Digital Intelligence Quotient: A New Way to Promote the Digitization of Higher Education

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Abstract—In the era of digital transformation, the digitization of college education has heightened the need for cultivating students' digital literacy skills. Through literature investigation, comparative research, and network investigation, this paper takes the Digital Intelligence Quotient (DQ) as the perspective to investigate the promotion of digitalization in college education. Digital citizens need to adhere to the correct digital attitude and value orientation. Digital knowledge can effectively improve the digital creativity of college students, and digital skills are an important starting point for enhancing the digital competitiveness. The digital practice of college education can be further promoted by improving the digital literacy level of college teachers, strengthening the role of ideological and political education in the cultivation of DQ, and constructing the local characteristics of the college digital education training framework.

Keywords- higher education; digitization; digital intelligence quotient

1. Introduction

Digital intelligence quotient (Digital IQ) represents the key skills individuals require in the digital age need to actively participate in the social division of labor. With the advent of digital society, attaching importance to the development of individual digital literacy has gradually become a global consensus. The overall layout plan for the construction of Digital China, released in 2023, proposes that "by 2035, the digital development level will enter the forefront of the world. The national education digitalization strategic action will be vigorously implemented to improve the national smart education platform". This provides a fundamental guideline for improving the digital level of higher education and points out the direction of progress. Digital intelligence quotient is a relatively new concept that spans multiple fields such as computer science, artificial intelligence, and cognitive science. At present, the research of digital IQ is still in the process of continuous development and improvement. In the United States, the United Kingdom, Singapore, and other countries, the application and research of digital IQ have made a lot of progress [1]. However, the research and practice of digital literacy in China is still in its infancy stage [2]. Especially in the cultivation of digital literacy of global citizens, it is still "lack of identity, policy, and practice" [3]. The involvement of colleges and universities to the construction of digital China and the cultivation of college students' digital literacy are important tasks that higher education needs to actively deal with [4]. Based on the related contents of three levels, eight fields, and 24 abilities of digital intelligence quotient (DIQ) [1], this paper studies the education of digital IQ of college students, aiming to promote the high-quality development of China's higher education.

2. The framework of digital IQ education for college students

Digital IQ contributes to the digital transformation of higher education. Digital technology has become an important part of college education, such as online courses, distance learning, digital resources, and so on. Through literature investigation, comparative research, and network investigation, this paper takes the Digital Intelligence Quotient (DQ) as the perspective to investigate the promotion of the college education digitalization. Digital IQ can help universities better understand and apply these digital technologies and improve the quality and effectiveness of teaching, as shown in Figure 1.
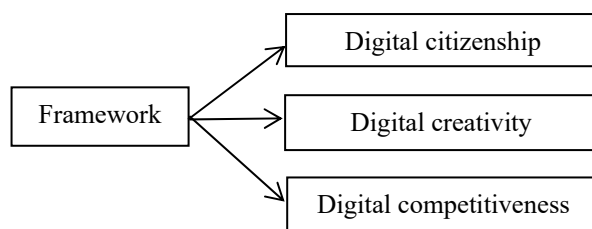

Figure 1 The framework of digital IQ education.

2.1 Digital citizenship: adhere to a positive cognitive attitude and value orientation

In the current context of digitalization of various spheres of life, an important characteristic of participants in a digital society is the level of their digital intelligence [5]. In the digital age, college students can break through the restrictions of time and place and enter the network world freely. In particular, the directional information pushed by big data screening will be comprehensively presented in front of college students. Under the impact of algorithm filtering and precise push, college students are easily affected by "bad information". The ultimate goal of the development of technology is to serve people, and the theory and practice of digital IQ can not be separated from this attribute. Taking a global view, adhering to the correct digital attitude and value orientation is one of the main principles for the construction of digital citizens in countries around the world. Universities should encourage teachers and students to learn and master various digital technologies, including core disciplines such as computer science and artificial intelligence, as well as emerging disciplines such as data analysis, cloud computing, and the Internet of Things. Seminars and training courses are held to enhance teachers' and students' understanding and application ability of digital technology, so as to better serve teaching and scientific research. Digital IQ also depends on the cognition and practice of educators. Through the application of digital technology, colleges and universities can better understand the learning needs and characteristics of students and provide personalized teaching services. Digital IQ can help colleges and universities better analyze and process these data to provide more accurate and effective support for personalized teaching. It is necessary for teachers to understand, accept, master, and use the tools and theories of smart education, and integrate values education into the cultivation of digital citizens.

