

INTEGRATED STRATEGIES TO IMPROVE INFORMATION
LITERACY OF AGRICULTURE STUDENTS IN
YUNNAN HIGHER EDUCATION, CHINA



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INTEGRATED STRATEGIES TO IMPROVE INFORMATION
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A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY
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ACADEMIC ADMINISTRATION AND DEVELOPMENT MAEJO UNIVERSITY
2023

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INTEGRATED STRATEGIES TO IMPROVE INFORMATION
LITERACY OF AGRICULTURE STUDENTS IN
YUNNAN HIGHER EDUCATION, CHINA

QIU JING

THIS DISSERTATION HAS BEEN APPROVED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY
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บทคัดย่อ

งานวิจัยนี้ศึกษากลยุทธ์แบบบูรณาการเพื่อปรับปรุงการเรียนรู้เท่าทันสารสนเทศของนักศึกษาเกษตรในระดับอุดมศึกษาของมณฑลยูนนาน วัตถุประสงค์ของการศึกษาคือ 1) เพื่อกำหนดระดับการเรียนรู้เท่าทันสารสนเทศของนักศึกษาเกษตรระดับอุดมศึกษาในมณฑลยูนนาน 2) เพื่อวิเคราะห์ปัจจัยที่ส่งผลต่อการรู้เท่าทันสารสนเทศของนักศึกษาเกษตรระดับอุดมศึกษาในมณฑลยูนนาน และ 3) เพื่อกำหนดกลยุทธ์เชิงบูรณาการเพื่อปรับปรุงการเรียนรู้เท่าทันสารสนเทศของนักศึกษาเกษตรในระดับอุดมศึกษาของมณฑลยูนนาน

การศึกษานี้มุ่งเน้นไปที่นักศึกษาวิทยาลัยเกษตรจากมหาวิทยาลัยสี่แห่งในมณฑลยูนนาน กำหนดขนาดตัวอย่างโดยใช้สูตรของ Taro Yamane และได้นักศึกษาวิทยาลัยเกษตร 385 คน โดยผ่านการสุ่มตัวอย่างอย่างเป็นระบบ ทำการรวบรวมข้อมูลปฐมภูมิโดยการสัมภาษณ์แบบมีโครงสร้างที่เกี่ยวข้องกับปัจจัยส่วนบุคคลด้านการศึกษา วัฒนธรรม และเศรษฐกิจสังคม และระดับการเรียนรู้เท่าทันสารสนเทศของปัจจัยเหล่านั้น โดยใช้โปรแกรมการวิเคราะห์สำเร็จรูปทางสังคมศาสตร์ (SPSS 21.0) สถิติที่ใช้เป็นวิเคราะห์เชิงพรรณนา และวิเคราะห์การถดถอยพหุคูณในแบบสอบถาม ในขณะเดียวกัน การสนทนากลุ่ม มีการใช้เมทริกซ์ SWOT และเมทริกซ์ TOWS รวมทั้งการวิเคราะห์เนื้อหา (Content analysis) เพื่อพัฒนากลยุทธ์ที่เหมาะสมในการปรับปรุงการเรียนรู้เท่าทันสารสนเทศของนักศึกษา

ผลการวิจัยพบว่า 1) ระดับการเรียนรู้สารสนเทศของนักศึกษาวิทยาลัยเกษตรอยู่ในระดับปานกลาง 2) ปัจจัยที่มีผลกระทบประกอบด้วย 14 ปัจจัย ประกอบด้วย เกรดเฉลี่ย ระดับการเรียนรู้เท่าทันคอมพิวเตอร์ ระดับการศึกษา ความต้องการความสำเร็จ รูปแบบการเรียนรู้ หลักสูตร IL ทฤษฎีการดิจิทัล งานมัลติมีเดีย ชื่อเรื่องคุณภาพข้อมูล การดำเนินโครงการความร่วมมือ จำนวนบทความที่เผยแพร่, กลุ่มปฏิสัมพันธ์ของนักศึกษากับเพื่อนและเพื่อนร่วมงาน และ 3) ใช้วิธี SWOT และ TOWS วิเคราะห์ข้อดี ข้อเสีย ภัยคุกคาม และโอกาสในการปรับปรุงระดับการเรียนรู้สารสนเทศของนักศึกษา และนำเสนอ 10 กลยุทธ์ในการปรับปรุงระดับการเรียนรู้สารสนเทศของนักศึกษา ซึ่งได้แก่ 1) เพื่อส่งเสริมความเป็นมืออาชีพของอาจารย์ที่รู้เท่าทันสารสนเทศของนักศึกษา 2) เพื่อส่งเสริมการสร้างอัจฉริยะ 3) เพื่อสร้างแพลตฟอร์มการสอนภาคปฏิบัติของ

