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An Empirical Study on the Educational Environment of Digital Literacy for Students in Independent Undergraduate Universities

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Abstract: *Independent undergraduate universities are a crucial component of China's higher education classification and development system. The digital literacy of students is not only linked to their academic performance but also impacts their lifelong learning ability and future sustainable development. This study employs questionnaire surveys and empirical analysis to investigate the educational environment's impact on students' digital literacy. The sample consists of undergraduates from G-university. The study revealed that students at from G-university do not enrol in enough digital literacy courses. While the computer hardware supply is adequate, network access is insufficient. Additionally, due to a lack of understanding of database search paths and methods, students do not utilise the library's free digital resources. However, teachers of professional courses can provide support and demonstrations to students during the teaching process, which can aid in developing their digital literacy skills. Finally, countermeasures are proposed to enhance the educational environment of digital literacy for students in G-universities. These countermeasures include improving the construction of the digital environment, introducing digital learning resources, and providing differentiated training.*

Keywords: *Digital literacy; Educational Environment; Empirical analysis*

1. Introduction

Independent undergraduate universities are an essential component of China's higher education classification and development system. They mainly cultivate application-oriented and innovative talents. As higher education becomes more widespread, the number of citizens with a university degree is increasing, which is a key factor in promoting social and economic growth. The digital literacy of university students is linked to their personal academic achievement, ability to engage in lifelong learning, and future sustainable development. This is also connected to national innovation ability, economic development, and social stability.

1.1 Theoretical Significance

The main aim is to broaden the research scope and digital literacy of university students. Digital literacy research has been conducted in China since the 1990s. Research in academic universities is relatively extensive, and the research literature is mostly focused on libraries and digital literacy education, digital literacy cultivation from the perspective of various majors, the current situation of digital literacy among university students, digital literacy education and related curriculum, digital literacy standards and evaluation system, and the introduction and comparative study of digital literacy education in China and abroad. Although there is limited research on the educational environment of digital literacy for students in independent undergraduate colleges and universities, this study aims to contribute to this area.

1.2 Practical Significance

The purpose is to promote the comprehensive and sustainable development of university students. The advent of the digital age requires people to re-examine the status and role of digital literacy in higher education and to think farsightedly about education, making higher education more suitable for the goal of lifelong learning and the sustainable development of citizens in the future. On the one hand, digital literacy education can help cultivate the information abilities of applied high-level talents; on the other hand, it can help realize the demand for lifelong learning and sustainable development of applied talents.

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2. Literature Review

In 1994, Professor Yoram Eshet-Alkalai introduced the concept of digital literacy. In 2012, he proposed his well-known model of digital literacy, which includes six skills[1]. The Programme of Action for Enhancing Digital Literacy and Skills of the Whole Population 2022~2035, issued by the Central Committee for Network Security and Informatisation, highlights that digital literacy encompasses a range of qualities and abilities, including digital acquisition, production, use, evaluation, interaction, sharing, innovation, safety and security, ethics and morality. These competencies are essential for citizens of the digital society in their learning, working and daily lives. Research on digital literacy has been primarily concentrated in UNESCO conferences and documents, national policies of developed countries, and individual researchers' writings. After 2000, foreign research on digital literacy shifted towards practical applications, such as equipping citizens with basic digital literacy skills through education and training. During this research period, the concept of 'digital literacy' transitioned from a focus on skills to a focus on competence.

Several studies have been conducted on digital literacy education for college students, including those by Huang Ruhua and Li Baiyang (2015)[2], Zhang Libin and Wei Wei (2016) [3], Zhong Yunzhen and Zheng Jianming (2017)[4], and Guo Jun (2019)[5]. These studies have examined the role of MOOCs in digital literacy education in colleges and universities. In 2021, Wang Zhiping conducted a study on the content of digital literacy courses for college students in the context of mobile network environments[6]. Similarly, Luo Yi conducted research on the educational support of digital literacy[7].

There is a wealth of research on the concept, components, and standards of digital literacy both domestically and internationally. Digital literacy is closely related to various disciplines, primarily including education, library and information science, computer technology and applications, lifelong learning, and sustainable development. Our research focuses on conducting empirical studies on the educational environment of digital literacy for students in independent undergraduate colleges and universities. We aim to supplement the lack of research in this area by building on existing theories and studies.

