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Research on the Training Paths of Youth Digital Literacy Ability in the Digital Age

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Abstract

Against the background of accelerated advancements in China's digital field, talent with high digital literacy has become a key factor in the comprehensive promotion of the Digital China strategy. However, due to the late start of digitalization in China and the "digital divide" among regions, the comprehensive level of digital literacy among Chinese youth is relatively weak. This paper constructs a reasonable digital literacy framework from the three aspects of comprehensively improving basic digital literacy, multiparty collaborative training of digital economy talent at different levels, and cultivating creative thinking, which will provide indicators and directions for citizens' digital literacy education.

Keywords: Digital Literacy, Young Talent, Creative Thinking, Training Path

1. Requirements of the digital age for youth digital literacy

As China enters a critical period of economic development against the digital background, the optimization and upgrading of its industrial structure are gradually accelerating, the influence of high-tech technologies such as big data, cloud computing, and artificial intelligence is increasing, and the demand for jobs with higher technology content and the division of labor are also varying. Digitization seems to have become a necessity for people. Self-driving and vehicle-infrared cooperative travel services are no longer uncommon. Smart railways, smart civil aviation, smart ports, digital tracks, and smart parking lots are all providing solutions for our needs. Life provides convenience, and digital empowerment will lead the next future.

1.1. The new employment situation places new requirements for digital literacy

The rapid development of the digital economy has promoted significant changes in the demand structure for digital talent, which has led to greater requirements for talent training. Digital literacy ability has become a basic ability that everyone should have, especially for the young generation, who, as digital talents, have never been able to do so. To meet the development needs of the times, aboriginal people in the era need to have greater digital literacy abilities. Moreover, the rapid development of the digital economy has led to greater requirements for the digital skills and literacy of workers. The requirements for basic digital skills and the application of digital tools in

nondigital occupations are gradually increasing. Skill application training has become the consensus of governments around the world (Li & Cheng, 2023).

Currently, with the development of information technology such as big data, cloud computing, and artificial intelligence, the digital society has become the overall trend of the development and changes of modern society. People's production and life are changed by the digital transformation of society, which will also be extensively affected by people's individual behavior and group interaction, such as technology updating, platform building, and resource sharing (Liang & Hu, 2023). From the perspective of the relationship between youth digital literacy and the digital economy, the improvement of youth digital literacy escorts the promotion of high-quality development of the digital economy. This makes youth workers face more severe and new challenges.

However, due to the information gap, the digital literacy of youth from different regions and different classes is quite different, which is unfavorable for the development of countries in the digital age. Unbalanced development among regions makes future employed persons more inclined to flow to economically developed regions. This study conducted a questionnaire survey on youths in Hangzhou and Jiaxing to compare the comprehensive digital literacy and the effect of urban posts on digital literacy among youths in cities with different economic levels. Regarding the degree of emphasis, areas with a higher economic level have greater requirements for digital skills and digital literacy. Due to the dual effects of the pursuit of personal value and the information technology requirements of the workplace, the requirements for youth digital literacy increased sharply.

1.2. Effect of the national digital economy on the digital literacy of youth

In October 2022, in the "Opinions on Strengthening the Building of High-skilled Talents in the New Era" issued by the General Office of the State Council, it was proposed that the action to enhance the digital literacy and skills of the whole nation should be implemented around the building of cyber power and digital China. At present, China's demand for digital talent far exceeds its supply, and the imbalance between the supply and demand of digital talent has become an important factor constraining the high-quality development of China's digital economy.

The digital literacy ability of youth is directly related to national innovation ability and competitiveness. With today's globalization, competition among countries is no longer simple economic competition but rather comprehensive competition reflected in the fields of science and technology, culture, and education. Therefore, improving the digital literacy ability of youth not only helps their personal growth and development but also helps enhance the overall competitiveness of the country. However, due to the late start of digitalization in China compared with that in Western developed countries, the number of young talented people with high digital literacy is insufficient, and the overall digital literacy of its citizens is not high. This makes it urgent for China to establish a sound scientific and technological talent training system to accelerate the training and development of high-level scientific and technological talent (Liu et al., 2024).