การรู้เท่าทันสารสนเทศ 4) เพื่อสร้างสภาพแวดล้อมและบรรยากาศการศึกษาด้วยตนเองสำหรับการรู้สารสนเทศของนักศึกษา 5) สร้างระบบการสอนที่มีการบูรณาการอย่างลึกซึ้งของการศึกษาทั่วไป การศึกษาวิชาชีพ การศึกษาในห้องเรียนที่สอง และการศึกษาค้นคว้ารู้เท่าทันสารสนเทศ 6) เพื่อสร้างรูปแบบการสอนการรู้สารสนเทศที่หลากหลาย 7) เพื่อพัฒนาระบบการประเมินการรู้เท่าทันสารสนเทศของนักศึกษามหาวิทยาลัย โดยเฉพาะการกำหนดตัวบ่งชี้ 8) สร้างแพลตฟอร์มร่วมสร้างและแบ่งปันทรัพยากรดิจิทัล 9) สร้างบรรยากาศสำหรับทั้งสังคมให้มีส่วนร่วมในการศึกษาความรู้เท่าทันสารสนเทศของนักศึกษา 10) สนับสนุนการใช้เครือข่ายที่เหมาะสม

คำสำคัญ : ระดับการรู้เท่าทันสารสนเทศ, ปัจจัยที่มีอิทธิพล, นักศึกษาเกษตร, กลยุทธ์เชิงบูรณาการ



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ABSTRACT

This objectives of this study were to: 1) determine information literacy level of higher education students in Agriculture, Yunnan; 2) find out factors effecting information literacy research ability and information inquiry ability of the students; and 3) formulate integrated strategies to improve information literacy of the students. The sample group consisted of 385 Agriculture students from four universities in Yunnan and they were obtained by Taro Yamane's formula and simple random sampling. A set of questionnaires was used for data collection and analyzed by using descriptive statistics. Besides, focus group discussion and structured interview were conducted. SWOT and TOWS matrix were used to develop appropriate strategies for improving information literacy of the students.

Results of the study revealed that the informants had a moderate level of information literacy. Factors effecting their information literacy were: 1) grade point average, 2) computer literacy level, 3) educational attainment, 4) need for success, 5) learning style, 6) IL course, 7) digital resources, 8) multi media assignment, 9) tittle to information literacy, 10) collaborative project, 11) number of published articles and 12) interaction of student groups. The integrated strategies included the following: 1) promotion of professionalization student's information literacy teachers; 2) continuous promotion of the construction of students' intelligent campuses; 2) building an information literacy practical teaching platform; 4) creating self-learning environment/atmosphere for the students; 5) building a teaching system with deep integration of information literacy education; 6) building a diversified information literacy teaching model; 7) developing an evaluation system of the students' information literacy indicators; 8) building digital

resource co-construction and sharing platform; 9) creating atmosphere for the whole society to participate in information literacy education of the students; and 10) providing full play to positive energy of networks.

Keywords : Information literacy level, influencing factors, Agricultural students, integrated strategies



