

Research on the Current Situation of Digital Literacy of Normal University Students under the Background of Educational Digital Transformation—Take Universities in Jinan as an Example

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Abstract: This project first clarifies the connotation of the concept of digital literacy for normal university students, establishes the framework of digital literacy for normal university students, and formulates a scientific and feasible questionnaire combined with the existing digital literacy evaluation index system and the training characteristics of normal university students. We then combined the questionnaire survey data analysis with interview data to conduct a deeper excavation of normal digital literacy development demands and influencing factors, in order to improve the normal for digital literacy training thought and strengthen the training of digital literacy knowledge and skills as a starting point, close to the normal professional development, put forward the feasible normal digital literacy promotion strategy, digital literacy to provide certain reference for normal education.

1. Introduction

The party's 20th report clearly pointed out to build a "digital China" to promote the digitalization of education. When presiding over the fifth collective study session of the Political Bureau of the CPC Central Committee, General Secretary stressed that "the digitalization of education is an important breakthrough for China to open up a new track of education development and shape the new advantages of education development". We will further promote digital education to provide effective support for personalized learning, lifelong learning, expanding the coverage of quality education resources and education modernization.

In 2024, China launched a series of new reform policies in the field of education. To understand the digital literacy status of full-time undergraduate students, who are the future mainstay of compulsory education, and to master their actual demands and dilemmas in digital literacy development, targeted measures can be proposed to enhance students' digital literacy, update classroom teaching methods, and promote the process of education informatization.

2. Theoretical Principle

In 2024, China launched a series of new reform policies in the field of education, emphasizing opening up new space for development in the direction of digitalization, internationalization and

green education, speeding up the construction of a high-quality education system, and running education that satisfies the people. In the digital transformation of education, teachers are the bridge and the key to the deep integration between the teaching process, teaching content and digital technology, as well as an important driving force to realize the digitalization of education. Their digital literacy is related to the quality of national talent training. Normal education is the "mother machine" of education, is the cradle of teachers. It provides systematic training for the professional quality of normal university students, and is the starting point of their career development. Improving the digital literacy of normal university students will not only help to cultivate high-quality teachers, but also help to improve the digital literacy of the whole people, help to promote the digital transformation of education in China, and help to build a learning society of lifelong learning. Therefore, normal education has established and improved the digital literacy cultivation system of normal education students, established the concept of digital transformation and development of education, enhanced the awareness, knowledge and ability of digital education, and defined the digital social responsibility and professional development as an important content of normal education. The Digital Literacy of Teachers released by the Ministry of Education describes the digital literacy framework that teachers should have in the future, including 5 first-level dimensions, 13 second-level dimensions and 33 three-level dimensions, The first-level dimension includes digital awareness, digital technology knowledge and skills, digital application, digital social responsibility, professional development and other five aspects. The standard will be used for the training and evaluation of teachers digital literacy, including: to master the principles and methods of selecting digital equipment, software and platform in education and teaching; to use digital evaluation tools to analyze students learning situation, to use intelligent marking system, question bank system and evaluation system to analyze students knowledge preparation, learning ability and learning style; to use digital technology resources to find students learning differences and carry out targeted guidance. This is conducive to the solid promotion of the national education digital strategy, the improvement of the education information standard system, enhance the teachers awareness, ability and responsibility to use digital technology to optimize, innovate and change the education and teaching activities, and put forward the reference for cultivating normal university students with high digital literacy in the new era

3. Situation analysis

3.1 Foreign research status quo and development trends

With the Web of Science core collection of Web of Science as the data source and Digital Literacy as the theme word, it can be found that in 1994, Israeli scholar Yoram Eshet-Alkalai put forward the term digital literacy, and the research in such fields began to emerge. Until 2008, the number of documents began to grow steadily. After 2011, in view of the release of a series of digital capability frameworks in the EU, policies and frameworks related to digital literacy led by developed countries in Europe and the United States have been introduced successively, and the number of documents naturally entered the stage of rapid growth and produced many results. In general, before 2011 was mainly the theoretical review stage, and since 2011 is mainly the practical exploration stage[1]. His literature comes from pedagogy, communication, psychology, sociology and other disciplines, with a wide range of research. The research objects include children, primary and middle school students, college students, adults, teachers and special groups. The collation of these materials can help to clarify the research and development process of digital literacy, deepen the deep understanding of digital literacy, and help to focus on the connotation of digital literacy of normal university students. At present, foreign scholars focus on the evaluation standards of teachers digital literacy and the differences between different digital literacy evaluation standards, not only for the formulation of foreign digital literacy evaluation standards. There is a profound comparison between different

countries and different versions of the evaluation standards. These evaluation standards provide ideas for the formulation of the digital literacy evaluation standards for Chinese normal university students

