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Exploration on the Cultivation Path of College Students' Digital Literacy in the Era of Digital Economy

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Abstract: In the digital era, talents, especially young talents with high digital literacy, are one of the most critical elements of the development of digital technology and digital economy. However, due to the lack of research and experience in digital literacy of citizens in China, the cultivation of digital literacy of college students in China is insufficient, and faces many challenges. This paper explores the digital literacy cultivation path represented by college students, hoping to accelerate the establishment and practice of the digital literacy cultivation system and framework for young talents, so as to promote the overall improvement of Chinese citizens' digital literacy and the construction of its cultivation system. Based on the analysis of the current situation of college students' digital literacy cultivation, combined with the conditions and the characteristics of The Times of Chinese higher education, this paper puts forward the path and suggestions of college students' digital literacy cultivation from the aspects of goal orientation, the improvement of educators' digital literacy, the framework of college students' digital literacy, the evaluation system of college students' digital literacy, and the research on the theory and training system of college students' digital literacy. In view of the social value that universities play a strong driving and exemplary role in the cultivation of talent literacy and the improvement of citizen literacy, it is hoped that this will also lead the construction of digital literacy systems for other groups, and provide reference for the government or society to build a framework and system of citizen digital literacy.

1. Introduction

Digital technology and digital economy are becoming the leading technology and leading economic form of scientific and technological innovation and economic and social development in the world today. Under the tide of digital technology and digital economy, talents, especially young talents with high digital literacy, are one of the key elements of the development of digital technology and digital economy. It is an important task for colleges and universities to provide high digital literacy talents for country and society. The digital transformation of higher education in our country should adhere to and strengthen the digital literacy as the target-oriented, and take digital knowledge and digital technology as the content of universal education, so that students of all disciplines can have basic digital consciousness and master the core digital knowledge and digital technology. Cultivate socialist talents with high digital literacy. The 2022 "Digital China

Development Report" shows that the scale of the domestic digital economy is as high as 50.2 trillion yuan, and the digital economy has become an important support for the high-quality development of China's national economy. In the digital era, national digital literacy has become a key indicator to determine a country's competitiveness and soft power. Mastering good digital skills and possessing good digital literacy has become one of the essential qualities for the survival and development of young talents in the digital era. In this context, the country has also carried out relevant deployment in the digital capacity enhancement strategy of citizens. For example, the Cyberspace Affairs Commission of the CPC Central Committee issued the "Action Plan to Enhance Digital Literacy and Skills of the whole People" in November 2021, proposing to build a knowledge updating and innovation-driven digital literacy and skills cultivation system. The 14th Five-Year Plan for National Economic and Social Development of the People's Republic of China and the Outline of the 2035 Vision Goals issued in 2023 clearly states that it is necessary to "strengthen the education and training of digital skills for all, and popularize and improve citizens' digital literacy." The 14th Five-Year Plan for the Development of Digital Economy lists "improving digital literacy and skills of the whole people" as one of the five guarantee measures for the realization of the planning goals. Therefore, to improve citizens' digital literacy and skills is already an important policy and strategy for China to promote the digital transformation of higher education, build a learning society of lifelong learning and realize the modernization of Chinese-style higher education. This paper, starting from the strategic significance and times value of the digital literacy cultivation of higher education, and combining with the challenges faced in the current digital literacy cultivation, attempts to explore the realization path of the digital literacy cultivation of college students, hoping to provide a reference for the training practice of the high digital literacy talents at the undergraduate level of higher education in our country.

2. Literature Review

Digital literacy, as an individual's accomplishment and quality in digital culture, digital knowledge and digital skills in the digital era, generally includes the individual's cultural understanding and awareness of digital technology and digital economy, knowledge acquisition and application, and speculation and judgment of digital culture and phenomena. A person with high digital literacy not only has a certain pursuit of digital knowledge and skills in consciousness and emotion, but also can show good quality and behavior in the above aspects. The concept of "digital literacy" was first put forward in 199 by the Israeli scholar Yoram Eicht-Alkarai, but it was not clearly defined. In 1997, Paul Gilster formally proposed the concept of "Digital Literacy" in Digital Literacy, and "digital literacy" refers to that when information is presented by computers, people can understand and use information from a wide range of formats, which is the basic behavior of cognition. Since then, scholars from different countries, international organizations and different fields have defined and explained the concept of "digital literacy" from different levels and angles, and their understanding has different angles and emphases. Elements of digital literacy include information and data literacy, communication and collaboration, media literacy, digital content creation (including programming), security (including digital health and cybersecurity related literacy), intellectual property related issues, problem solving, and critical thinking. [1] In 2017, the American Library Association proposed that "digital literacy" is "the ability to use information and communication technologies to find, evaluate, create, and communicate, supported by cognition and skills." [2] In 2018, UNESCO defined "digital literacy" as "the use of digital devices, the use of network technology, and the use of information technology." The ability to securely and appropriately access, manage, understand, integrate, communicate, evaluate and create information to participate in economic and social life, including, inter alia, computer literacy, communication