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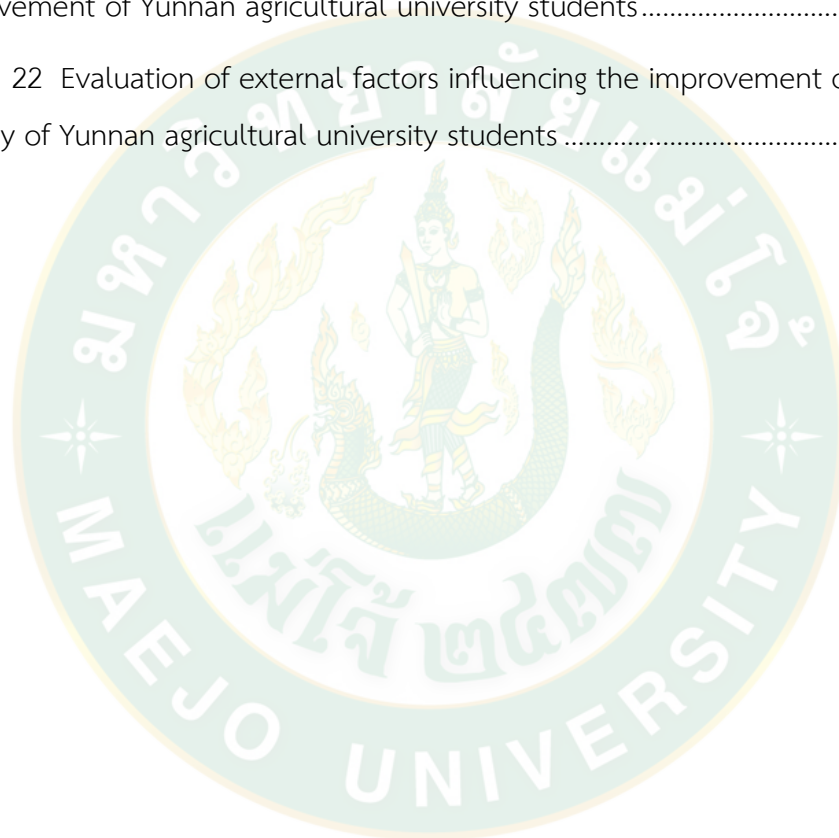
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CHAPTER 1

INTRODUCTION

Background of the Study

With the rapid development of computer network technology and information technology, human society has entered the information age relying on the high-speed operation of the Internet, which has broken through the concepts of geopolitics, economy, and culture, forming a virtual, digital information-based cross.

The information society will break national boundaries and form a new space for cross-language and cross-cultural. The arrival of the information age has changed people's ideas and behaviors, and has presented us with a different world. Information has become a vital social resource. Information has become the most active and decisive factor in all fields of society. It has become indispensable to people's daily life, work, and study.

The American futurist Naisbit describes in "The Megatrends - Ten New Directions for Changing Our Lives": Our society is in the midst of the most subtle and explosive transformation - from the industrial society to the information society. "We are overwhelmed by information, but we are eager for knowledge. Such a large amount of information is unmanageable by current means. Losing control and unorganized information no longer constitutes resources in the information society. Instead, it becomes an information worker." (Naisbit and Mallet, 2010) The emergence of the information society stems from the ability to find, acquire, analyze, and use information and knowledge, and to combine this ability with people's careers. This ability is information literacy. The American Library Association wrote in the Information Literacy Report: "Today, information—not minerals, agricultural products, or an industrial product—is the country's most precious asset, and information-savvy people—those who know how to explore knowledge and use knowledge. People—the country's most valuable resource" (Association, 2008). Under the era of information resources becoming the elements of productivity, agriculture

students must have the ability of information literacy, including the ability to quickly and accurately acquire and identify information, and creatively analyze, process and utilize information. Ability to better adapt to the learning and development needs of the information society.

A person must be able to recognize when information is needed and have the ability to locate, evaluate, and use the needed information effectively. Producing such a citizenry will require that schools and colleges appreciate and integrate information literacy into their learning programs and that they play a leadership role in equipping individuals and institutions to take advantage of the opportunities inherent within the information society. Ultimately, information-literate people are those who have learned how to learn. They know how to learn because they know how knowledge is organized, how to find information, and how to use information so that others can learn from it. They are people prepared for lifelong learning, because they can always find the information needed for any task or decision.

1. Information literacy is the essential ability required by talents in the information society

The American Education Technology CEO Forum's fourth quarter 2001 report presents the 21st century's competency and abilities, including basic learning skills (reading, writing, computing), information literacy, innovative thinking, interpersonal and collaborative spirit, and practical ability (Thompson, 2003). The new era has information. The literate person has become the creator of social wealth and the primary laborer of the information society. Therefore, information literacy has become an essential indicator for evaluating talents' comprehensive ability. The production, processing, and utilization of information resources have become every society. It is one of the fundamental viability of members.

In an era when materials and energy are increasingly over-consumed, the changes in information and knowledge are exponentially increasing. Old and new knowledge is merged, and the cycle of knowledge is shortened. The wide application and development of information technology and network technology make digital information more and more needed and utilized by people. At the same time, many qualitative changes have occurred, such as the carrier of information from entity to

virtual, the transfer of information from human resources to computer, and the exchange of information from reality to the network. Therefore, we have gradually transitioned from an industrial society to an information economy society based on the distribution and exchange of information and the creation of productivity based on information resources. New technologies and new energy that affect social change are also closely related to the high progress of information technology. The information society is not only manifested in the fact that more and more people are engaged in information work. More importantly, information and knowledge have become indispensable core resource for society.