In the digital age, young people are faced with complicated information, especially with the emergence of "digital anxiety" and "digital cocoon rooms." These people are prone to relying on data, which affects their discrimination ability and leads to hidden concerns about growing up under the dominance of data (Wu & Liu, 2023). High digital literacy can enable young people to discriminate and analyze information in digital torrents and understand the useful information they want. In addition, as an important part of society, young people should enhance their digital literacy, which not only promotes the transformation of young people from digital natives to qualified digital citizens with digital awareness, knowledge, skills and ethics but also provides important support for the cultivation of newcomers and contributes to society. The transformation of the public's identity in the digital society also has important reference significance (Wu & Liu, 2023). However, at present, young people have a low sense of digital identity, weak awareness of digital security, their mastery of digital technology is only at the operational level, and high digital literacy talent with digital creativity capabilities is scarce, which cannot drive the improvement of overall civic literacy. How to improve digital cognition ability, enhance digital security awareness, and cultivate creative thinking are the main directions of this paper's study on youth digital literacy training paths.

2. Analysis of digital literacy status among youth

To explore the training path of digital literacy for young people, this paper analyses three current problems: the interregional "digital divide," the lack of digital identity, and the lack of creative digital talent.

2.1. Youths in the digital age lack a sense of digital identity

The rapid development of digital technology has made the importance of digital literacy increasingly obvious, and digital literacy and skills need to be improved. In 1994, Y. Eshet-Alkalai was the first to propose the concept of "digital literacy" (Ling, 2020). In 1997, Gilster proposed a relatively complete definition of digital literacy, that is, "the ability to understand and read the true meaning of various digital resources and information displayed on the computer," which is referred to as literacy in the digital age (Gilster, 1997). In August 2017, the IFLA Declaration on Digital Literacy, the first international systematic declaration on digital literacy, clarified that digital literacy is "the ability to use digital tools and realize their potential." According to UNESCO, digital literacy covers previous information literacy, computer literacy, ICT literacy and media literacy and is defined as "the ability to safely and appropriately acquire, manage, understand, integrate, communicate, evaluate and create information through digital technology." The Central Cyberspace Affairs Commission defines "digital literacy" as a series of qualities and abilities that citizens in the digital society should possess in their studies, work and life, including digital awareness, computational thinking, digital learning and innovation, and digital social responsibility (NetComm China, 2022). Specifically, digital literacy includes digital awareness, computational thinking, digital learning and innovation, and digital social responsibility. Its basic connotation also determines that it is an indispensable part of general-purpose talent with digital technology and literacy; in particular, the awareness of digital social responsibility, with extremely developed digital networks, is the basic literacy of every digital network user. Therefore, in this paper, we propose the necessity of "establishing a sense of digital identity."

New developments have brought about new employment situations. From the perspective of industries, China has successively issued the "Regulations of the State Council on Printing and Distributing Broadband Services" in the fields of information and communication technology, digital manufacturing, the digital service industry, digital agriculture, and digital government. The "Notice of the State Council on Issuing the Action Outline for Promoting the Development of Big Data," "Guiding Opinions of the State Council on Deepening the Integrated Development of the Manufacturing Industry and the internet," "The Development Plan for Smart Manufacturing (2016-2020)", "The State Council A series of guiding documents with a leading role, such as the Guiding Opinions on Deepening the "Internet + Advanced Manufacturing" and the Development of the Industrial internet, and the "Guiding Opinions of the General Office of the State Council on Promoting the Standardized and Healthy Development of the Platform Economy," have a profound impact on the integrated innovation development of various industries and the development of data. (Source: China Academy of Information and Communications Technology.) In addition, a large number of scholars have conducted research on the relationship between technological progress and employment. In the mid-to-late 18th century, scholars began to study the impact of technological progress on employment. Under the dual effects of "innovation" and "substitution," the impact of technological progress on employment is controversial. Berman (1998), Piva (2005) and Smolny (2002) have proven that technological progress can promote employment growth; Caballero and Hammour (1996) and Baltagi and Rich (2005) believe that technological progress will inhibit employment. Some scholars have also studied the impact of technological progress on employment, such as Bratti and Matteucci (2005) and Hornstein et al. (2005), who believe that skill-biased technological progress has reduced the demand for low-skilled labor and increased the demand for high-skilled labor, thus affecting the income level. According to domestic research, Li (2022) believes that the development of the digital economy has created jobs, which has promoted the reproduction of enterprises, and that the new business forms and new models derived from it can alleviate the decrease in employment in the traditional economy. Qi Yudong (2020) and Liao Dongsheng and Sui Haifang (2023) noted that the opportunity to improve the employment environment, enhance employability and improve the quality of employment is the development of digital employment. Economy (Wang, 2023). Under the influence of the above two factors, general-purpose talents with digital skills and literacy have emerged as the times require.

