

Research on the Path of Enhancing the Digital Literacy Capability of the Whole Population in the Context of Digital Strong Province

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Abstract: With the rapid development of digital technology, strong digital provinces have become an important trend for future development. As an important foundation to support the development of the digital economy, the study of the path to enhancing the digital literacy of the whole population is particularly important. This paper firstly analyzes the current situation and challenges of the digital literacy ability of the whole population in the context of a strong digital province, then uses the "five forces" model to study digital literacy, and at the same time distinguishes different groups of people from age or education level to conduct research and analysis of digital literacy, so as to put forward paths to cultivate and enhance the digital literacy ability of the whole population, including strengthening digital education, optimizing the digital environment, promoting digital industries, and promoting the development of digital economy. Optimizing the digital environment, promoting digital industry innovation, establishing a digital literacy assessment system, and other measures. This study provides theoretical support and practical guidance for the construction of a strong digital province and helps to enhance the digital literacy of the whole population and the sustainable development of the digital economy.

Keywords: digital literacy; digital strong province; enhancement paths

I. Introduction

Digital literacy and skills refer to a collection of qualities and abilities, including digital acquisition, production, use, evaluation, interaction, sharing, innovation, safety and security, ethics, and morality, that citizens in a digital society should have in their life, work, and learning. Digital literacy includes digital awareness, computational thinking, digital learning and innovation, and digital social responsibility.

Correct understanding of the authenticity and value of numbers, motivation to actively discover and utilize real and accurate numbers, constructing models and algorithms for solving problems after abstracting and decomposing them to form a paradigm for efficiently solving the same kinds of problems, actively utilizing rich digital resources, tools, and platforms to explore and innovate, and forming a correct outlook on values, morality,

and the rule of law, as well as complying with the norms of digital ethics, are all considered to be digital literacy.

Currently, the widespread application of technologies such as the Internet, big data, and artificial intelligence has created a digital information space. From socializing, entertainment, and shopping to travel, people increasingly rely on various online platforms, and everyone's attention and behavioral data have become the target of continuous acquisition of digital technology. While this change empowers the digital industry and releases the dividends of science and technology innovation, it also introduces many challenges that cannot be ignored. To cope with the challenges of the digital era, it is necessary to improve digital literacy and adapt it by applying the ethical wisdom of the digital era.

In order to thoroughly implement General Secretary Xi Jinping's important thoughts on a strong network country, implement actions to enhance the digital literacy and skills of the whole population, accelerate digitalization, and build a strong network country and digital China, the National Internet Information Office of the People's Republic of China has formulated the Outline of Actions to Enhance the Digital Literacy and Skills of the Whole Population, in accordance with the "Proposals of the Central Committee of the Communist Party of China on the Formulation of the Fourteenth Five-Year Plan for the Development of the National Economy and Society and the Visionary Objectives of the Year 2035" and the Outline of Visionary Goals for 2035, the National Internet Information Office of the People's Republic of China has formulated the Outline of Actions to Enhance Digital Literacy and Skills of the Whole Population.

The following year, four departments, namely the Central Internet Information Office, the Ministry of Education, the Ministry of Industry and Information Technology, and the Ministry of Human Resources and Social Security, jointly issued the "Key Points for Enhancing the Digital Literacy and Skills of All People in 2022," which emphasized the importance of increasing the supply of high-quality digital resources, creating a high-quality digital life, enhancing workers' ability to work digitally, promoting lifelong digital learning for all people, improving the ability of digital innovation, entrepreneurship, and creativity; building a firm barrier for digital security and protection; strengthening the construction of digital society and civilization; and strengthening organizational leadership and overall promotion of eight key tasks[1].