The information age requires information talents, and information talents call for information literacy. Therefore, information literacy education and training has become an increasingly important educational activity. In an increasingly competitive information society, we need more people to capture and use the information and discover new information growth points.

2. Information literacy is a basic human right for lifelong learning

In 2003, the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the United States Library and Information Science Committee (NCLIS) jointly held a meeting of information literacy experts, and the "Prague Declaration: Towards an Information-Based Society" was released. The declaration puts forward: How to make people benefit from the information, communication resources and technology in the Internet era is a significant challenge facing today's society (Declaration, 2003). Information cultivation is a prerequisite for people to participate effectively in social practice in the information age, and is an essential requirement for lifelong learning. In 2005, UNESCO, the International Federation of Library Associations (IFLA) and the National Information Literacy Forum of the United States jointly hosted the High-Level Colloquium on Information Literacy and Lifelong Learning Bibliotheca Alexandrina, Alexandria, Egypt. Participants announced that information literacy and lifelong learning are the beacons of the information society, illuminating the development, prosperity, and freedom of the information society. As a core component of lifelong learning, information literacy enables people to effectively seek, evaluate, use and create information throughout their lives to

achieve their personal, social, professional and educational goals. From the above two declarations, we can see that information literacy is not only a question for discussion in the education or academic circles, but also a mission for new talents in the new era, and an important strategic issue that affects the sustainable development of our society.

In 1972, UNESCO published a study in "Learning to Be: The World of Education Today and Tomorrow": lifelong education encompasses the entire educational process, consisting of all forms, all expressions, and teaching actions at all stages (Faure, 1975). The tools and expressions used in the cyclical relationship mark the formation of modern lifelong education thoughts and trigger a revolutionary change in the traditional concept of education, which is "comparable to the revolution brought by Copernicus's heart. It is one of the amazing events in the history of education."

In 1998, the Ministry of Education of China clearly stated the goals and methods for establishing a lifelong learning system in the "Action Plan for Education Revitalization for the 21st Century": to establish a lifelong learning system throughout the country by 2010, to provide sufficient information for the national knowledge innovation system and modernization (Thompson, 2003). Talent support and knowledge contribution can thus be seen that the ability to cultivate lifelong learning is the core mission of higher education for college students in the 21st century. (Ministry of Education China, 1999)

Information literacy is the core of lifelong learning. This ability enables people to effectively find, evaluate, utilize and create knowledge throughout their lives to achieve a high degree of social development, organizational progress, education and personal ascension. In a volatile global environment, opportunities and challenges coexist. Those who can seize opportunities to avoid disadvantages are lifelong learning, highly information literate, and people who can better adapt to social change and development. Such talents are also the wealth of society. They can help effective enterprises and institutions to cope with more complex scientific research and economic challenges and promote the shared prosperity and development of the group.

3. Information literacy is the basic requirement of quality education

Innovative thinking and practical ability are the two focuses of higher-quality education. The information literacy training process is the preparation process for this innovative thinking and practical ability. They are connected and support each other, essential in cultivating students' scientific research and practical ability.

China made the "Decision on Deepening Educational Reform and Comprehensively Promoting Quality Education" at the Third National Education Work Conference (Decision on Deepening Educational Reform and Comprehensively Promoting Quality Education, 1999). The "Decision" clearly states that it is necessary to "train students' ability to process information, acquire new knowledge, and analyze and solve problems" and "inspire students' awareness of independent thinking and innovation." With society's development, the education quality discussed in higher education has put forward higher standards for college students. In addition to mastering professional knowledge, we must also understand more extensive and updated knowledge. In terms of ability, as mentioned above, not only must we have creative thinking skills, but we also can practice and participate. Cultivating compound or innovative talents has become a goal that society and schools have always pursued. The school's information literacy education is based on the above objectives, focusing on mining information knowledge and improving the information skills of college students.

4. Strengthening the practical needs of Chinese college students' information literacy

Since the Internet entered China in 1994, after nearly 25 years of development, China has become a veritable network power. According to the 44th China Internet Network Development Status Report released by China Internet Network Information Center (CNNIC (China Internet Network Information Center, 2019), as of June 2019, the number of Chinese Internet users reached 854 million, an increase of 25.08 million compared with 2018. Internet penetration rate reached 61.2%, an increase of 1.6 percentage points from the end of 2018 (Figure 1). Among the Chinese netizens, the most significant number of students accounted for 26.0% (Figure 2).

