

A study on the path to enhance the information literacy ability of college students in the context of education informatization

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Abstract: At present, China has entered a digital society and the development of information technology requires us to master a certain level of information literacy. Information literacy, as a high-level part of thinking consciousness, is particularly important for people's lifelong learning, especially in education, where information literacy has become one of the important indicators for evaluating the quality of education in China. This paper firstly analyses the current situation of research on information literacy among college students through literature research method, and then analyses the current problems of information literacy among college students through questionnaire method. According to the survey results, an information literacy assessment system for college students was designed to explore the path of improving college students' information literacy ability, and to improve the information literacy ability of college students and the teaching quality of teachers to a certain extent.

Keywords: information technology in education; information literacy; exploration; assessment; university students

1. Research Background

The development of artificial intelligence, 5G and other information technologies has helped to continuously deconstruct and reshape the society under the knowledge system. As an important part of the higher education system, the literacy needs and structure of the group of university students are facing new opportunities for change. How to use appropriate methods to accurately access the information they want, and to classify and manage the information in a rational way and migrate it in the vast information resources is a basic skill that university students must master. The ability to "choose suitable methods and tools to accurately obtain the information you want" is the ability to retrieve information, and is also a necessary condition for good information literacy. People with information literacy skills know when they need information, understand the organisation of knowledge, and are better able to obtain information, understand information and solve problems better and faster.

In the face of the challenges posed by the information age, the government has given high priority to the development of human resources. In 2000, the Ministry of Education issued the Outline of Information Technology Curriculum Guidance for Primary and Secondary Schools (for trial implementation), which clearly stated that students should be trained to have a good level of information literacy and required the use of information technology to support collaborative learning and lifelong learning. In 2016, the report "Facing the Future: Global Experiences on Core Literacy Education in the 21st Century" proposed seven core literacies. In 2020, the "China Education Monitoring and Evaluation Statistical Indicator System 2020 Edition" promulgated by the Ministry of Education included "students' information literacy attainment rate" as an indicator of education quality for the first time. In 2021, the "Action Plan for Enhancing Digital Literacy and Skills for All" was released, which clearly states the importance of enhancing digital literacy and skills for all in the process of building a strong network nation and digital China. It can be seen that information literacy has been taken seriously by countries around the world and is gradually playing an increasingly important role in social development.

2. Information literacy concepts and research

Many scholars have creatively developed a new information literacy based on American library search skills. The concept is an outgrowth of the rapid development of information and the overall

informatization of society. The term information literacy was introduced in 1974 by the American scholar Paul Zurkowski, who considered information literacy to be a skill of retrieving, evaluating and using information to solve problems using information tools and sources [1]. The main purpose is to teach people how to process, use and communicate information in the information age. The origins of information literacy can be seen in the fact that it is based on a field of "scientific" technology and aims to develop people's ability to access and use information.

UNESCO considers information literacy to be the ability to identify, retrieve, evaluate, organise, create, use and exchange information, and to deal with problems[2]. The International Association for the Evaluation of Educational Achievement (IEA) defines information literacy as the ability to support individuals to participate effectively in home, school, work and social activities, and to use computers to retrieve, create and communicate [3].

Some domestic scholars believe that information literacy can be divided into information literacy in a narrow sense and information literacy in a broad sense. In a narrow sense, information literacy refers to the possession of basic information technology skills by information literate people. In a broad sense, information literacy refers to the skill of being able to find and use information sources to process the required information, requiring the ability to discover and evaluate information[4].

The author searched the Chinese Internet with the theme of "information literacy assessment", and the results showed that there were 256 articles. The number of articles will peak at around 45 in 2021. In terms of the number of articles published, information literacy assessment is still at a preliminary stage of exploration, and research work is still relatively small. The research field is mainly focused on educational technology and intelligence science, and scholars mainly study the definition of the concept of information literacy, the significance of research, the constitutive factors and information literacy standards.

As university students, by mastering to information knowledge and skills, they fully apply information technology work, and then choose information technology tools to lay a solid foundation for solving various problems in daily life and study. At the same time, by making full use of the information technology channels, we can search for data, reconstruct information and finally transform it into the required knowledge system, which means that in the development of information literacy among university students, it is more important to be able to consciously discover tools, select tools, use tools and even create tools, which is the important goal of the development of information literacy among university students.

3. Analysis of the problems of information literacy skills of university students

Through literature search, it is found that the following problems generally exist in information literacy among college students: (1) insufficient understanding of information literacy education, believing that information literacy education means learning a large amount of knowledge about information acquisition, processing, management and application, which has nothing to do with college life; (2) lagging support concept of information literacy education for college students, insufficient education specialization, lack of multiple subjects of education, and lack of effective use of information (3) the lack of university supply of information literacy policies for college students; (4) the insufficient construction of information-based learning environment; (5) the late start of China's research on the assessment of college students' information literacy ability.