3.2 Domestic research status quo and development trends

Compared with foreign countries, the research on teachers digital literacy in China was relatively slow. After 2014, the research literature on teachers digital literacy began to grow rapidly. To CNKI database as the source, in 2000-2024 time period of retrieval, domestic literature research topics mainly: digital literacy concept, digital economy, digital literacy, digital literacy education, library digital literacy, digital transformation, digital citizen literacy, digital divide, promotion strategy and the foreign horizon report and new media alliance digital literacy research experience. In recent years, with the rapid development of digital technology, the research on digital literacy has begun to increase substantially. In 2021, the number of articles was 289, with a year-on-year growth of 55%. Under the guidance of Chinas policies, it reached 605 in 2022, with a year-on-year growth of 109%. As a basic project, the digital transformation of education plays an important role in the future social development. The digital transformation of education has become a new hot spot of attention, which not only means the innovation at the technical level, but also involves the all-round reform of education concept, teaching mode and management system[2]. In 2022, the market size of Chinas digital education industry was 362 billion yuan, up 12.42% from 322 billion yuan last year, and the overall development of the industry entered the fast lane. In terms of user size, the digital education industry in China had 314 million users in 2022, marking an increase of 5.36% from its launch.

Although the user scale of the industry is not at the peak level in 2022, it has shown a recovery trend. In the future, with the empowerment of new technologies such as the Internet of Things and artificial intelligence, the digital education industry will accelerate the realization of digitalization and intelligence. "Double reduction" clear discipline training institutions prohibit capitalization operation, directly led to the capital market; in 2022, the total financing of digital education industry in China was 1.34 billion yuan, down 90.50%, less than 10% of the total financing last year, only 2.4% of the peak in 2020; the number of financing events was only 47, down 63.57% compared with the previous year. In 2023, Chinas research on teachers digital literacy in China has become the promotion trend and development focus in the field of education. From the trend, 2024 will continue to grow substantially, into the stage of rapid development. This momentum shows that digital literacy has been paid attention to in China, and the research prospect is very broad. Domestic digital literacy research is closely related to economy, education and library, and is also closely related to the digital age, big data, artificial intelligence and other era background and digital technology. Among them, there are many comparative studies with concepts such as media literacy and information literacy[3].

4. Key issues to be solved

4.1 Insufficient innovation of digital literacy training strategies for normal university students.

With the rapid development of information technology, digital technology has changed the form of education. As the main force of future educators, the improvement of their digital literacy has become an inevitable requirement of educational informatization, and the educational practice under the guidance of their digital literacy has a profound impact on the digital transformation of education. However, according to the preliminary investigation and the collation of academic achievements, it can be seen that the current strategies for improving the digital literacy of normal university students are mainly to focus on the input, while ignoring the key aspect of output. As a result, normal university students have formalism, low level, poor effect and so on. So, this study aims to cover the complete process for normal students to absorb digital literacy from knowledge to apply it to education practice,

through the organic unity of input and output, enrich the content of digital literacy training strategies, improve the level and enhance the effect, so that normal students can better internalize digital literacy in their hearts and externalize it in their actions.

4.2 The implementation degree of the digital literacy training strategy for normal university students is low

Combined with the initial research and understanding, the current theory of normal digital literacy promotion exists, but to some extent still assumption or experience guess at the top level, in the implementation of the effect is poor, the reality for normal digital literacy training strategy practice lack of clear goals and reasonable planning, the effect is not obvious. Therefore, this project will comprehensively investigate various guiding theories and assumptions on the improvement of digital literacy of normal university students, give suggestions from the perspective of implementation and feasibility, and extract special guiding theories with high feasibility and forceability for the improvement of digital literacy of normal university students.