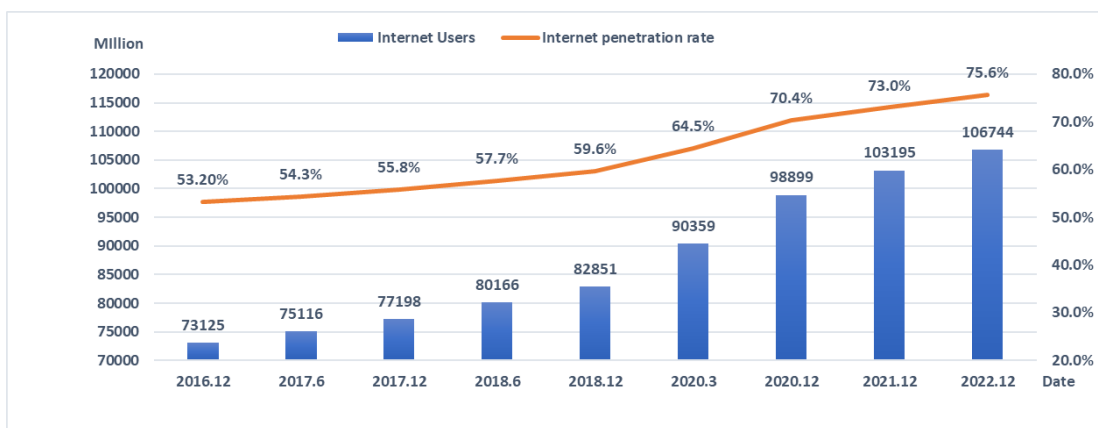


Figure 1 Number of Internet User and Internet penetration rate in China

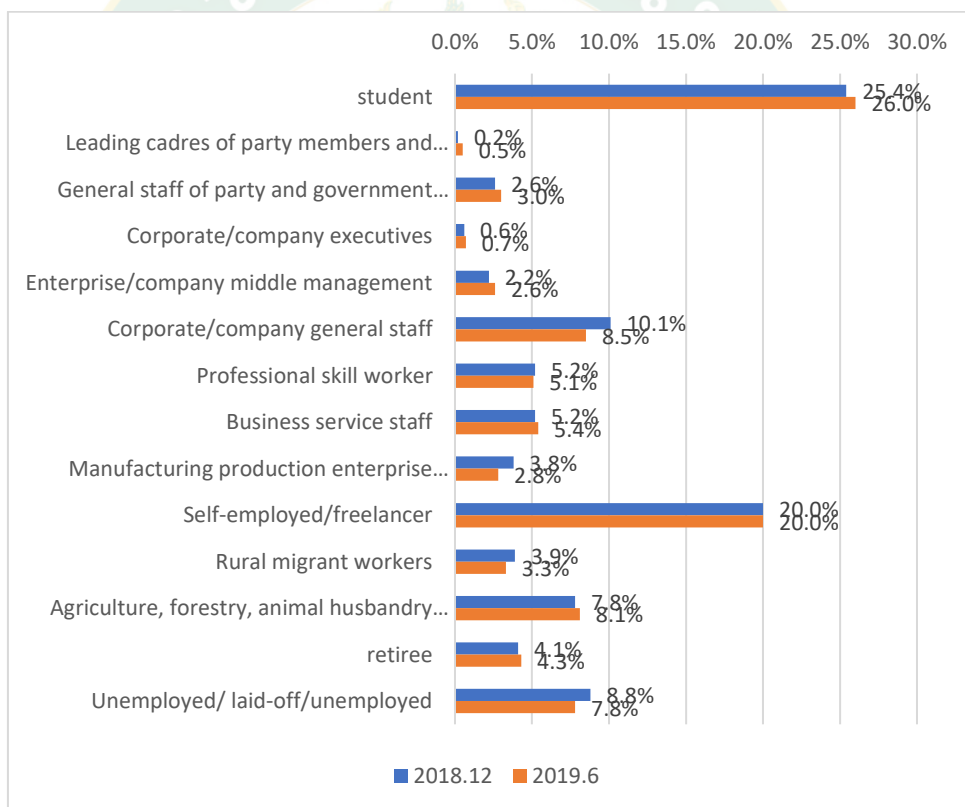


Figure 2 People on the Internet occupation structure chart

Among the 854 million internet users, 26% are students, and 20.2% of internet users have received college education. As a particular group in China's Internet use group, College students are at the best age of life learning. With

relatively high cultural literacy, it is easy and willing to accept new things, new ideas, and new ideas. The demand for and use of network information is also significantly higher than in other age groups. It is the leading force for using network information. They are responsible for the motherland's future and are the backup force of high-quality talents in society.

