformation of education. The 20th National Congress of the Communist Party of China explicitly proposed to promote the digitization of education and build a learning society and a learning oriented country with lifelong learning for all.

In November 2022, the Ministry of Education released the "Digital Literacy of Teachers" [1] industry standard, which provides a framework for teacher digital literacy and proposes the requirements from different dimensions.. Teachers should make appropriate use of digital technology to acquire, process, use, manage, and evaluate digital information and resources, discover, analyze, and solve educational and teaching problems, and assume the responsibility of the era of digital upgrading and replacement of education.

With the rapid development of digital technology and the rise of digital education, as well as the promotion of national digital strategies, the digital transformation of education has entered the new phase. The integration of digital technology and education is reshaping the education ecology, and both teaching and learning have undergone profound changes. In order to cultivate more students who can better adapt to the digital age, teachers must keep pace with the development of digital technology and face the practical need to enhance their own digital literacy abilities. Faced with a wide and open online learning environment and digital educational resource platforms, teachers need to integrate new digital technologies with educational learning and promote the digital transformation of education.

This paper aims to explore the connotation of digital literacy, explore the path for teachers to enhance their digital literacy, achieve the comprehensive development of teachers' literacy under digital conditions, and better serve the fundamental goal of cultivating morality and talents.

2. DIGITAL LITERACY

Digital literacy is not presented in the literature as a concept itself but as a kind of ensemble and joining of cultural and historical understandings and practices regarding the use of information, mediated by digital technologies, on any aspect of daily human life [2][3][4]. Digital literacy is actually an extension and expansion of information literacy in the digital age. The expert to propose the concept of "information literacy" was Paul Zurkowski, the president of the American Information Industry Association. He first mentioned the concept of information literacy in a speech in 1974, describing it as "the technology and skills people use to solve problems with information."

The first scholar to study "digital literacy" was Israeli scholar Yoram Eshet Alkalai, who proposed five frameworks for digital literacy in 1994: The first is image literacy, which refers to the ability to learn to understand visual graphic information. The second is the ability to recreate literacy, which refers to the ability to integrate various media (text, images, and sound) and give new meaning. The third is branch literacy, which refers to the ability to construct knowledge from fragmented and non-linear information. The fourth is information literacy, which refers to the critical thinking ability to discern the applicability of information; the fifth is social emotional literacy, which refers to the ability to emotionally communicate with digital forms and discern human nature in virtual spaces. The five framework concept is considered the embryonic form of the concept of digital literacy.

In December 2022, the Ministry of Education released the "Teacher Digital Literacy" education industry standard, which provides action guidance for promoting the national education digitalization strategy, encouraging teachers to use digital technology, innovate and transform educational and teaching activities. Teacher Digital Literacy requires teachers to use digital technology resources to carry out learning. Teachers should innovate teaching models and improve teaching activities based on personal development needs from five dimensions: teacher digital awareness, digital technology knowledge and skills, digital applications, digital social responsibility, and professional development.

2.1 Digital Awareness

The active reflection of objectively existing digital related activities in the minds of teachers includes digital awareness, digital willingness, and digitalization will, including teachers' understanding of the value of digital technology in economic, social, and educational development, as well as their awareness of the potential new problems that may arise in education and teaching, and their recognition of the opportunities and challenges that digital technology development brings to education and teaching, and also the attitude of teachers towards digital technology resources and their application in education and teaching, as well as their initiative to carry out digital education practice, exploration, and innovation. Teachers should have the belief, confidence, and determination to actively overcome difficulties and solve problems when facing digital education issues.

2.2 Digital Technology Knowledge and Skills

Teachers' competencies, both in digital technology and information technology, have the same direction and competencies requiring teachers to be constructive, logical, and creative in the use of information technology. Hence why teachers have two positions at once, namely as learners/users and teachers [5]. Digital technology knowledge and skills refer to the digital technology knowledge that teachers should understand and the digital technology skills they need to master in daily educational and teaching activities, including digital technology knowledge, and digital technology skills. Common digital technology knowledge that teachers should be familiar with includes the concepts and basic principles of common digital technologies. The digital technology resource application skills that teachers should master include the selection strategies and usage methods of digital technology resources.