Information literacy assessment is one of the important links of information literacy education, and accurate assessment results play a key role in improving students' learning ability. Currently, common information literacy assessment methods are divided into quantitative assessment and qualitative assessment[6]. Quantitative assessment refers to the collection of assessment data, quantitative analysis and calculation, so as to make a judgement on the information literacy of the assessment subject; qualitative assessment is to make a judgement by observing students' performance in applying their knowledge in real life.

Paper and pencil tests are also a quantitative assessment with strong operational advantages. They are an effective means of monitoring the quality of education in terms of assessing students' knowledge and cognitive ability, quantifying the knowledge and skills dimensions of the subject and presenting them in objective data. However, paper-and-pencil tests tend to focus too much on the memorisation of knowledge and the simple application of skills, and are weaker in the area of problem solving.

4. The purpose and significance of information literacy assessment of university students

With the rapid development of information technology, information technology has penetrated into every aspect of society. The university student group is at the forefront of the wave of information society, and as the main user group of the Internet, the cultivation of information literacy ability of university students in China is generally carried out from the macro level at present, and the specific educational activities are realized through a series of activities, such as: offering information literacy courses, information retrieval courses, library use courses, etc. These activities do not substantially improve the assessment of information literacy skills of college students at the micro level, and to a certain extent, they also cause many college students to be unclear about the concept and understanding of information literacy skills, so they cannot talk about how to improve their information literacy skills [5].

In terms of information literacy evaluation practices of college students, there are corresponding evaluation index systems at home and abroad. However, there are still some problems regarding the assessment tools, for example, the design is relatively single, the assessment mainly favours questionnaires and the scale method, and some researchers base their assessment on test questions, focusing on students' basic knowledge of information science, neglecting the examination of problem-solving ability and information awareness, thinking and attitude in the context of information technology, which cannot scientifically and accurately examine the actual level of students' information literacy. In addition, there is little research on the application and optimisation of assessment tools, and the verification of the scientificity and validity of assessment tools is still at a blank stage. Therefore, the design of suitable information literacy assessment tools for university students and the scientific and accurate measurement of students' information literacy level are urgent issues to be solved.

5. Demand Analysis of "Information Literacy of College Students" Assessment System

5.1 Subject and content of questionnaire

The questionnaire was mainly targeted at undergraduate students of Yunnan Normal University, and a random sample was used to conduct the survey. 500 questionnaires were distributed, and 482 valid questionnaires were returned, with a valid return rate of 96.4%. The survey was divided into four parts: basic information, willingness to use the platform, demand for platform functions and demand for platform resources, with a total of 24 questions. The basic information was mainly about students' gender, grade and major categories; the intention to use the platform was to find out whether students had used assessment-related systems or software and whether they were willing to use the assessment system or platform to improve their information literacy ability; the demand for platform functions was to investigate what factors would affect students' information literacy ability, so as to determine the required functions; the demand for platform resources was to investigate students' learning content and resource. Finally, an open-ended question was designed to collect other needs of learning on the platform.

5.1.1 Questionnaire results

Table 1: Survey on Information Literacy Needs of University Students

Projects	Options	Number of people	Percentage(%)
Grade	Freshman	95	19.7
	Sophomore	140	29.04
	Junior	185	38.38
	Senior year	62	12.86
Believes information literacy is important for university students	Fully compliant	386	80
	General compliant	52	10.78
	General	41	8.50
	Not quite right	3	0.62
	Does not comply	0	0
Willingness to enhance information literacy skills through the assessment system	Fully compliant	368	76.34
	General compliant	80	16.59
	General	32	6.63
	Not quite right	2	0.41
	Does not comply	0	0

The questionnaire was distributed in the form of a questionnaire star, informing the respondents of the purpose and significance of the research. After giving consent, the questionnaire was distributed in

the form of a two-dimensional code, and the survey data was analysed using SPSS25.0 statistical software.

Of the 482 university students surveyed, 19.7% were first-year students, 29.04% were second-year students, 38.38% were third-year students and 12.86% were fourth-year students. Among them, 80% of university students considered information literacy very important, 10.78% considered it more important, 8.50% considered it generally important and only 0.62% considered it less important. 76.34% of university students were very willing to improve their information literacy skills through the assessment system, 16.59% were more willing to improve their information literacy, 6.63% of the university students had a general attitude towards improving their information literacy through the assessment system, and 0.41% of the university students were not too willing to improve their information literacy through the assessment system. (See Table 1 for the survey situation)

5.2 Survey on Information Literacy Competency Level of University Students and Analysis of Results

The Information Literacy Competency Questionnaire for University Students (Table 2) was designed based on the ACRL evaluation indicators, with the aim of capturing the information literacy level of university students. According to the results of the survey (Table 3), university students' information literacy in general showed a medium level. In the dimension of deciding the nature and scope of information needed, 25.1% of the university students were able to develop their arguments and systematically elaborate them based on information needs completely, 50.82% met them basically, 14.73% did not meet them very well, and 9.33% could not develop their arguments based on information needs at all; only 24.48% of the university students could define and adjust their information needs completely, 48.96% college students basically met, 14.93% not so much, and 11.62% not at all; 43.57% of college students could identify key concepts and terms to describe information very accurately, 39.00% could basically, 9.54% not so much, and 7.88% could not identify key concepts and terms to determine information needs.