4.3 The role of normal university students in the process of digital transformation of education

The Ministry of Education issued the Action Plan of Education Informatization 2.0, which clearly pointed out that "education informatization from the 1.0 era to the 2.0 era" to build a new mode of talent training. As the reserve army of the future teachers, normal university students undertake the important fulcrum to realize the goal of digitalization of education, and should also act as an important subject to play a role in the digital transformation of education. Therefore, this study will comprehensively investigate various resources and deficiencies, study and analyze the current level of digital literacy, understand the existing digital literacy education, and actively respond to the basic goal of comprehensively improving the digital literacy of teachers and students proposed in the Education Informatization 2.0 Action Plan, so as to enhance the educational competitiveness of normal university students.

5. Expected results (solution)

Combining proposed problem solving and technical route, we expect the following three results.

5.1 Forming organized and systematic papers and related research reports

The research team plans to write at least three academic papers and produce a detailed research report. These documents will comprehensively analyze the collected quantitative data (including questionnaire survey results, scores of various indicators, etc.) and qualitative data (such as interview records, on-site observation notes, etc.), and present the problems and solutions for the improvement of the digital literacy of normal university students, as well as the practical application value of the research results in a systematic way.

5.2 Apply the research results to the digital education practice as far as possible

We expect that the research results can be applied in the digital education practice of normal university students, and will directly affect the digital literacy education and improvement of more than 200 normal university students. At the same time, we expect that these results can be referred to by education policy makers, so as to promote the improvement and optimization of relevant education policies.

5.3 Enrich and supplement the related theories on the digital literacy of normal university students

The research objectives include putting forward at least five new theoretical viewpoints or hypotheses based on the existing theory of improving the digital literacy of normal university students, and publishing them in academic journals, so as to enrich and expand the theoretical framework of the digital literacy of normal university students.

6. Research data

6.1 Data analysis

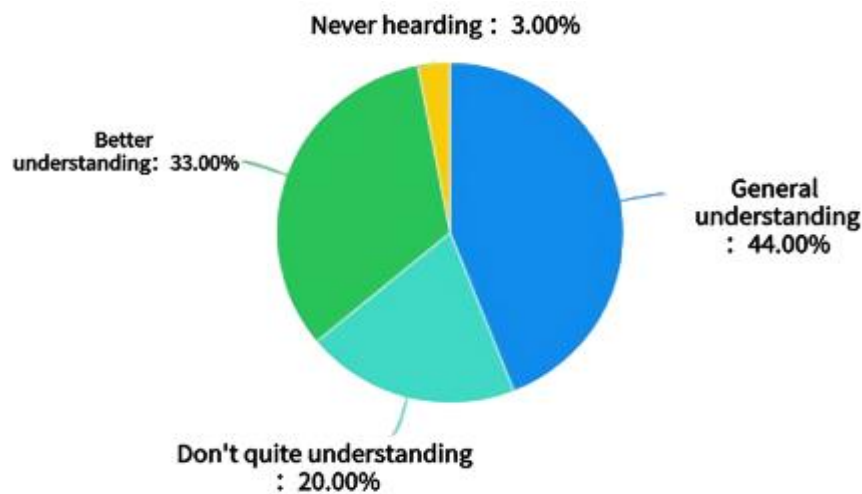


Figure 1: Understanding of "digital consciousness" among normal major students

In Figure 1, 44.00% of the samples will choose "general understanding", and 33.00% of the samples will be more understanding. It can be seen from this that for the "digital consciousness", many people are in a shallow understanding, do not have a deep understanding.

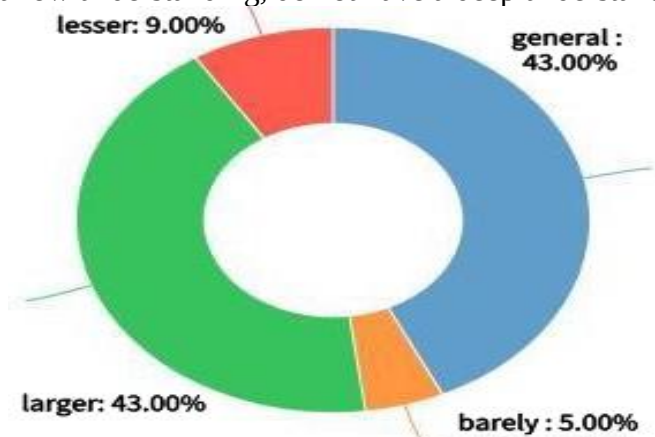


Figure 2: Research results of normal major students mastery of digital technology knowledge and skills

In Figure 2, 43.00% of the samples will choose "large", and 43.00% of the samples are "average". It can be seen that normal students have a certain basis for the mastery of digital technology knowledge and skills, but do not have a deep understanding.