2.3 Digital Applications

They refer to the following abilities: the ability of teachers to use digital technology resources to carry out educational and teaching activities, including digital teaching design, implementation, and implementation, academic evaluation and digital collaborative education; the ability to use digital technology resources to analyze learning situations, design teaching activities, and create

learning environments; the ability to apply digital technology resources to implement teaching; the ability to use digital technology resources to conduct student academic evaluation, and the ability to utilize digital technology resources to promote collaborative education among schools, families, and society.

2.4 Digital Social Responsibility

The responsibility of teachers in terms of moral cultivation and behavioral norms in digital activities includes legal and ethical norms, as well as digital security protection. It also includes the laws, regulations, and ethical norms related to digital activities that teachers should abide by, and the ability of data security protection and network security protection that teachers should possess in digital activities.

2.5 Professional Development

It refers to the ability of teachers to utilize digital technology resources to promote their own and community professional development, including digital learning and training, as well as digital teaching, and the ability to utilize digital technology resources for learning and sharing educational and teaching knowledge and skills, as well as reflecting and improving teaching practices. Teachers have the ability to conduct teaching research on digital teaching related issues and utilize digital technology resources to achieve teaching innovation.

3. NEW FEATURES OF FUTURE EDUCATION

3.1 Differentiated Teaching

The future education in the digital age can achieve unprecedented and truly differentiated teaching. It is necessary to provide different content, plans, and learning interventions based on the characteristics of each student, and achieve differentiated teaching that covers all time periods and various areas.

In the past, due to the limitations of human abilities, teachers' energy was limited. When teachers faced too many students, it was difficult to truly achieve a high level of attention to each individual student. But now with the help of technologies such as big data and artificial intelligence, teachers can truly achieve the organic

unity of large-scale education and personalized training.

3.2 Personalized Learning

When people mention personalized learning, they often hope to achieve true learning for everyone, everywhere, and at all times. However, limited by objective conditions, an open, inclusive, and ubiquitous learning space for every learner cannot be provided. Now, thanks to the Internet, artificial intelligence and other technologies, learners can be provided with open space, massive resources, and the possibility of free interaction across time and space.

3.3 Refined Management

The pursuit of refined management in educational governance may have been subject to many constraints in the past. But in the future, with the deep application of technologies such as big data, people can already achieve refined and scientific educational decision-making through multimodal fusion, reconstruction, and mapping of human-machine collaboration under spatiotemporal reconstruction. People can achieve refined resource allocation and precise decision-making based on data, which can greatly improve the scientific level of teachers' educational management and decision-making.

3.4 Artificial Intelligence Services

People can achieve high-performance intelligent services through innovative educational concepts, technologies, scenarios, and models. In the past, they could only provide a relatively unified and homogeneous service for the entire school's teachers and students. And now schools can provide highly personalized tailored services based on the individual needs of each teacher and student. The level of life services, teaching services, and work services provided by the school to teachers and students will be significantly improved.

4. ENHANCING DIGITAL LITERACY OF TEACHERS

Digital teacher competencies are "the set of skills, attitudes and knowledge required by educators to support student learning in a technologically rich world, design and transform classroom practices and enrich their own professional development" [6]. In addition,

Tarraga-Minguez et al. [7] sustain that the digital teaching competence “is a complex pedagogical concept that involves a series of dimensions and aspects linked to forms of pedagogical representation of technology in the classroom, learning, and teacher training” and this makes it different from DL. Digital literacy 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 educational and teaching activities. These are the skills and knowledge that teachers need when using technological tools and digital resources. The following are the key steps and effective methods for cultivating and improving teachers' digital literacy:

4.1 Strengthening Digital Awareness

In the digital age, teachers should have digital awareness to adapt to the needs of the times. Improving digital literacy should be regarded as an important issue in strengthening teachers' own construction, and digital awareness should be rooted deep in their thinking. Teachers need to dynamically pay attention to the forefront of global digital economy development, deeply understand and grasp the trend of digital economy development, as well as the complex and profound impact and changes it brings to the education field, timely update the value cognition of digital technology empowering education, and keep teaching concepts, methods, etc. closely following the pace of digital transformation.