2.2. "Digital divide" between regions and between urban and rural areas

The report of the Nineteenth National Congress pointed out that as socialism with Chinese characteristics has entered a new era, the principal contradiction in Chinese society has transformed into a contradiction between the people's growing need for a better life and unbalanced and insufficient development. With the rapid digital development of first-tier and second-tier cities, the unbalanced development between urban and rural areas and between regions has become increasingly evident.

Among the five aspects of digital literacy, mobile skills are the most basic requirement and prerequisite for training. However, in rural areas and some backward and remote areas, the penetration rate of mobile devices is not high. As of June 2022, the internet penetration rate in rural areas has increased by 1.2 percentage points compared to December 2021; the internet penetration rate in China's urban areas is 82.9%, and the number of internet users is 758 million, accounting for 72.1% of the total number of internet users; the internet penetration rate in rural areas is 72.1%; and 58.8% of the total number of internet users were 293 million, accounting for 27.9% of the total number of internet users. Both the proportion and the number of internet users were less than half of the urban levels. Research shows that at present, the construction of 5G base stations in rural areas seriously lags behind that in cities; there are 572 counties with less than 50% of the household broadband subscription rate, accounting for 21.7% (Ministry of Agriculture and Rural Development Information Centre, 2022). The lack of hardware support for the integrated application of digital technology is an important reflection of weak rural digital infrastructure construction (Li & Xu, 2022). As of June 2022, the number of non-Internet users in China was 362 million. Among them, non-Internet users in rural areas accounted for 41.2%, which was 5.9 percentage points greater than the proportion of the national rural population (He & Liu, 2023). The high number of non-Internet users makes it urgent to build basic technology facilities in rural areas.

Not only in China but also "how to bridge the digital divide" has become an issue of concern worldwide. In Europe, the DigComp framework has always been regarded as a powerful measure for enhancing the digital capabilities and digital literacy of citizens and bridging the digital divide. Gao's team believes that the COVID-19 epidemic and its suppression measures have accelerated digital transformation in European society, and teleworking and distance learning have become the new social normal, which has also led to a further exacerbation of the digital skills gap and unemployment among citizens, i.e., a new digital divide. DigComp2.2 is used as the basic support and scientific basis of the decision-making process to help EU countries develop forward-looking strategic planning and systematic solutions to bridge the digital divide and achieve digital transformation by providing a common understanding of the latest digital capabilities (Gao & Qu, 2024). However, due to the large population base and the large gap in network penetration rates among regions, it is too difficult to rely on one digital model to manage the internet. The top priority is to solve the problem of the popularization of rural digital infrastructure and eliminate the regional digital information gap.

2.3. Training of high digital literacy youth talent with creative thinking

With the advancement of the digital intelligence era, all walks of life have begun to cultivate "high numerical intelligence" talent. Zhang Lan's team analyzed the structure of numerical thinking ability in the training of management accounting talent and conducted research on strategic thinking, data integration and application, interpersonal communication, and learning innovation. ability, and efficient behavior ability, and based on the current status of management accounting personnel training, the management accounting talent training model is optimized from the three perspectives of government, society and universities (Zhang et al., 2023). This reveals that in the digital age, informatization is no longer the monopoly of the computer industry. An increasing number of industries have implemented digital reform, and the demand for talent with high digital literacy has been increasing.

Jingjing Chen used college students as the research object to explore the current paths for cultivating innovative digital talent in colleges and universities. She found that the depth and breadth of innovation and entrepreneurship education in schools are insufficient, the curriculum is relatively simple, and the content is basic. Other aspects of

teaching are also lacking. Most of them rely on knowledge lectures and publicity and education, college student innovation and entrepreneurship competitions, computer competitions, national digital media design competitions, or the construction of industrial incubation bases for college students. However, the implementation of this approach often lacks specific methods and countermeasures, and only a few students who have a foundation and skills or who are interested in this area lack universality and extensiveness, fail to meet the expected goals and requirements, and seriously affect the effectiveness of personnel training (Chen, 2022). However, the current research objects are mostly school students, and the proposed paths are mostly college curriculum education, while digital literacy training paths for youth are rarely involved.