The information age brings infinite convenience to human beings. However, due to the richness of information content, the diversity of information forms, and the wide range of information sources, various false and spam messages flood the network and bring people. There have been many problems, such as information explosion and overload, information retrieval fatigue, information anxiety, information fraud and crime. At the same time, college students have a less social experience, less experience, and more remarkable plasticity, vulnerable to evil social thoughts. In addition, network viruses, security, and information security issues are becoming more prominent. Various types of pervasive viruses are deliberately stealing personal information. Privacy, which jeopardizes the security of information, and college students are the least aware of self-protection. Many students need help to identify reliable sources of information. For example, from anti-abortion groups deliberately pretending to be French government health resources to crimes committed by German refugees circulated by Islamic refugees in Germany. In addition, cyber fraud occurs occasionally, and incidents of job scams and even involvement in online pyramid schemes and campus online loans occur.

The level of knowledge level of college students is relatively high. The frequency of using online media and accessing network information is relatively high. Improving the information literacy of college students is beneficial to the overall healthy development of college students and helps improve the overall level of information literacy of Chinese citizens. The level of information literacy of college students affects the comprehensive competitiveness of China in the future. Therefore, it is essential to strengthen information literacy education for college students and improve their ability and quality in collecting information, using information, and obeying information ethics.

Significance of the Study

Today research scholars need technological skills to search for, retrieve, process and present information. Information literacy is essential for today's learners as it promotes problem solving and thinking skills. It helps in asking questions and seeking answers, finding information, forming opinions, evaluating sources and making decisions to be successful learners, effective contributors, confident individuals and responsible citizens.

The demands of the users are increasing gradually, and on the other side, the technological advancements make great leaps at all levels. Computer literacy is finding more significant common ground with other literacies. It has been described as literacy with digital texts (McMillan, 1996). As digital texts and their unique characteristics become a significant means of communication and information distribution, literacy with digital texts will be included as a component of literacy (Naisbit & Mallet, 2010)

Information literacy knows when and why one needs information, where to find it, and how to evaluate, use, and communicate it ethically (Group 2005). In the present situation one must find, locate, access, use and evaluate information from the electronic environment.

In the information age, information literacy has become an essential ability that people must have in response to global informationization. It is the essential quality of survival for everyone in the information society. Students face the daunting task of identifying, locating, searching and evaluating various sources of information to meet their information needs. It is due to the rapid development of the Internet and ICT, which has generated tremendous information. Although information literacy is included in quality education in China, there needs to be more research on whether students have sufficient information literacy to identify, search, locate, and evaluate information sources. In addition, there needs to be a more ethical use of how students can refer to and reference bibliographies in an academic environment to comply with copyright requirements and information. Therefore, assessing

information literacy is critical because it helps determine if a student has mastered the skill and identifies ways to improve the ability further.

The results of information literacy survey help to identify the shortcomings of agricultural students in information literacy, and plan to take remedial measures to overcome the shortcomings and improve the quality of information literacy of agricultural students. The results of the information literacy assessment will help higher education institutions formulate effective policies, establish a scientific and reasonable information literacy training system, and help agricultural students improve information literacy. Future researchers can use the research results to adjust the research techniques/methods and strategies of information literacy research, which will help agriculture students to conduct in-depth research on information literacy. At the same time, it will also provide reference for similar research on information literacy.

Statement of the Problem

Rapid technological changes are transforming how people communicate, collaborate, and learn using online social networks. College students must graduate with the pre-requisite skills for the 21st century, such as online communication, collaboration, and digital literacy skills, to succeed in the 21st-century global society (Roberts, 2000).

Many countries have incorporated information literacy into primary to higher education courses as one of the basic needs of citizens in the 21st century. In February 2002, the government documents promulgated by the Ministry of Education of China incorporated cultivating university students' information literacy into one of the main tasks and essential goals of quality education in colleges and universities (General Colleges and Universities Library Regulations (Revised), 2002).