While improving digital literacy, building a strong digital province has become one of the important goals of development in various regions. Relevant outlines, policies, and documents have been issued worldwide to achieve this goal. The Central Committee for Network Security and Informatization has issued the Outline of Action for Enhancing Digital Literacy and Skills of the Whole Population, which makes arrangements and deployments for enhancing the digital literacy and skills of the whole population. In addition, the Central Internet Information Office, the Ministry of Education, the Ministry of Industry and Information Technology, and the Ministry of Human Resources and Social Security jointly issued Work Points for Enhancing the Digital Literacy and Skills of the Whole Population in 2022, which clearly sets out the work objectives. By the end of 2022, the work of enhancing the digital literacy and skills of the whole population will have made positive progress, and the pattern of systematic advancement will have been established. The Zhejiang Provincial Government issued several policies to accelerate the development of the digital economy, which put forward a series of measures to support the development of the digital economy, including financial support, tax incentives,

financial support, and the introduction of talent.

As early as 2003, "digital Zhejiang" as an important element of the "eight-eight strategy" deployment to promote and start the layout of the construction. Zhejiang in 2017 deployed the implementation of the digital economy "one project"[2] on the basis of 2022 and then pushed the upgraded version for the development of the digital economy to refuel renewed power. As an important development strategy of the Zhejiang provincial government, Digital Zhejiang aims to build Zhejiang into a modern economic and social development model that is digitalized, networked, intelligent, and green[3]. The construction of digital infrastructure, digital economy, digital government, digital society, and digital ecology all contributed to the construction of Digital Zhejiang.

In 2018, the General Office of the People's Government of Zhejiang Province issued a notice on the digital transformation standardization construction program of Zhejiang Province (2018-2020), proposing to comprehensively implement the deployment of the construction of digital Zhejiang, focusing on the modernization of high-quality competitiveness, accelerating the full implementation of the standardization strategy, and deepening the pilot of the national standardization comprehensive reform.

In 2019, the Zhejiang Provincial Government issued the "Implementation Opinions on Accelerating the Development of 5G," proposing to strengthen the construction of 5G networks and the promotion of applications, and to enhance the level of digital infrastructure[4]. It meets general requirements in terms of network construction, industrial development, integration, and application.

The Twenty-sixth Meeting of the Standing Committee of the Thirteenth People's Congress of Zhejiang Province on December 24, 2020, adopted the Regulations on the Promotion of the Digital Economy in Zhejiang Province, which aims to promote the development of the digital economy in Zhejiang Province, promote industrial digitization and digital industrialization[5], and enhance the competitiveness of core industries in the digital economy. These regulations clarify the duties and obligations of the government, enterprises, and social parties in the development of the digital economy and provide legal protection for the development of the digital economy in Zhejiang Province.

On March 1, 2021, the Comprehensive Deepening Reform Committee of the Zhejiang Provincial Committee of the Communist Party of China issued a notice on the Overall Program of Digital Reform in Zhejiang Province, which included an overall program for accelerating digital reform, as well as a corresponding special program. It is proposed that the digitalization reform should be pushed forward in depth throughout the province to promote the quality, efficiency, and power changes in the economic and social development and governance capacity of the province as a whole, and to fundamentally realize the overall wisdom and efficient synergy of the province as a whole, striving to become a major landmark achievement of the "Important Window."

2022 State Council government work report pointed out the need to deeply implement the strategy of coordinated regional development, accelerate high-quality integrated development in the Yangtze River Delta, and enhance the balance and coordination of regional development. The work report of the Zhejiang Provincial Government and the Action Plan for Promoting the Integrated Development of the Yangtze River Delta Region

in Zhejiang Province proposed strengthening innovation-driven development, promoting industrial synergy, accelerating infrastructure connectivity, strengthening ecological environment joint protection and common governance, promoting the sharing of public services, deepening the reform and opening up of cooperation, and improving the organization and coordination mechanism. Combined with actual Zhejiang, vertical deepening integration promotes the integration of the Yangtze River Delta[6]. However, in this process, there are also problems, such as the small volume of digital emerging industries, too large a regional gap in industrial collaboration, and the serious development of industrial homogenization.

The introduction of these programs and policies has provided important support and guarantees for the construction of Digital Zhejiang.