technology literacy, information literacy and media literacy. "[3] This definition also clearly explains digital literacy as the comprehensive embodiment of four aspects of competence, which has a more important impact on subsequent relevant research. In 2022, the European Union released version 2.2 of the Framework for Digital Literacy of European Citizens, in which the "five-step" literacy framework construction model is applied to decompose and explain digital literacy, mainly including: Five main elements, 21 sub-elements, level setting of four-level and eight-paragraph classification, application behavior examples of various sub-elements according to the three dimensions of knowledge, ability and attitude, application examples of various sub-elements in learning and work scenarios. The five main elements are: information and data, communication and collaboration, digital content production, security, and problem solving. [4] This framework clearly defines "digital literacy" and forms a visual framework definition, in-depth explanation and listing of the connotation of digital literacy, and becomes an important reference or basis for subsequent relevant research.

Domestic attention to the concept of "digital literacy" is relatively small, mainly from 2005 gradually emerged. In the journal paper database of CNKI, 857 articles were obtained by the search of article title = "digital literacy" as of June 6, 2024. Through the screening and analysis of relevant papers in academic journals, it is found that there are few studies on the elevation of digital literacy in China, most of which are mainly aimed at the measurement of digital ability or literacy for some specific groups, and few studies on the connotation, theory and system of digital literacy, and no systematic theoretical system has been formed. In general, there are more studies on the digital literacy of digitally vulnerable groups such as minors, the elderly and rural groups. It can be seen that researchers from all walks of life pay more attention to the social value of digital literacy of the whole people. However, as a digital power in China, from the long-term goal and value of digital technology innovation and digital economic development, the digital literacy of higher education and high-level groups is also worthy of attention and attention. Further select "SCI", "Peking University Core" and "CSSCI" as the source categories of the above literatures, and select "higher education" as the subject for further screening, and only 30 papers are obtained. There are also some researches specifically aimed at the framework of college students' digital literacy. For example, Wang Nan et al., based on the existing digital literacy evaluation indicators and taking finance and accounting as an example, combined general digital literacy and professional discipline literacy to build an evaluation index system of college students' digital literacy from the perspective of the development characteristics of the discipline. The digital literacy index of finance and accounting major college students is classified from two aspects: independent index and professional course, and consists of 24 indicators from four dimensions: general innovation literacy, financial and accounting course, specialized audit course and other courses. The four aspects of the system not only integrate the general and innovative perspectives of the previous scholars' assessment of innovation literacy, but also reflect the uniqueness of the professional course field, which combines the professional ability of finance and accounting college students with the digital literacy ability, which is relatively comprehensive. [5] Wu Tanning summarized and constructed college students' digital literacy from the three dimensions of operational skills, applied ability, thinking and consciousness, and further subdivided the three dimensions into five first-level indicators, with a total of 15 indicators and indicator interpretation. Through Pearson correlation analysis, the stability and reliability of the framework and the correlation among indicators were tested. [6] Most studies on college students' digital literacy mainly focus on the practical training of a certain major, which provides certain practical references for the digitization of higher education.

3. The Challenges of Digital Literacy Training of Chinese College Students

(1) Lack of goal setting and top-level design for college students' digital literacy training

At present, although there are many researches on citizens' digital literacy in China, there are not enough researches on the theoretical level, and there is no systematic concept and framework for citizens' digital literacy. Therefore, there is a lack of unified and systematic guidelines in the digital transformation of higher education and the cultivation of college students' digital literacy. Although some colleges and universities have continuously strengthened the cultivation of students' digital ability and literacy in the construction of some disciplines or educational practices, they lack a unified goal and top-level design at the national level or in higher education departments. Most of them are carried out unsystematically through some professional training or curriculum practice, or in the form of school characteristics or professional characteristics. In order to cultivate the characteristics and advantages of schools or specific majors, the lack of systematic thinking and unified norms can not form a stable and systematic general and general education. Due to the lack of effective evaluation standards and evaluation system, the level of digital literacy of college students can not be effectively evaluated and tracked.