Table 1: Research results of normal major students thinking that education and teaching reflect the degree of digital application

Name	Option	Frequency	Percentage (%)	Cumulative percentage (%)
Q-13 I can use digital technology resources to carry out learning according to my personal development needs.	Very consistent with	24	15.190	15.190
	Compare in line with	118	74.683	89.873
	Basically conform to	11	6.962	96.835
	The comparison is not consistent	4	2.532	99.367
	It doesnt fit	1	0.633	100
Amount to		158	100.000	100.000

In Table 1, 25.00% will choose "very sufficient", 39.00% students will choose "relatively sufficient", and 26.00% students will choose "average". It can be seen that students majoring in normal education think that education and teaching reflect a high degree of digital application, but still some students do not think so, the reason may be that these students do not have a deep understanding.

Q-13 I can use digital technology resources to carry out learning according to my personal development needs. The frequency analysis shows that the matching matching frequency is 24, 15.190%; the matching frequency is 118, 74.683%; 11,6.962%; 4,2.532%; 1,0.633%. It was the highest (74.683%) and the lowest (0.633%).

As can be seen from the above data, the current situation of digital literacy of normal university students is basically good, but there are still normal university students who do not have a deep understanding of the digital transformation of education, and how to better integrate and then put forward relevant training strategies is the issue we will discuss next.

7. Technical research route

7.1 Research ideas

With the theme of "Analysis of the Status quo and cultivation strategies of digital literacy of Normal University Students under the background of educational digital transformation", this research is mainly conducted according to the idea of putting forward, analyzing and solving problems.

First, ask the question. Under the context of the research background of this study, that is, the current situation of digital literacy of normal university students in China? How should they improve their digital literacy? In order to understand these two problems, it is necessary to first understand how to define the concept and connotation of digital literacy of normal university students and construct a framework of digital literacy training strategies that meet the requirements of digital development of education and target the normal university students.

Then, analyze the problem. Through the guidance of literature research and related theories, on the basis of clarifying the connotation of digital literacy, the concept definition and connotation of digital literacy of normal university students are further analyzed. Then, we interpret the policy documents and requirements of reports related to education digitalization and digital literacy in China and representative digital literacy in foreign countries, and combine the conceptual connotation of digital literacy for normal university students to analyze and plan the training strategy of digital

literacy for normal university students proposed by the institute.

Finally, solve the problem. Under the guidance of relevant theoretical basis, the research objects were determined, questionnaires were prepared, surveys and predicted, formal questionnaires were formed, questionnaires were distributed to collect data, collated and collected data, and conducted statistical analysis of the digital literacy of full-time undergraduate normal university students.

To analyze the current overall level of digital literacy of full-time undergraduate normal university students, we need to understand the specific status of digital literacy of full-time undergraduate normal university students, and to clarify the influencing factors of digital literacy of full-time undergraduate normal university students.

On the basis of basically mastering the current level of digital literacy of full-time undergraduate normal university students in our university, we will further explore the development needs and influencing factors of digital literacy of normal university students based on the interview data, and propose some feasible strategies for improving digital literacy based on this, as shown in Figure 3.