II. Research on the measurement of digital literacy

Porter's five-forces model was first proposed by Porter to analyze the competitive dynamics of an industry. These five forces include competition within the industry, potential entrants, threat of substitutes, bargaining power of suppliers, and the bargaining power of buyers. This approach can still be used in digital literacy measurement studies. Firstly, there is intra-industry competition: in the field of digital literacy measurement, intra-industry competition mainly comes from competition from other similar measurement tools and methods. However, these competitors may provide similar measurement services and compete for market shares and resources. Therefore, to cope with the competition, we analyze the current digital literacy measurement tools or methods in the market and understand their strengths and weaknesses to optimize our own measurement system as well as measurement methods. Meanwhile, we actively promote our services to increase the market awareness and user satisfaction. Second, for potential entrants, because this module is a more popular segment in daily life, it may attract many people to get involved in the research; we focus on organizations or individuals that may enter the field of digital literacy measurement and analyze the challenges they bring to us. Simultaneously, we can also develop new measurement tools and methods with other organizations or enterprises through cooperation and alliances to improve competitiveness. Then, again for the threat of alternatives, we learn about other possible alternative measurement methods and tools and analyze their competitive pressure on existing digital literacy measurement tools. Then there is the bargaining power of suppliers: in the field of digital literacy measurement, suppliers mainly include data collection and analysis service providers, technology vendors, and so on. Their bargaining power determines their cost and profit levels. Therefore, we need to ensure the smoothness of the price of resources or information purchased to ensure a stable supply of resources and cost-effectiveness, thus improving the continuity and expansion of our research. Finally, buyers' bargaining power is mainly that of the clients or users who use our measurement services. Their bargaining power depends on supply and demand in the market and the competitive situation[7]. To increase the bargaining power of buyers, we need to continuously optimize service quality and user experience to increase user satisfaction and loyalty. Additionally, we can expand our user base and market share through marketing and branding. We should understand the needs and expectations of our target audience for digital literacy measurement tools to better fulfill their needs and increase their acceptance of measurement tools. This will ensure that our research has greater value and generalizability.

Improving the digital literacy of the entire population is a key task in the process of building a strong digital province. Through scientific measurement research, we can fully understand the current situation and the problems related to digital literacy. Combined with the application of the Five Forces Model, we can better understand the market demand and competitive situation and formulate targeted enhancement strategies and optimization plans to adapt to the ever-changing digital environment.

III. Research on digital literacy in different groups

3.1 Adolescent groups.

Adolescents face several challenges in terms of digital literacy. First, adolescents are faced with a large amount of information on the Internet, including issues of authenticity, credibility, and relevance. The Internet use behavior of minors needs to be guided and regulated, and they are prone to indulging in online games and short videos while neglecting the proper acquisition and utilization of digital information. Second, primary and secondary school students and university students are blind and one-sided in their acquisition and processing of information and are weak in their ability to recognize information on the Internet, making them susceptible to the influence of undesirable information.

In response to this phenomenon, the government has issued a series of documents and policies to strengthen the cultivation and guidance of digital literacy for young people. On January 1, 2024, the Regulations on the Protection of Minors' Networks issued by the State Internet Information Office came into force, which aims to protect the legitimate rights and interests of minors in cyberspace, regulate the behavior of network service providers, and strengthen the digital literacy cultivation of minors by families, schools, and other educational institutions. These regulations aim to protect the legitimate rights and interests of minors in cyberspace, regulate the behavior of network service providers, and strengthen the training of minors in digital literacy by families, schools, and other educational institutions. The Information Technology Curriculum Standards for Primary and Secondary School Students, issued by the Ministry of Education, emphasize the need for primary and secondary school students to develop the ability to acquire, process, and transmit information, as well as the ability to evaluate and use information.

Scholars have conducted in-depth research on digital literacy among adolescents and put forward corresponding recommendations. Ohler's "multimodal learning" theory emphasizes the need for young people to learn in multiple media environments and to develop skills across multiple media, rather than just mastering the written word; Gee's "new literacy" theory advocates the development of digital literacy through interactive methods, such as games, and the integration of learning into the digital environment. Gee's "New Literacy" theory advocates the development of digital literacy in adolescents through interactive methods such as games that integrate learning into interesting and challenging contexts. Research on youth digital literacy not only focuses on technical aspects, but also emphasizes the ability to acquire, process, and evaluate information, as well as the ability to use these skills correctly in a digital environment. The government, schools, and families need to work together to formulate appropriate policies and programs to foster digital literacy for the holistic development of youth.