(2) There are significant differences in digital competence and literacy among higher education institutions and among their members

Digital capability is the key to realize the digital transformation and development of higher education. The digital transformation of higher education and the quality of its transformation is largely influenced by the digital capabilities of higher education institutions and their members, as well as stakeholders. [7] At present, most teachers and other staff in colleges and universities have not received systematic education or training on digital ability. Therefore, there are great differences in digital knowledge, ability and attitude among different staff in the same college and university, and there are also great differences in digital literacy and digital teaching ability. In particular, there is a large difference between different professions in high efficiency. This undoubtedly brings many obstacles and challenges to the digital transformation of higher education and the cultivation of overall digital literacy for college students.

(3) The academic community itself pays insufficient attention to the research and practice of digital literacy of teachers and students in higher education

According to the above literature research and comparative analysis, it can be seen that compared with foreign countries, especially the European Union, in terms of the degree of attention paid to the research and practice of citizens' digital literacy and the richness of results, both the government and the academic community pay insufficient attention to citizens' digital literacy. At present, non-systematic practice is still the main practice, and the research on theoretical level and systematic practice has just started. There are few points of concern, and related research is gradually growing but the growth rate is slow.

4. Digital Literacy Training Paths for College Students in the Era of Digital Economy

In today's digital era, digital technology has become a new driving force for economic development, digital economy has become a new economic form, and the demand for high digital literacy talents is increasing, so it is imperative to strengthen the cultivation of college students' digital ability and literacy. The government should increase the investment in digital transformation and talent cultivation of higher education, and provide all-round training and education to meet the demand for high digital literacy talents in the development of digital economy. Based on the challenges facing the higher digital transformation and the training of high digital literacy talents in our country, this paper puts forward some suggestions on the digital literacy training path of contemporary college students from the following aspects:

(1) Establish a quality-oriented educational concept

In the process of digital transformation and development of education, in the era of digital intelligence education, it should be regarded as one of the essential qualities of contemporary college students, and it should strengthen the goal orientation based on digital skills, and establish a target system of college students' digital ability cultivation, and strive to improve college students' digital ability and literacy. [8]

First of all, the establishment of literacy oriented education concept, combined with China's national conditions and national development strategic goals, to carry out digital ability education suitable for China's socialist construction. Secondly, the government should strengthen investment and policy support for the digital transformation of higher education, advocate the role of digital technology in promoting literacy learning, and provide systematic support for the digital transformation of higher education to promote the transformation of education paradigm. Third, establish a target system for the cultivation of digital ability of college students. Education management departments and colleges and universities should formulate targets for the improvement of digital ability of college students at all levels, build a target system for the improvement of digital ability of college students, explore effective education models to promote the implementation of digital ability cultivation goals and accelerate the cultivation process of digital ability and literacy. Finally, we should promote the reform of education and teaching mode to adapt to and implement the educational concept of "literacy as the goal orientation". Such as "cross-border integration", school-enterprise joint training mode.

(2) Establish a systematic training system for teachers' digital skills to improve teachers' digital education capabilities

To realize the digital transformation of higher education and the cultivation of college students' digital literacy, the important premise and foundation is the improvement of teachers' digital literacy and skills. Through the improvement of teachers' digital literacy, the transformation of educational concepts and abilities can be promoted. In November 2022, the Ministry of Education promulgated the "Teacher Digital Literacy", which, as a standard for the education industry, includes five first-level dimensions of digital awareness, digital knowledge and skills, digital application, digital social responsibility, and professional development. Under these five dimensions, 13 second-level dimensions and 33 third-level dimensions are subdivided into specific descriptions. It clarifies the goal for the cultivation and promotion of teachers' digital literacy, and improves the corresponding implementation and evaluation basis. At this stage, higher education departments or universities should establish a digital education skills training system for teachers as soon as possible, focus on cultivating teachers' digital ability and digital education ability, promote the integration of digital ability related content into the entire process of talent training and teaching of various disciplines, gradually form a digital literacy oriented education concept, change the original teaching mode, and effectively carry out digital education [9].