4.2 Providing Professional Training

Schools and educational institutions should provide professional training for teachers to familiarize them with the use of various digital tools and educational technologies. Education administrative departments and schools should increase their efforts in training digital technology theoretical knowledge, support and guide teachers to deeply learn and master the concepts, characteristics, and application fields of digital technologies such as artificial intelligence, big data, and cloud computing, expand their knowledge of digital technologies, and establish a digital technology knowledge graph and theoretical framework as soon as possible. Conditions should be created for teachers to master digital skills, improve the digital skills training curriculum

system, widely popularize the use of digital technology tools and platforms, and comprehensively enhance teachers' digital skills and application abilities.

4.3 Encouraging Cooperation and Sharing

Teachers should encourage to enhance their cooperation and sharing of digital teaching resources and experiences among themselves, establish professional learning communities or online platforms where teachers can communicate and share best practices, and strengthen in-depth communication with experts in the field of digital technology, enhance information acquisition and case sharing in digital technology communities such as technology forums and social media platforms, gain a deeper understanding of practical experience in the field of digital education, and systematically master essential skills in digital education. The collaboration and sharing can promote learning and growth among teachers, and enhance their digital literacy.

4.4 Providing Support and Feedback

School management and educational institutions should provide support and feedback mechanisms to help teachers solve problems and confusion in digital teaching. This includes regular teaching observations and feedback, as well as providing technical support and guidance. Through active support and feedback, teachers can continuously improve their digital teaching skills, cultivate the ability to proficiently apply digital tools and platforms, and serve the efficiency and effectiveness of teaching.

4.5 Stimulating Interest and Exploration

Teachers should break through the traditional teaching mindset, arm their minds with digital thinking, guide educational and teaching practices, continuously improve their digital literacy, and firmly establish the concept of digital development, and continuously promote self-improvement in the digital transformation and development of education. Teachers should actively cultivate their interest in digital technology and encourage students to participate in it. Teachers can continuously update their knowledge and skills by exploring new educational applications, attending professional seminars and training courses, and encouraging students to use digital tools for creative and collaborative learning and teaching.

4.6 Integrating Digital Literacy into the Curriculum

Through digital classes, it has been proven to produce pedagogical designs and development of information literacy competencies and critical thinking skills for both students and teachers [8]. Teachers should integrate digital literacy into daily teaching, enabling students to apply digital technology in various subjects. By designing and implementing digital teaching activities, teachers can help students cultivate digital literacy and improve their learning outcomes and creativity. By utilizing digital technology resources and methods such as virtual experiments and multimedia displays, multi-dimensional and multi-level digital teaching activities are designed to provide students with a more intuitive and vivid learning experience. From the perspective of teaching evaluation, teachers should make full use of big data analysis tools to explore data information such as students' academic performance, learning progress, and learning habits, and conduct a more scientific comprehensive evaluation of students.

5. CONCLUSION

This paper analyzes the concept of digital literacy and the features of future education, and proposes methods and paths to enhance teacher literacy. In the digital age, teachers' digital literacy has become an essential quality for qualified teachers. The development of teachers' digital literacy has the characteristics of flexibility, diversification, and personalization. It is very important and urgent to upgrade the development of digital literacy and enhance teachers' comprehensive digital literacy. In the future, more attention should be paid to teachers' abilities such as digital communication and collaboration in digital age, integrating knowledge, skills, and abilities into one, and promoting the development of teachers' digital literacy. As the supporting force for the comprehensive deepening of education reform, teachers are the most essential element in accelerating the digital transformation of education. By comprehensively strengthening teachers' digital literacy, teachers can better promote the deep integration of digital technology and education, and help promote the high-quality development of education.

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