3.2 Older people.

There is a relative lag in digital literacy among the older groups. The fact that most older people do not receive systematic education in digital technology when they are young, coupled with their relatively weak acceptance of new technologies, has led to the inadequacy of older groups in terms of digital literacy. They are not sufficiently skilled in the use of digital devices such as smartphones and computers, and their ability to access and utilize online information is limited, making them vulnerable to online scams and false information. Some older persons may not have access to digital technologies for geographical and economic reasons, leading to a digital divide, and a lack of digital literacy may lead to social isolation in a digital society.

The report of the Twentieth Party Congress proposes the "implementation of a national strategy to actively cope with the aging of the human population", of which the promotion of digital applications for older persons is a proper part. To address the lack of digital literacy among older people, the government has introduced a series of supportive policies to encourage older people to participate in digital technology training and learning, including providing education on technology training, cybersecurity, and access to and assessment of information. At the same time, the state introduced relevant laws and regulations to protect the rights and interests of older persons in the digital space, including cybersecurity and information privacy.

Scholars have also conducted in-depth studies on the digital literacy of older adults and proposed corresponding solutions. Czaja and Sharit emphasize the importance of digital literacy training for older adults, arguing that through training and support, older adults can improve their understanding and ability to apply digital technology; Xie et al.'s study proposes the "older adults' usability" theory, which emphasizes that digital products and services should consider the special needs and abilities of older people in order to improve their digital literacy level. Many studies have shown that the development of digital literacy among older persons needs to be combined with their actual needs and interests, and that progressive training methods, focusing on practical exercises and case studies, should be adopted to enhance their learning interests and effects.

3.3 Farmer groups.

Farmer groups face certain difficulties in terms of digital literacy. As most farmers have been engaged in agricultural labor for a long time, they lack exposure to and understanding of digital technology, resulting in a relatively low level of digital literacy. In terms of information acquisition and utilization, farmers lag behind with limited access to new agricultural technologies and market information, which affects their production and living standards.

The report of the Twentieth Party Congress points out that it is necessary to promote the digitization of education and to build a learning society and country with lifelong learning for all. In the era of the digital economy, farmers' digital literacy has become a link to effectively activate the synergistic development of rural digital infrastructure, digital industry, digital life, digital ecology, and digital governance, as well as a new driving force for the development of digital villages and the sustained and high-quality development of digital villages. Lifelong learning of digital knowledge has become the key for farmers to ride digital waves. Since the release of the Outline of the National Informatization Development Strategy in July 2016 and the Strategic Plan for Rural Revitalization (2018-2022) in 2018, the term "digital countryside" has been formally mentioned. In July 2021, the Digital Countryside Construction Guidelines 1.0 was released, and the Guidelines for

Construction of the Digital Countryside Standard System in August 2022 was released. In July 2021, "Digital Village Construction Guide 1.0" and August 2022, "Digital Village Standard System Construction Guide" were released, and there was a more systematic plan for digital village construction[8]. The construction of the digital countryside is in the initial stage of development, constrained by the reality of the dilemma, and the research perspective of the digital countryside has shifted to the endogenous dynamics of the rural subject. 2022, the Central Internet Information Office, and ten other departments jointly issued the Action Plan for the Development of Digital Countryside 2022-2025, which proposes that efforts be made to improve the digital literacy and skills of farmers. At the same time, the "Opinions of the State Council of the Central Committee of the Communist Party of China on Doing a Good Job in Comprehensively Promoting the Revitalization of Rural Areas in 2022" published in Document No. 1 of the Central Committee in 2022 also emphasized the need to improve farmers' digital literacy and strengthen digital skills training.