(3) Establish a digital literacy framework for college students in line with China's national conditions and its updating mechanism

First of all, the EU Citizens' Digital Competence Framework has built a digital competence framework system for different groups, and its research results and practical results give us good reference and reference value. There are also some scholars in China who have conducted research on the framework design of college students' digital literacy and obtained reliable results. At present, China's research on the framework of citizens' digital competence has just started, and it is summarized as a series of qualities and capabilities such as digital acquisition, use, evaluation, interaction, innovation, and security in the Action Program to Enhance Digital Literacy and skills for all. These are not enough to guide the systematic cultivation of college students' digital literacy. Therefore, we can make use of the advantages of the higher education system in academic ability

and practical ability, first establish a localized digital literacy framework in line with China's national conditions, in order to standardize and accelerate the digital literacy training of college students, and gradually promote and improve the construction and implementation of citizens' digital competence framework. While developing the digital literacy framework for higher education, it should also adapt to the progress of The Times and the trend of iterative changes, and establish a corresponding framework update mechanism to ensure the sustainable development of the digital literacy framework with The Times. Combining with China's national conditions, Chinese higher education and its goals, the main elements of digital literacy construction of college students can be subdivided and defined from the four dimensions of ideology, knowledge, ability and attitude. In terms of connotation, it emphasizes the ideological value orientation of digital cultivation and adheres to the core value of socialism. In the process of learning and applying digital skills, college students should clearly take the position and value orientation that the interests of the nation and the country come first, and in the overall structure, the skill dimension should occupy a dominant position.

Secondly, accelerate the establishment of college students' digital literacy evaluation system, conduct dynamic assessment and tracking of college students' digital abilities, and further promote the continuous optimization of digital literacy framework. It is necessary to construct the definition and expression form of numerical ability, so as to judge whether numerical ability is acquired or acquired for objective judgment, and to form an objective basis for judging the level of numerical ability. According to the target system of digital ability cultivation, the standard system of digital ability measurement is developed to effectively evaluate the level of digital ability and the achievement of training goals. In terms of the construction and evaluation of the digital competence level of college students, the design should be based on the roughly advanced level in the framework of digital literacy of EU citizens, so as to adapt to the goal of higher education and the quality level of college students. At the same time, the mechanism of dynamic evaluation of college students' digital ability should be established to carry out the evaluation of college students' digital ability continuously.

Third, accelerate the research of college students' digital literacy training system, and guide the concrete implementation of college students' digital literacy training plan. Colleges and universities should give full play to the advantages of academic resources and abilities as well as the convenience and resource advantages in education practice, explore the comprehensive and deep integration of digital ability and teaching, boldly and actively practice, test and optimize the training experience of digital literacy of professional talents in practice, constantly summarize experiences and lessons, and promote the continuous optimization and update of the digital literacy training system of college students.

(4) "cross-border + crossover" integration to strengthen the transformation of college students' digital ability

Colleges and universities can cooperate with scientific research institutes, technology companies, enterprises, communities and other institutions to strengthen the cross-training between digital majors and various majors on campus, and promote the multi-integration of collaborative education carrier of digital skills training and transformation of college students with platform thinking. Through multiple integrated collaborative education carriers, coordinate and promote the reform coordination of "three education", strengthen the open collaborative training of "interdisciplinary", especially the collaborative training of digital technology majors such as network information and other majors, so as to promote the integration of college students' professional literacy and digital literacy, and promote the transformation of digital skills in professional fields [10]. Through the "cross-border + cross-over" integration training platform, the digital literacy of college students is empowered, digital skills of students in various majors are enhanced, the cultivation process of

digital ability is accelerated, and the digital gap between colleges and majors is narrowed.

5. Summary

In the stage of rapid digital development and transformation, institutions of higher education and college students are not only important influencing factors, but also important guarantees for the cultivation of citizens' digital literacy. They are not only one of the important goals of the cultivation of citizens' digital literacy, but also the guides, important enablers and promoters of the cultivation of citizens' digital literacy. It plays an irreplaceable role and status in the cultivation process of citizens' digital literacy. Therefore, strengthening the cultivation of digital literacy represented by college students is not only to meet the demand for high digital literacy talents in the development of digital economy, but also to explore the advance and experiment of citizens' digital literacy cultivation and framework construction, which plays a pivotal role. However, due to the lack of previous research and accumulation in digital literacy of citizens in China, we are faced with many challenges. Therefore, at present, the government, higher education management departments, higher education institutions and their members should pay full attention to and invest in promoting the systematic practical and theoretical innovation and construction of digital literacy cultivation of college students. This study strengthens and accelerates the construction and implementation of the framework and system of college students' digital literacy training, promotes the cultivation of talents with high digital literacy, and ADAPTS to the needs of the rapid development of digital economy.

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