3. Research Design

3.1 The research Subject

This paper examines G University, which was established in 2005 and recently became an independent undergraduate-level private general higher education university. The university was approved by the Ministry of Education as a research sample. G-University is a multidisciplinary undergraduate institution offering courses in economics, law, education, literature, science, engineering, medicine, management, art, and other subjects. It is open to students from across China and currently has an enrolment of over 20,000 students.

3.2 Research Methods

This paper discusses the research methods of Wang Ying (2008) [8]and Suo Xingmei (2018)[9] and presents a digital literacy questionnaire for G-university students. The questionnaire items are measured using the Likert 5-level scoring method, with all questions scored from 1 to 5. The questions are positively scored, with higher scores indicating higher levels of agreement. The survey was conducted using a random sampling method. Item analysis was performed using the traditional high and low two-group independent sample t-test. Descriptive statistical analysis, frequency analysis, and multiple response frequency analysis methods were used to analyze the research data. The statistical analysis software used in this paper was SPSS23.

3.3 Questionnaire Design

The survey questionnaire was administered to undergraduate students at G-university using "wjx" (an online platform to assist questionnaire distribution) and random sampling method. Out of 620 questionnaires distributed, 596 were recovered, and 581 of those were valid. The recovery rate was 96.13%, and the ratio of valid questionnaires to recovered questionnaires was 97.48%.

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3.4 Demographic Characteristics of Questionnaire Sample

According to Table 1, the proportion of female students is 69.5%, which is nearly twice as high as that of male students. There are 280 students from the first year of G University with the highest proportion at 48.2%, accounting for nearly half of the total number of students; followed by juniors, sophomores, and seniors at 32%, 12%, and 7.7%, separately. Besides, 65.4% of the students majored in liberal arts, 30.6% of the students are from the department of science and engineering, and the remaining students are in art and sports. Moreover, more than half of the students are in agricultural household registration.

Table 1 Demographic Characteristics of Questionnaire Sample

Demographic variables	**Category**	**Frequency (N)**	**Percentage (%)**
Gender	Male	177	30.5
	Female	404	69.5
Grade	Freshman	280	48.2
	Sophomore	70	12.0
	Junior	186	32.0
	Senior	45	7.7
Major	Science and Engineering	178	30.6
	Liberal arts	380	65.4
	Art and sports	23	4.0
Nature of household registration	Agricultural household registration	339	58.3
	Non-agricultural household registration	242	41.7

4. Analysis of Digital literacy Education Environment

The educational environment of digital literacy for students in G-universities was investigated through a questionnaire (Q33-Q47). The digital literacy curriculum (Q33-Q37), computers, networks, and information resources (Q38-Q41), and the teaching of professional course (Q43-Q46) were examined using frequency analysis for the single-choice questions and multiple-response frequency analysis for the multiple-choice questions.

4.1 Digital literacy Courses

We investigated the participation and acceptance of G-university students in digital literacy education programmes in terms of computer-based courses and information retrieval courses respectively.

Table 2 Frequency analysis of digital literacy course topics

		Frequency	Percent	Valid Percent	Cumulative Percent
Q30	A	139	23.9	23.9	23.9
	B	442	76.1	76.1	100.0
	Total	581	100.0	100.0	
Q31	A	392	67.5	67.5	67.5
	B	189	32.5	32.5	100.0
	Total	581	100.0	100.0	
Q32	A	204	35.1	35.1	35.1
	B	377	64.9	64.9	100.0
	Total	581	100.0	100.0	
Q33	A	143	24.6	24.6	24.6
	B	394	67.8	67.8	92.4
	C	44	7.6	7.6	100.0
	Total	581	100.0	100.0	

Table 2 shows that 23.9% of respondents opted for additional computer courses, while 76.1% did not. Regarding the question 'Q31: Have you ever taken a literature search course at G University?', 67.5% of students answered 'Yes,' while 32.5% answered 'No.' This suggests that approximately one-third of students have yet to participate in fundamental digital literacy courses. In response to Q32, 35.1% of

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volunteers answered 'Yes' and 64.9% answered 'No', indicating that students are not highly motivated to independently seek information through online courses. Only 24.6% of G University students claim to 'know very well' the paths and methods for searching the university library's online databases, while 67.8% responded 'not very well' and 7.6% selected 'don't know at all'.