The key to realizing agricultural and rural modernization lies in the people, and the cultivation of digital literacy among new farmers, as the new mainstay of agricultural and rural modernization, is a necessary means of stimulating the internal energy of rural construction and enhancing the digital capacity of new farmers. The improvement of farmers' digital literacy needs to be combined with the actual situation in rural areas to promote the application of digital technology in agricultural production and life services, and to improve farmers' understanding and acceptance of digital technology. Enhancing the digital literacy of farmers' groups is of great significance for the development of the rural economy and the improvement of agricultural production efficiency. Digital technology can help farmers better manage agricultural production, obtain market information, and sell agricultural products, thus improving agricultural production efficiency and farmers' incomes [9].

3.4 Teachers' communities

The teacher community also faces challenges in terms of digital literacy. With the continuous development of information technology, teachers must constantly update their knowledge of digital technology and teaching methods to meet the needs of education in the new era. However, some teachers have certain difficulties in applying digital technology and updating their teaching methods, which affect their digital literacy levels. There is also an uneven level of digital literacy among the teacher community, with some teachers lacking the basic knowledge of digital technology and the ability to apply it. Insufficient investment in digital teaching resources and equipment in some schools may also result in teachers being unable to make full use of digital technology in their teaching.

In order to improve the level of digital literacy of the teaching community, the education sector has issued a series of policies and documents to encourage teachers to participate in digital technology training and education. 2022 On November 30, 2022, the Ministry of Education issued the industry standard of Digital Literacy for Teachers, which clearly defines teachers' digital literacy as "the awareness, competence and responsibility of teachers in appropriately utilizing digital technology to acquire, process, use, manage It defines teachers' digital literacy clearly as "the awareness, ability and responsibility of teachers to make appropriate use of digital technology to acquire, process, use, manage and evaluate digital information and resources, to identify, analyze and solve educational and teaching problems, and to optimize, innovate and change educational and

teaching activities, “and it also formulates a framework for teachers' digital literacy, which stipulates five aspects, namely, digital awareness, digital technological knowledge and skills, digital application, digital social responsibility, and professional development, and so on. Digital social responsibility, professional development, and five other dimensions of the requirements[10].

Scholars have also conducted in-depth studies on teachers' digital literacy and made corresponding recommendations. Studies have shown that improving the digital literacy of the teacher community is of great significance in promoting informatization of education, improving the quality of teaching, and developing students' digital literacy. Digital technology can help teachers to better carry out teaching design, teaching implementation, and assessment, and improve teaching effectiveness and students' learning interest[11]. Therefore, strengthening the training and support of teachers' digital literacy is an important task in current educational development.

Different groups face their own difficulties and challenges in digital literacy, and the government, scholars, and all sectors of society have proposed relevant policies and research. By strengthening the cultivation and guidance of digital literacy for different groups, it is possible to improve their ability to acquire and utilize information, promote the application of digital technology in various fields, and facilitate the development of the digitalization process of society. It is hoped that research and policy formulation can be further strengthened in the future to provide more support and assistance for enhancing digital literacy in different groups.

IV. Cultivation and enhancement of digital literacy

In 2018, UNESCO released the Global Digital Literacy Framework report (Law et al. 2018)[12], with accompanying recommendations for assessment (Laanpere,2019)[13], which aims to provide a methodological basis for the SDG 4.4.2 indicators, with a view to creating, through extensive empirical research, digital literacy frameworks that are broadly and universally accessible, and which can be used to guide countries in the development and assessment of digital literacy[14]. In 2022, the EU introduced DigComp 2.2, a version that largely builds on DigComp 2.0 and DigComp 2.1 by updating examples of knowledge, skills, and attitudes from DigComp 1.0, and finalizing 259 examples of knowledge, skills, and attitudes aimed at helping European citizens to be confident, critical, and use digital technologies safely[15]. This is an important reference point for global efforts to foster and promote digital literacy. Since then, an increasing number of countries have begun to introduce or formulate relevant policies and measures for digital literacy cultivation and enhancement.