Table 2: Information Literacy Competency Level Test Questionnaire for University Students (partial)

I.Ability to determine the nature and scope of the information required					
(i) Defining and describing information needs	Fully compliant	General compliant	General	Not quite right	Does not comply
(1) I can develop arguments and systematically address issues based on information needs					
(2) I can define and adjust information needs to a manageable point					
(3) I can identify key concepts and terms to describe the need for information					

Table 3: Results of the Survey on Information Literacy Competency Levels of University Students (partial)

Projects	Options	Number of people	Percentage(%)
can develop arguments and systematically address issues based on information needs	Fully compliant	121	25.10
	General compliant	245	50.82
	Not quite right	71	14.73
	Does not comply	45	9.33
can define and adjust information needs to a manageable point	Fully compliant	118	24.48
	General compliant	236	48.96
	Not quite right	72	14.93
	Does not comply	56	11.62
can define and adjust information needs to a manageable point	Fully compliant	210	43.57
	General compliant	188	39.00
	Not quite right	46	9.54
	Does not comply	38	7.88

A combination of literature and survey results show that a large proportion of university students believe that information literacy is important to them and are willing to use assessment systems to accurately grasp and improve their information literacy levels. The results of the survey also show that there are still some students who do not have a good understanding of information literacy, for example, over a quarter of the students are not able to develop an argument based on information needs, and only

a quarter of them can quickly define and adjust their information needs. This suggests that it is feasible to carry out information literacy assessments with a view to improving the level of information literacy among university students.

6. Design and application of the assessment system of "information literacy skills of university students"

6.1 Rationale and criteria for the construction of the measurement system

In the face of the ever-changing information environment, information literacy is receiving increasing attention as an important competency. This study is based on the American Competency Standards for Information Literacy in Higher Education developed by the ACRL, the official document used by the American Association of College and Research Libraries to replace the old information literacy standards, as an indicator system [7]. Its novel structure and philosophy has generated an enthusiastic response and is used as a programmatic document for information literacy education in higher education in many countries. It focuses on the emotional guidance of students and introduces concepts from the field of pedagogy such as 'metacognition'.

6.2 Design of the system functional modules

The system is divided into four functional modules: login and registration module, assessment module, resource learning module and feedback module (see Figure 1).

The registration module is mainly for the management of user information, while the question bank manages the test questions designed according to the evaluation index system, including basic, advanced and contextualised knowledge of information literacy, and learners can take the first assessment after entering the system to get an overview of their mastery of information literacy. The assessment module is the focus of this study, and users can take multiple tests, both before and after learning. The purpose of the tests is to pinpoint their strengths and weaknesses, and to target their learning more precisely and fill in their shortcomings. After the first few steps, users will have a good idea of how well they have mastered information literacy. The Resources Learning module is a personalised recommendation of learning resources based on the learner's assessment results, including reading, audio and video, graphics, information technology related information, practice questions, research tools, etc. The feedback module allows users to communicate and learn.

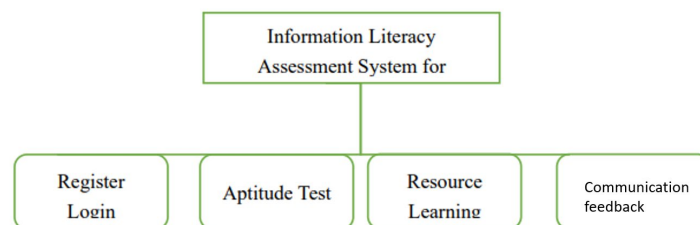


Figure 1: Overall functional structure.

6.3. Application of the "Information Literacy Competence of University Students" Assessment System

Information literacy is an important quality that is essential in contemporary society. If university students have a high and strong ability to acquire and process information during their studies, it will have a positive effect on their future work and society.

By designing the assessment framework, developing assessment questions and questionnaires, and authoritative evaluation indicators, the study of information literacy assessment for university students is supplemented and extended to provide guidance and basis for assessment for educational institutions, schools, teachers and other relevant units or personnel. The design and development of this assessment tool will help to fill the gap and promote research on information literacy assessment for university students.

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