4.2 Computers, Network Infrastructure and Information Resources

This part analysed the utilisation of digital resources by students, taking into account the school's computer equipment, network infrastructure, and information resources.

Table 3 Frequency Analysis of Computers, Network and Information Resources Questions

		Frequency	Percent	Valid Percent	Cumulative Percent
Q34	A	468	80.6	80.6	80.6
	B	113	19.4	19.4	100.0
	Total	581	100.0	100.0	
Q35	A	383	65.9	65.9	65.9
	B	198	34.1	34.1	100.0
	Total	581	100.0	100.0	
Q36	A	230	39.6	39.6	39.6
	B	351	60.4	60.4	100.0
	Total	581	100.0	100.0	
Q37	A	77	13.3	13.3	13.3
	B	314	54.0	54.0	67.3
	C	146	25.1	25.1	92.4
	D	44	7.6	7.6	100.0
	Total	581	100.0	100.0	

Table 3 presents the results for Q34-Q37. For Q34, which asks whether the opening hours of the university's public computer room are sufficient to meet students' learning needs, 80.6% of respondents answered 'Yes' and 19.4% answered 'No'. In addition, 65.9% of students answered 'Yes' and 34.1% answered 'No' for Q35, citing the university's implementation of WIFI blocking in teaching buildings as a reason for inconvenient Internet access. Q36 pertains to satisfaction with the campus network. 39.6% of the volunteers selected 'Yes' while 60.4% chose 'No.' This result is consistent with the previous question. The majority of students are aware of the free electronic resource library, although only 13.3% of them reported using it frequently.

4.3 Professional Course Teaching

We also investigate the role of professional course instruction in developing students' digital literacy.

Table 4 Frequency Analysis of Professional Course Teaching Questions

		Frequency	Percent	Valid Percent	Cumulative Percent
Q38	A	543	93.5	93.5	93.5
	B	38	6.5	6.5	100.0
	Total	581	100.0	100.0	
Q39	A	543	93.5	93.5	93.5
	B	38	6.5	6.5	100.0
	Total	581	100.0	100.0	
Q40	A	145	25.0	25.0	25.0
	B	345	59.4	59.4	84.3
	C	25	4.3	4.3	88.6
	D	66	11.4	11.4	100.0
	Total	581	100.0	100.0	
Q41	A	543	93.5	93.5	93.5
	B	38	6.5	6.5	100.0
	Total	581	100.0	100.0	

Table 4 shows that 93.5% of students and volunteers agreed that teachers of professional courses use more teaching-related information network platforms. Additionally, teachers were found to commonly share information resources used in the courses with students. However, when asked about the online resource websites related to their major (Q40), only 25.0% of respondents reported knowing and often

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using them, while 59.4% reported knowing but rarely using them, 4.3% reported knowing but never using them, and 11.4% reported not knowing about them. In contrast, 93.5% of students answered 'Yes' to Q41, indicating that they use computer networks more frequently to complete related learning tasks.

5. Conclusion and Recommendations

5.1 Conclusion

After studying digital literacy courses, including computer, network and internet resources, and professional courses, we discovered that G-university students primarily take compulsory basic computer courses. The participation rate in literature retrieval courses is not 100%, and the proportion of independent participation in digital literacy or information retrieval MOOC courses or online courses is low. Additionally, the proportion of independent participation in digital literacy or information retrieval courses is low. Overall, students' participation in digital literacy education courses is inadequate, and their learning is insufficient. While the hardware supply in the school's public computer room meets students' learning needs, network access is inconvenient, and students are dissatisfied. Although most students are aware of the free e-resources available in the school library, they do not use them frequently due to a lack of knowledge about how to search online databases. Teachers of professional courses use teaching-related information network platforms to share information resources with students. This can provide students with support and demonstration in information resources and technology. Teachers also assign relevant learning tasks that require the use of computer networks, which can help train students in digital literacy.

5.2 Recommendations

5.2.1 Strengthening the Construction of Digital Environments in Colleges and Universities

The digital environment of a school is the foundation for digital literacy education. It serves as the hardware interface for students to integrate into the information society for daily life, study, and work. The quality of the digital environment determines the extent to which students' digital literacy can be improved. Colleges and universities must understand the impact of rapid information technology development on education and teaching. They should take the initiative to promote the modern transformation of digital literacy education and create a favourable digital environment for students. The combination of strengthening digital literacy curriculum construction, hardware support, resource development, and cultivating citizens with lifelong learning and sustainable development capabilities has created a holistic digital environment for education and management, encompassing both hardware and software.