In 2021, the Internet Information Office of the Central Committee of the Communist Party of China issued the Outline of Action for Enhancing Comprehensive Digital Literacy and Skills (the Outline of Action for short), which sets scientific goals and provides guidance programs for the cultivation of digital literacy in China at present and in the coming period and pushes forward the further enhancement of China's efforts to cultivate digital literacy. According to the Outline of Action, digital literacy and skills are a collection of the qualities and abilities that citizens in a digital society should have for learning, working, and living, such as digital acquisition, production, use, evaluation, interaction, sharing, innovation, safety and security, ethics, and morality. It is a collection of qualities and abilities that citizens need to demonstrate for their survival and development in the digital world in the new era. In the context of digital China, digital technology runs through all aspects of social

production and achieves in-depth integration with the economy, culture, and society, which inevitably stimulates the urgent demand for digitally skilled talents in the whole society. Therefore, the construction of a digital literacy and skills development cultivation system that covers the entire population and integrates urban and rural areas is conducive to the active participation of the entire population in the digital transformation of various industries, thus ensuring the smooth implementation of the goals of a strong network country and digital China.

In February 2023, the Central Committee of the Communist Party of China (CPC) and the State Council issued an Overall Layout Plan for the Construction of Digital China (the plan), which puts forward an overall framework for the construction of digital China. This is an important strategic plan made by the CPC Central Committee in response to the development trend of the era of global digitization, networking, and intelligence, which is of great significance and has far-reaching impact on the comprehensive construction of a modern socialist country. Whether it is to consolidate the foundation of digital China's construction and comprehensively empower economic and social development or to strengthen the key capabilities of digital China and optimize the environment for digital development, it is indispensable to have digital talents with high literacy and skills. In the wave of digital transformation of society and industry, we have to accelerate the improvement of our own digital literacy and skills to seize the initiative and contribute to the construction of Digital China[12].

Many experts and scholars have carried out a series of useful explorations of how to cultivate and improve the network literacy of different individuals or groups from different perspectives, taking into account the special characteristics of different subjects. The following discussion centers on the issue of "cultivating and improving digital literacy."

4.1 Cultivation and enhancement of digital literacy among youth

From systematic thinking, scholars such as Wu Main and Zhu Sha pointed out that it is necessary to "adhere to the theoretical orientation of combining synergistic development and independent development, combining comprehensive development and characteristic development, combining personal value and social value, and constantly stimulating the students' subjective initiative in practice, so as to promote the diversified and connotative development of students' digital literacy"[16]. Wang Shuping, Chen Haifeng, and other scholars believe that the key to improving the digital literacy of college students is "to improve the ability of college students to correctly recognize and obtain data information, the ability to communicate, analyze, and evaluate data, as well as the ability to protect digital security, solve digital problems, and set up correct digital values"[17]. Zheng Caihua believes that "on the one hand, we should fully consider the requirements of our country's parenting goals and the real needs of economic and social development for talents, that is, to cultivate reliable socialist builders and successors, especially our country's requirements in cultivating digital literacy of talents; on the other hand, it is necessary to have the cooperation of many parties to play a role in the cultivation of digital talents together. "[18] . On the basis of theoretical investigation and data analysis, Li Yuan proposes that "relying on the self-empowerment of college students, the support of their families, peers and the society, especially colleges and universities, we need to build a set of effective media literacy cultivation system for college students by taking curriculum construction as a breakthrough point"[19].

Yu Ying, Xie Shixing, and other scholars believe that along with the rapid development of artificial intelligence and other new technologies, the importance of cultivating digital literacy among young people has been further emphasized, and it is necessary to deeply grasp the key platform of the school, "from the purpose of the curriculum, the curriculum structure, and the level of teaching and learning of the curriculum closely around problem solving, so that the students can form the big concepts in real problem solving, develop the concepts of disciplines, and students can form big concepts in real problem solving, develop disciplinary concepts and disciplinary thinking, and form digital literacy that is compatible with the digital society"[20]. According to scholars such as Wen Jiou and Huang Furong, "cultivating digital literacy among adolescents can be done in terms of cultivating their critical thinking skills, cultivating their content production and creativity, reducing their screen time, and increasing their screen sharing time with their parents." [21]. Li Xiaojing, Liu Yining, and other scholars pointed out through sample surveys and in-depth interviews that "in the future, it is necessary to continuously improve the assessment framework of digital literacy in China, focusing on cultivating students' skills in digital content creation, digital learning, digital security, and other skills; digital literacy education needs to strengthen its efforts in the expansion of technological application scenarios, the construction of the curriculum system, and the construction of a multi-party collaborative linkage mechanism."