3. Development of digital literacy in youth in the digital age

Against the background of the new round of technological revolution, to seize the opportunity to achieve high-quality development of the digital economy, we must innovate; at the same time, to promote the enhancement of industrial competitiveness and improve China's position in the global value chain, we must also cultivate innovative talent. However, the current studies mostly focus on how to penetrate from the marketing and sales end to the upstream industry chain, such as logistics, manufacturing, R&D, and design (Chen & Ma, 2018), and neglect the cultivation of national digital literacy. Therefore, the present study is based on the goal of cultivating high-end digital talent. We also need to comprehensively improve the basic digital literacy of the Chinese people and cultivate the innovative thinking of young people through multifaceted and multifield cooperation. This paper is based on Professor Xiaojing Li's five aspects of youth digital literacy (Li & Hu, 2020) and proposes the following three training paths:

3.1. Comprehensively improving the basic digital literacy of youth

3.1.1. Increasing the penetration rate of mobile devices

Due to the unbalanced and insufficient development in China, although the proportion of "mobile skills" is greater than that in other countries, the gap between the various regions in China is too large. First-tier cities such as Beijing, Shanghai, Guangzhou and Shenzhen are not just about "mobile skills." Compared with those in ordinary second-tier cities, education related to digital content is also more abundant and excellent. Although ordinary second-tier cities are not as good as first-tier cities in terms of "creation skills," their "operation skills" and "mobility skills" are still very good. For some remote towns and mountainous areas, operation and even movement skills are slightly lacking. To comprehensively improve basic literacy, we must first start with simpler "mobility skills" and "operation skills" to reduce interregional digital information differences.

3.1.2. Strengthen security skills education to acquire a sense of digital identity

With the popularization and development of information technology, many developed countries and organizations have actively explored digital literacy education and have gathered various forces from government departments, higher education management and research institutions, and library industry organizations to support the research and development of digital literacy in these countries. Educational practice (Zhang & Huan, 2016). Australia, the United Kingdom, and Singapore have specifically formulated digital skills training goals in their national digital strategies and promoted the implementation of digital literacy education by developing digital skills course training. Among them, while organizing a series of digital literacy practice activities, a number of library associations in the UK have also carried out a large amount of research on digital literacy, including digital literacy education mechanisms, curriculum systems, assessment frameworks, and team and institution building (He, 2022). Western countries have focused on digital literacy education research for a long time and have established relatively complete and mature digital literacy education models that are suitable for their citizens. Their digital literacy education practices have mainly revolved around digital hardware facilities, curriculum systems, cooperation mechanisms, etc. (Li et al., 2023).

Building a two-way connection between digital literacy and youth values can help young people better integrate into the torrent of the digital age. The construction of the value subjectivity of youth enables them to set clear

personal goals and develop self-management and self-discipline abilities to more effectively master digital technology and improve digital literacy (Smahel et al., 2020). When young people develop digital identity awareness in their own values, they can spontaneously learn digital technology and cultivate digital thinking. Thus, young people realize that the digital society is not as far away as it used to be. Under the joint action of subjective and objective factors, social needs and values, young people can assume social responsibility and have more in-depth experience with the positive role of digital technology in social change. This can thereby enhance digital literacy.

3.2. Multiparty collaborative training for digital economy talent at different levels

The development of emerging technologies such as big data, the internet, and artificial intelligence as well as the new characteristics of industrial development in the digital age have placed new requirements and new ideas on the cultivation of social talent, and the demand for compound talent is gradually increasing. Now that information technology talent is no longer exclusive to the computer industry, there is an enormous demand for young talent with high digital literacy in the business field, construction field, or even the education field. Therefore, this study proposes the following points on how to cultivate interdisciplinary or even multidisciplinary digital talent.