2.2 Digital creativity: College students need to master the necessary digital intelligence and ability

The lack of digital knowledge is one of the core factors that hinder one's digital creativity, which means that the lack of digital creativity is directly related to the low digital IQ of college students. In the era of intellectualized design, designers need to reshape design thinking, change the traditional role positioning, and rationally apply intellectualized design tools for design and creation. The fuse of artificial intelligence and design will inject new vitality into the broader research field of design [6]. In the digital age, where intelligent technology experiences rapid iteration, information acquisition means and processing ability have become essential skills for college students' daily life and study. Digital creativity requires college students to be able to integrate into a specific digital ecosystem. For obtaining social resources, IQ appears to have a stronger contribution than education. This is somewhat unexpected as we consider IQ as a fundamental cognitive variable, while education is considered as a social process of acquiring knowledge, skills, values, morals, beliefs, and habits [7]. Although most teachers are more or less aware of big data, digitalization, and digital IQ, a series of issues concerning the core concept, operational framework, construction plan, teaching effect, and evaluation system of higher education digitalization are still unclear. Digital technology provides unlimited possibilities for college education, such as virtual reality, augmented reality, and other emerging technologies. Colleges and universities with digital IQ can better explore and apply these new technologies to promote innovation and development of education. Therefore, this matter needs to be taken seriously by educators.

2.3 Digital competitiveness: College students should master the necessary digital skills

Digital IQ can be improved through the construction of education. The Education 2030 Framework published by the Organization for Economic Co-operation and Development (OECD) identifies "trend skills" including, creating new value, reconciliating conflicts and dilemmas, and taking responsibility. In the digital environment, the use of certain information technology means and methods can quickly and effectively discover and obtain information, evaluate information, integrate information, exchange information, and cultivate comprehensive scientific skills and cultural literacy. At present, the prevailing education system of colleges and universities cannot effectively meet the demands of college students for digital competitiveness. Simulation results imply that the Digital Ecosystem performs better with the application of a distributed intelligence, showing increased efficiency when powered by Support Vector Machine than Neural Networks, and suggest that it can contribute to optimising the operation of our Digital Ecosystem [8]. Integrating high-quality course resources on the Internet for free learning is itself an important part or manifestation of education digitization. However, we should not equate this work simply with digital education. Digital education can bring richer content to college students' digital competitiveness.

3. the practical approach to higher education digitization

Colleges and universities are important carriers of education digitization. At present, there are few colleges and universities in China to carry out digital IQ teaching and relevant practices for college students' digital IQ courses or classes. This research adopts the qualitative research

method to study the practical approach to digitization of higher education. In the face of new challenges, the higher education system should take the initiative to carry out reform and do a good job in education digitization and the innovation and development of college students' digital IQ. Based on a study of 68 teachers from 7 undergraduate universities (In Jiangsu Province), the following conclusions are drawn.

3.1 Improving the digital literacy of college teachers

The promotion and development of digitization of college education cannot be separated from the intellectual support of college teachers. Intelligence influences the rate at which individuals can learn and the complexity of intellectual problems that individuals can solve [9]. Colleges and universities need to strengthen the training of teachers' digital education ability to improve their digital IQ and digital education level. Training, seminars, academic exchanges, and other activities can be organized to let teachers understand and apply the latest digital education technologies and methods. Statistics show that 88% of teachers surveyed believe there is an urgent need to improve digital literacy; 96% of teachers surveyed believe that digital literacy development is a long-term process. It is necessary to activate the whole education ecology of the school with technology empowerment, update and guide ecological learning with smart education concepts, and build an ecological environment for smart learning. Faced with the challenges brought by the new teaching model, the pressure of the whole process supervision, and the uncontrollable teaching evaluation, the impact of digital education on teachers can be said to be subversive. On the one hand, universities should set up targeted digital literacy courses when carrying out teacher ability training in summer and winter vacations. On the other hand, teachers' ability training should be combined with disciplinary and professional characteristics to explore the realization form and practice path of wisdom education to reconstruct school ecology. The scientific combination of software and hardware construction of digital education, the combination of online and offline, phased and targeted planning, for college digital education to consolidate the intellectual foundation and hardware conditions.