4.1 Cultivation and enhancement of digital literacy among farmer groups.

Wu and Wang believe that "farmers' digital theoretical and practical literacy can be enhanced by expanding the cultivation content, identifying the cultivation targets, optimizing the cultivation process, and broadening the cultivation system"[22]. According to Ma Li and other scholars, "Firstly, top-level design should be strengthened to build an implementation framework for promoting farmers' digital literacy to empower rural revitalization; secondly, hardware foundation should be consolidated to strengthen the construction of digital infrastructure in rural networks; thirdly, the connection mechanism should be improved to promote the coordinated development of farmers' digital literacy and rural industries; fourthly, diversified strengths should be mobilized to establish a system of cultivating and exchanging farmers' digital literacy". Exchange System"[23]. Based on the theory of situational cognition, scholars such as He Yunting and Liu Wugen proposed that in the future, we can expand the supply of rural digital resources through "technology sinking," gather the consensus of farmers' digital value through "cognitive transformation," and reconstruct the rural digital technology through "resource integration." It is proposed that in the future, we can expand the supply of rural digital resources through "technology sinking," gather farmers' digital value consensus through "cognitive transformation," and reconstruct the rural digital technology cultivation system through "resource integration," so as to continuously improve the level of farmers' digital literacy[24]. Based on the theory of multiple streams, Gu and Song analyzed the process of setting the agenda for improving the digital literacy and skills of the whole population in the context of China. It is proposed that future policy makers should pay attention to the "problem stream," smooth the reflection channel of the "policy stream," match the value orientation of the "political stream," and give full play to the "policy spillover." We should pay attention to the "problem source flow," smooth the reflection channel of "policy source flow," match the value orientation of "political source flow," and exert the radiation influence of "policy overflow"[25], so as to continuously improve the digital literacy of

farmers."

4.3 Cultivation and enhancement of digital literacy in the teaching community.

Scholars such as Wu Main and Chen Min believe that "the industry standard of digital literacy for teachers should be strictly implemented and that digital awareness, digital technology knowledge and skills, digital application, digital social responsibility, and professional development should be strictly implemented.

Five dimensions to strengthen the cultivation of teachers' digital literacy"[26]. Du Yanyan, Huang Qingshuang, and other scholars believe that "the development of primary and secondary school teachers' digital literacy is affected by multiple subjective and objective factors. Enhancing teachers' knowledge of the value of digital literacy, meeting teachers' personalized learning demands for digital literacy, building intelligent teaching spaces, and creating a digital teaching atmosphere are effective ways to enhance primary and secondary school teachers' digital literacy"[27]. Hu, Li, and other scholars believe that five main aspects should be considered to promote the continuous improvement of teachers' digital literacy: "constructing a micro-competency index system, strengthening the integrated development of pre-service and post-service teachers, increasing the application of the resources of the National Intelligent Education Platform, exploring a mechanism for the scale-up of literacy, and applying a non-sensory situational assessment method."[28] . Kong Linshuai and other scholars pointed out that "we should learn from international advanced experience, build open resources for teachers' digital literacy, equalize the development of high-quality education, develop a hierarchical framework for teachers' digital literacy, serve teachers' education practice, and implement teachers' digital literacy training"[29], in order to provide an effective guarantee for the improvement of teachers' digital literacy. Zhou Liubo, Zhang Mengyao, Zhang Chenghao and other scholars pointed out that "the current concept of lagging behind, the lack of curriculum, insufficient mechanisms, lack of protection and other realities constrain the improvement of the effectiveness of the cultivation of teachers' digital literacy," so "first, the concept of the first, enhance the value of teachers' digital literacy cognition and awareness of the main body; second, the systematic cultivation, improve the teachers' digital literacy training", so that the teachers' digital literacy training can provide effective protection. Systematic cultivation improves the training supply side reform of teachers' digital literacy cultivation; three are the environment upgrading, build teachers' digital literacy cultivation of high-quality digital atmosphere, and four is the system guarantee, improving the all-round guarantee system of teachers' digital literacy cultivation"[30].