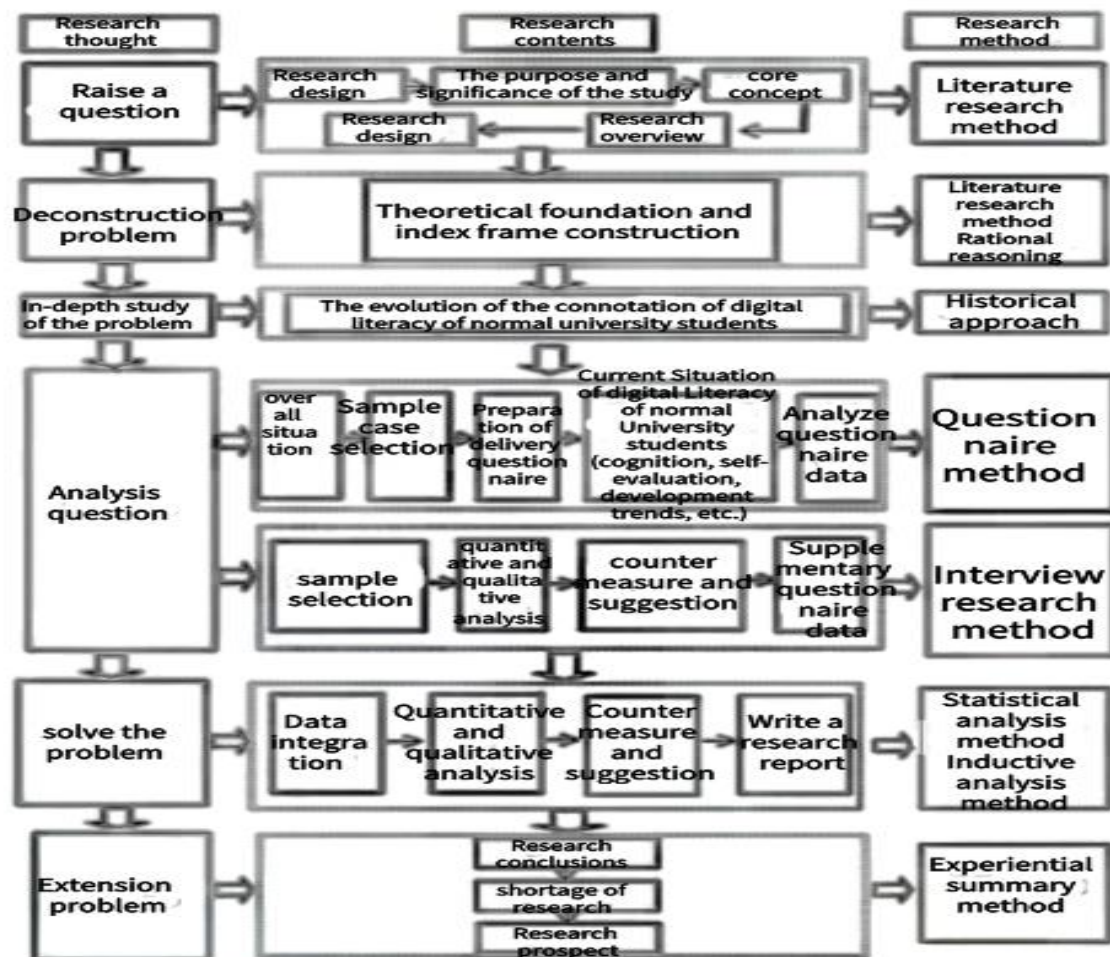


Figure 3: Research on the technical route

7.2 Research methods

This study mainly used the literature research method, questionnaire survey method, interview research method and expert survey method.

7.2.1 Literature research method

Through a comprehensive search and analysis of the research literature on digital literacy, especially the digital literacy of normal university students, the research team has established the theoretical framework and direction of the research. This move helps to clarify the core concepts, guide the construction of the literature review, and provide a solid theoretical basis for the selection of research methods and the construction of the reporting framework.

7.2.2 Questionnaire survey method

Based on the review of the literature, this research team developed a questionnaire designed to assess the current status of digital literacy among normal students. The validity and reliability of the questionnaire were ensured through pre-testing, data analysis and necessary questionnaire revision, thus providing a data basis for in-depth analysis of the digital literacy level and influencing factors of normal students.

7.2.3 Interview research method

To compensate for the depth limitation of the questionnaire, semi-structured interviews were used in this study. Based on the results of the questionnaire data analysis, the research team developed the interview guide and selected full-time undergraduate normal university students as the interview subjects. This approach allows research to gain a deeper insight into the current state of digital literacy of normal students and its determinants.

7.2.4 Expert investigation method

The research team used the Delphi method, an expert investigation technique, to solicit views from experts in the field on the digital literacy improvement strategies for normal students. Through multiple rounds of anonymous feedback and repeated revisions, the study aims to ensure that the proposed strategy is both scientific and practical and gains a broad consensus among experts.

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