3.2 Strengthen the role of ideological and political education in the cultivation of digital IQ

In modern society where digitization gradually plays an important role, the development of science and technology provides realistic conditions for the digitization of ideological and political education. Digital technology disrupts the intelligent transformation of ideological and political education, which is the internal need for the independent development of ideological and political education [10]. The promotion of digital education in colleges and universities and the cultivation of digital IQ of college students need to be carried out under the framework of ideological and political education. Statistics show that 90% of the teachers surveyed believe that innovative measures are needed to integrate digital literacy education into the ideological and political curriculum. Only by adhering to the guidance of values of ideological and political education can we effectively standardize the path of digital development. In the "meta-universe" era, knowledge is fragmented, and college students are more interested in receiving information through images, videos, etc., rather than words in the traditional sense. In the context of big data, informatization, digitalization, and intelligence have become important trends in the new era [11]. Colleges and universities need to create a digital educational cultural atmosphere, encourage teachers and students to actively explore and apply digital technology and improve their own digital IQ and innovation ability. Activities such as digital education

cultural festivals and seminars can be held to promote the exchange and sharing of digital education and promote the innovation and development of digital education. Consequently, to address challenges posed by digital delinquency and digital crime, it is necessary to develop creative problem-solving skills in college students.

3.3 Build a framework for the cultivation of digital education in colleges and universities with the characteristics of the times

3.3.1 Optimize the design of digital education modules

Colleges and universities need to strengthen the construction and sharing of digital education resources, establish a digital education resource database, and provide diversified digital education resources and services. At the same time, it can also cooperate with other universities and enterprises to share digital educational resources and technological achievements to improve its own digital education level. Statistics show that 96% of teachers surveyed believe that the modular design of digital education is an important support for future higher education reform. Module design should reflect the university's school-running positioning, talent training goals, and professional training goals, clear the path of digital education and teaching reform, especially in the "teaching method" and "learning content", which highlight the educational means and methods of digital education. To promote the digital practice of the learning ecosystem with the support of educational digital technology, the construction of digital classrooms, digital teachers, digital teaching research, digital evaluation, and other modules. Teachers should give more trust and focus on the preferences and skills already present. Other possibilities will emerge with more augmentation of Internet technologies with capabilities to be adaptive and to proactively learn about users and their requirements, providing projective guidance and support [12]. Strengthen exploration and practice from the aspects of ability enhancement and digital innovation, so that college students can expand their professional knowledge in the process of active learning.

3.3.2 Construct a scientific and measurable curriculum evaluation system

The measurement of the digital effect of higher education is inseparable from the function of the evaluation system. Statistics show that 98% of the teachers surveyed believe that a scientific and reasonable curriculum evaluation system is of great significance to the cultivation of digital literacy. On the one hand, in the course preparation, teachers should design the content framework of the course and evaluation, inform students of the evaluation methods and principles in a timely manner, and carry out assessments with the help of the sub-assessment module. We should pay attention to the convergence of online teaching and learning big data, strengthen curriculum supervision, and promote the digital transformation of the curriculum evaluation system. On the other hand, based on the digital evaluation platform, the wisdom measurement of course assessment is realized. The assessment process emphasizes the content of classroom performance and practical links and builds a diversified assessment system that combines peacetime assessment, homework assessment, mid-term test, and final exam. To ensure the independence of the assessment, scientific.

3.3.3 Take digital assessment as the starting point to lay a solid foundation for quality construction

By establishing a data platform to collect and analyze relevant data of education and teaching, teachers and students can make more scientific and effective decisions based on data. Colleges and universities need to strengthen the management and evaluation of digital education, establish a digital education quality assurance system, and carry out scientific evaluation and management of the effect of digital education. Statistics show that 88% of the teachers surveyed believe that the assessment of digital literacy should include both students and teachers. At the same time, it is also necessary to strengthen the management of digital education security to ensure the stability and reliability of digital education. On one side is the assessment of teachers. The challenge of digital education for teachers is comprehensive. This is not only reflected in the comprehensiveness and depth of knowledge but also in information acquisition and data analysis and processing. On the other hand, universities participate in and promote the assessment of digital education. The focus is on cultivating students' ability to master digital knowledge, digital innovation and competitiveness potential, comprehensive ability, and advanced thinking in the risk society.