4.4 Cultivation and enhancement of the digital literacy of the entire population

Scholars such as Jiang Minjuan and Zhai Yun have pointed out that in the context of current social development, "the enhancement of digital literacy of our citizens is still facing a series of challenges and difficulties such as lack of preparation, dislocation of ability, imbalance of supply and demand, and ecological disorder." Therefore, it is necessary to take more real and effective measures to effectively consolidate the four fundamental tasks of "building foundation, empowering, expanding excellence, and strengthening governance," so as to comprehensively improve the digital literacy of Chinese citizens. Scholars such as Shang Xianli and Zhang Jun have pointed out through comparative analysis between China and foreign countries that China should "realize local strategic leadership and formulate a framework with Chinese characteristics; follow up the

demand for skills of the whole population and implement a variety of cultivation projects; build a financial support system and implement the concept of multi-party cooperation; improve the application of resources and set up a comprehensive cultivation platform' to achieve a comprehensive foundation of digital literacy cultivation for the whole population in China. A comprehensive foundation for digital literacy cultivation in China has been achieved. Cheng Huiping, Jiang Xing and other scholars believe that we should construct an effective path for the enhancement of digital literacy for all people in China from three main aspects, namely, "perfecting policy support and accelerating the construction of a localized digital literacy framework; enriching the supply of digital resources to create a maximally digitally inclusive environment; and attaching importance to digital literacy education and constructing a lifelong digital learning system".

Zheng Yunxiang, Zhong Jinping and other scholars believe that the key to enhance the digital literacy of citizens lies in the development of digital citizenship education, "the main bodies involved in digital citizenship education include the government, enterprises, universities, primary and secondary schools, families, academic institutions, non-profit organizations, etc., and can form a multi-level, cross-regional cooperation model between schools and enterprises, institutions, production and research, industry and research, and industry-academia-research, etc.". Based on the understanding of the current situation and characteristics of digital citizenship education at home and abroad, as well as the cognition of the changes in the participating subjects and the association of the subjects in the process of digital citizenship education implementation, they put forward the HOUSES implementation model.

In addition, many scholars have explored and researched the cultivation and enhancement of digital literacy of different subject types, providing good theoretical and practical references for the subsequent development of related research.

V. Conclusion

The purpose of digital citizenship education is to cultivate qualified digital citizens who can use information technology in a safe, legal, and ethical manner so that digital literacy and skills can be improved through the implementation of digital citizenship education. Therefore, this paper discusses how to implement digital citizenship education and improve digital literacy and skills in light of China's national conditions in terms of implementation principles, modes, and paths. On this basis, it focuses on practical cases in basic and higher education that utilize digital citizenship education to promote digital literacy and skills, with a view to escorting the smooth implementation of the task of building a digital China and providing theoretical and practical guidance for the effective implementation of the Platform for Action.

Implementing digital citizenship education and accelerating the localization process in China is not only an important initiative in line with the national policy, but also an effective means to implement the important task of teaching morality and educating people in the period of "double reduction," as well as a fundamental, strategic and pioneering work in building a strong network country and a digital China. Let us speed up our efforts to push forward the implementation of digital citizenship education; use digital citizenship education to escort the orderly, efficient, and high-quality implementation of the Plan and the Outline of Action; improve digital literacy and skills; and turn the population dividend into a quality dividend so as to move forward to the second-hundred-year goal.

Conflicts of interest

The authors declare that they have no conflicts of interest.

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