3.2.1. Carrying out the globalization of digital information

On the basis of already having a sense of digital identity, a more open online environment is created where young people can communicate with the world and exercise their operational, social and creative abilities in a freer atmosphere. Digital awareness among young people should be increased to avoid deficiencies in digital awareness. In addition, when individuals understand the value of digital resources, understand the significance of digital governance, and expand the breadth and depth of the use of digital technologies, due to their age and education levels, there are differences. A person's vision depends entirely on later education. The reason why first-tier cities far exceed second-tier cities in many aspects of digital literacy lies in the rich cognitive environment provided by international metropolises. Thus, how can people from other cities have experience similar to that of first-tier cities? what about resources? The answer lies on the internet. Youths should pay attention to new strategies, new plans, new industries, new formats, and new models of relevant national ministries and leading enterprises in the digital economy and digital technology to synchronize with the information and language of the digital world and bridge the "digital divide."

3.2.2. Multidomain digital technology learning

The future is one of multifield integration and development. Fang Wang et al. believe that with the deepening of industrial integration and the increasingly complex market environment against the background of the digital economy, most enterprises are facing interdisciplinary problems and require compound talents with interprofessional, interdisciplinary and knowledge integration. The shortage of data is even more scarce, especially when big data is integrated into production and operation as a new production factor, which inevitably requires industrial economy talent to have the ability to process and apply data. Therefore, graduate students in industrial economics should not only have solid professional knowledge but also have relevant peripheral basic scientific knowledge to achieve knowledge integration. Youth improve their digital literacy by understanding the digital technologies involved in different disciplines and fields at work and finding suitable participation methods when faced with hot concepts, such as metaverse, NFT, and numbers. Exercise your comprehensive digital literacy through practice.

3.2.3. Practical cultivation ability

Among the five elements of youth digital literacy, operational ability is indispensable. We must cultivate not only interdisciplinary R&D talent with solid professional knowledge but also digital technology application talent and digital skills talent. The training of digital talent should be oriented toward industrial practice and real business scenarios. Relevant state departments should encourage the deep participation of leading enterprises in the fields of digital industrialization and industrial digitization in the design of professional curriculum systems. Colleges

and universities should further deepen the integration of production and education, establish a collaborative education model between production and education and science and education centering on the industrial practice of the digital economy, and implement the key processes, key links and typical scenarios of digital technology research and development and its integration with businesses into professional teaching links to facilitate teaching and research. Close connection with industrial practice.

3.3. *Cultivate creative thinking*

In the digital economy era, enterprises need digital transformation, and people also need digital transformation. They must build digital thinking and be good at using data to help themselves. Professor Li Xiaojing's research report on the quality of teenagers in Shanghai shows that, among the five dimensions, mobile skills (M=4.49) are the highest, which is different from the conclusion that foreign countries have greater operational skills and social skills. However, creative skills (M=2.90) were the lowest, which was consistent with the findings of a previous study (Deng et al., 2023). This means that although creative skills are listed in the curriculum standards, the actual teaching effect is not satisfactory compared to other dimensions. The mastery and teaching of mobile skills are still difficult in information technology education, and they are also key to determining whether Chinese school-age children can gain advantages in global information age competition (Ying, 2021). Therefore, how should we change? The main method is to abandon the traditional "silent" classroom and create a free environment to stimulate creative thinking.

Comparing the development of the digital economy between China and the rest of the world, it is not difficult to find that the originators of Bitcoin, whether it was Bitcoin in 2002 or the hottest metaverse economy at present, are often foreigners. Don't we think this way? However, throughout the history of economics, many excellent theories have been proposed by the Chinese. Then, why can we only "process" but not "invent"? This paper proposes that the reason lies in the curriculum atmosphere of institutions of higher learning.

An open and inclusive classroom allows different perspectives, and everyone has their own unique thoughts. The world is full of diverse thoughts and viewpoints, and what we have to do is to listen to the thoughts of others and show respect for them. In an open and inclusive classroom, students are allowed to make mistakes, and sharp views are allowed. In this classroom atmosphere, teachers respect the subjectivity of students and stimulate students to engage in creative thinking and critical thinking (Ying, 2021). The shaping of thinking is a long-term process, especially the cultivation of creative critical thinking, which must provide a free platform and sufficient time for independent thinking. "The cultivation of thinking is inseparable from communication." However, because most of China's innovative talent is the product of colleges and universities, traditional education in China emphasizes knowledge teaching and lacks innovation vitality, and there is a lack of communication between teachers and students as well as between students. Thinking collisions make it difficult to form innovative thinking. To improve quick thinking and efficiency in the classroom, the "silent" atmosphere in the university classroom must first be broken, speeches are encouraged, and students are free to express their views.

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