4. Conclusion

Colleges and universities are key drivers of education digitization. Digital IQ plays an important role in promoting the digitization of higher education. By cultivating and improving the digital IQ of teachers and students, colleges and universities can better adapt to the needs of the digital age and improve the quality and efficiency of education. Cognitive intelligence is rarely discussed in the context of digital inequality for practical and normative reasons: substantial difficulties around measurements and the fact that it cannot (easily) be changed. In the current contribution, cognitive intelligence is studied in relation to resources and appropriation theory which explains digital inequality as a process of four successive phases of Internet access: motivational, material, skills, and usage [13]. In the face of new challenges, higher education should take the initiative to carry out reform and do a good job in education digitization and the innovation and development of college students' digital IQ. At this stage, by improving the planning and design of digital education in colleges and universities, the optimized training framework can not only provide digital knowledge for college students, but also stimulate their digital competitiveness, and more importantly, shape their values and ideals. Going forward, digital IQ will play an increasing role in driving development in colleges and universities.

Data Availability Statement.

Not applicable.

Informed Consent Statement.

Informed consent to analyze, publish, and divulge was obtained from all subjects involved in the study.

Data Availability Statement.

The data presented in this study are available on request from the author.

Conflicts of Interest.

The authors declared no potential conflict of interest with respect to the research, authorship, and/or publication of this paper.

References

[1]   Wang Youmei, Zhao Wenzhu, WAN Ping. Meeting the Challenges of the Digital Society: Digital Quotient and Its Online Education System. Modern Distance Education Research, vol.1. 2020, pp.61-68.

[2]   Gao Xinfeng, Chen Li. The Usage Context Analysis of Information Literacy, Digital Literacy and Network Literacy—Content Analysis Based on Domestic Government Documents and Reports from International Organizations. Modern Distance Education, vol. 2.2021, pp.70-80.

[3]   Wang Xuyan. Future-Oriented Global Digital Literacy and Competency Standards Framework—An Analysis Based on the "DQ Global Standards Report 2019". Library Development, vol.3. 2021, pp.173-180+185.

[4]   He Chun MA, Xiaoqiong. Digital Intelligence Quotient Standards: Contents, Applications, and Implications Enlightenment. Journal of World Education, vol.1. 2023, pp. 58-64.

[5]   Glazunova. Digital intelligence of a modern economist: an exploratory case study. Second International Conference On History, Theory And Methodology Of Learning. Vol.104. 2021, pp.1-11. DOI:10.1051/shsconf/202110403001.

[6]   Li, Yan. Impact of Artificial Intelligence on Creative Digital Content Production. Journal of Digital Art Engineering & Multimedia. Vol.6. 2019, pp.121-132. DOI10.29056/jdaem.2019.12.05.

[7]   Dewey J. Experience & Education. New York: Touchstone.1938.

[8]   Briscoe, De Wilde, P. Digital Ecosystems: Optimisation by a Distributed Intelligence. Neural and Evolutionary Computing.1. 2022, pp.12-14. DOI:arXiv:0712.4099.

[9]   Gottfredson LS. Pretending that intelligence doesn't matter. Cerebrum, vol. 3.2020, pp.75-96.

[10]   Han Jun, Jin Wei. An exploration of the intelligent transformation of ideological and political education under the integration of digital technology. Studies in Ideological Education, vol.6. 2022, pp.32-37.

[11]   Wang Haipeng, et al. The ideological and political construction of professional courses based on big data has been carried out accurately. Journal of Higher Education, vol. 11.2023, pp.189-192.

[12]   Smith TJ, Henning RA, and Adams RG. Social cybernetics of augmented cognition—a control systems analysis. In: Schmorrow DD, Stanney KM and Reeves LM (eds) Foundations of Augmented Cognition. Arlington, VA: Springer, 2006,pp.1248-1270.

[13]   Van Deursen, AJAM. IQ and digital inequality: An empirical investigation. New Media & Society, vol.6.2023, pp.1248-1270.