5.2.2 Integrating the roles of libraries and specialised teaching in the cultivation of digital literacy *is crucial*

College libraries should effectively contribute to digital quality education and the development of students' digital literacy. It is also important to recognise that digital literacy is an essential component of professional literacy. Therefore, the teaching objectives of professional courses should include the cultivation of digital literacy. Therefore, it is important to integrate digital literacy into professional courses, including digital awareness, knowledge, ability, ethics, and security. This will enable students to master the basic knowledge of their courses. Collaboration between libraries and teachers can help improve students' digital literacy and enhance their ability to learn independently and apply innovation.

5.2.3 Introducing a mechanism for mutual recognition of credits in digital literacy courses

As there are limited elective courses in digital literacy, it is difficult to meet the learning needs of students from various majors and grades. Consequently, digital literacy courses cannot be offered throughout the entire university curriculum. However, the MOOC platform provides a plethora of digital literacy courses and enables students to transition from traditional one-dimensional library space learning scenarios to more flexible and accessible Internet-based digital media learning scenarios. This allows students to learn at their own pace and according to their individual needs. This approach allows students to learn anytime and anywhere according to their own needs. The introduction of MOOC and other educational platforms' curriculum resources, as well as the development of a mutual recognition mechanism for credits, has improved students' enthusiasm and initiative in selecting and studying digital literacy courses.

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5.2.4 Digital literacy training should be differentiated

The study suggests that focused and differentiated training on digital literacy is necessary due to the varying effects on different factors such as gender, household registration, grade level, and major. Therefore, it is important to provide training that is tailored to the aspects that have significant effects. On one hand, the aim is to enhance the digital knowledge, skills, and safety of female students. This can be achieved through the establishment of digital literacy clubs, study groups, or workshops. Simultaneously, students in science, engineering, arts, and sports should be trained to improve their digital literacy. Agricultural students should focus on enhancing their digital knowledge, skills, and ethics to bridge the gap in digital literacy with non-agricultural students.

This paper examines the digital literacy education environment of G-university undergraduate students. While it expands the current research perspective to a certain extent, the study's limited sample size of only G-university students restricts the applicability of its conclusions. Future research should aim for a wider and more diverse sample to improve the study's breadth and depth.

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References

[1] Alkali, Y. E., & Amichai-Hamburger, Y. Experiments in Digital Literacy. CyberPsychology & Behavior[J]. 2004.7(4), 421–429. https://doi.org/10.1089/cpb.2004.7.421

[2] Huang Ruhua, Li Baiyang. The change of information literacy education in the context of MOOC[J]. Library and Intelligence Knowledge, 2015(04):14-25.DOI:10.13366/j.dik.2015.04.014.

[3] Zhang LB, Wei W. Research on the problem of information literacy education in foreign college libraries under MOOC environment [J]. Intelligence Theory and Practice, 2016, 39(09):140-144.DOI:10.16353/j.cnki.1000-7490.2016.09.025.

[4] Zhong Yunzhen, Zheng Jianming. Exploring the independent mode of information literacy education in college libraries based on MOOC[J]. New Century Library, 2017(05):6-11. DOI:10.16810/j.cnki.1672-514X.2017.05.002.

[5] Guo Jun. Exploration of the application of MOOC in information literacy education in colleges and universities under the background of big data[J]. Library Work and Research, 2019(01):36-41+57. DOI:10.16384/j.cnki.lwas.2019.01.006.

[6] Wang Zhiping. Research on Information Literacy Course Content for Undergraduates in Mobile Network Environment [D]. Hebei University, 2021

[7] Luo Yi. Research on college students' information literacy and its educational support [D]. East China Normal University, 2021.DOI:10.27149/d.cnki.ghdsu.2021.000278.

[8] Wang Ying. Research on information literacy standards of undergraduates in military colleges and universities [D]. Fourth Military Medical University, 2008.

[9] Suo Xingmei. Research on the Influencing Factors of Information Literacy of Ethnic Minority College Students in Ethnic Minority Colleges and Universities [D]. Central University for Nationalities, 2018.