Information literacy is an essential ability that people in the global informationization process need. Ability to determine when information is needed and how to get information, and how to locate, evaluate, and effectively use the information needed. Information literacy plays a vital role for college students, and it

is one of the necessary qualities for them to become modern talents adapted to the development of an information society. China's higher education law requires that college students must have information literacy, and this requirement is not only proposed. It is necessary to cultivate college students' modern knowledge retrieval skills and, more importantly, to improve their understanding and adaptability to information, to let them know how to use the information correctly and reasonably, and to independently and intuitively, and legally grasp the use of information to integrate the collected information. Enable people to have the ability to search for the information they need, the ability to solve problems independently, and the ability to explore the spirit actively.

With the rapid growth of knowledge and information, knowledge changes each day. According to incomplete statistics, the knowledge that a person learns in school accounts for about 10% of his life, and the remaining 90% of knowledge is in the future (Shou, 2011). Work and life are constantly learned and acquired. The information age requires people to have the ability to learn for life. The effect of lifelong learning is closely related to the level of information literacy. Cultivating lifelong learners is at the heart of the mission of higher education institutions, and information literacy is the foundation for acquiring lifelong learning skills.

In the past ten years, the No. 1 Document of the Central Committee of China has continuously focused on the issues of "agriculture, agriculture, and farmers." On October 18, 2017, Chinese President Xi Jinping put forward the rural revitalization strategy in the report of the 19th National Congress of the Communist Party of China and set the target tasks (Xiwen, 2018). By 2035, rural revitalization will make decisive progress, and the modernization of agriculture and rural areas will be realized. Agriculture students in higher education will become the main body of agricultural science and technology talents in the future. The new force of rural revitalization strategy studying the information literacy of agriculture students discovers the problems of higher education in information literacy training. It proposes information literacy improvement in a targeted manner. The strategy to enhance the information literacy of agriculture students is conducive to the smooth implementation of the rural revitalization strategy and the realization of agricultural and rural modernization.

Under the urgent need for technology and the ever-increasing sources of information, research on college students' information literacy will be a hot issue. This study aims to introduce helpful information literacy models and appropriate standards and to determine students' level of information literacy according to the needs of today's world. In addition to describing the status quo of information literacy of agriculture students, investigating and evaluating information literacy, this study will be for the government, schools, educators, and students to propose practical strategies to improve the information literacy of agriculture students.

Based on the above questions and reflections, this study will mainly make explanations and theoretical responses to the following research questions.

1. What is the information literacy level of higher education agriculture students in Yunnan?
2. What factors affect the information literacy of higher education agriculture students in Yunnan?
3. What are integrated strategies to improve the information literacy of agriculture students in higher education in Yunnan?

Objectives of the Study

The main objectives of the study include:

1. To determine the information literacy level of higher education agriculture students in Yunnan
2. To find out the factors affecting information literacy of higher education agriculture students in Yunnan
3. To formulate integrated strategies to improve the information literacy of agriculture students in higher education of Yunnan

Scope and Limitations of the Study

The research object is limited to full-time agriculture students in higher education in Yunnan. The data collected is mainly the response of full-time agriculture students to information about information literacy. The study was limited to respondents providing accurate information, and the strategy was developed based on the need to improve college students' information literacy. The research topics ranged from science, culture, and the behavior and skills of search information. Therefore, the conclusions of this study are based on the experience and behavior of college students at the research sites, and may differ from the information literacy skills of college students in other provinces in China.

The researchers believe that the research site selects some higher education institutions in Yunnan Province, including four high educations: YAU, SWFU, HHC, and PEC to ensure that these subjects have specific characteristics related to the research. The research object of this research is located in the western part of China, which is located in the frontier of China. The educational resources of universities in the West could be more vital, and the students are mainly from Yunnan Province.

Expected Results of the Study

The study hopes to propose a strategy to improve college students' information literacy through research appropriately and ultimately.

1. Enhance students' ability to acquire, locate, evaluate, and effectively use the required information, establish the concept of lifelong learning, and have the ability to learn for life, thus improving the information literacy of higher education agriculture students in Yunnan.

2. Enhance the establishment of a scientific and rational information literacy training system in higher education institutions to promote improving higher education agriculture students' information literacy in Yunnan.

Operational Definitions of Terms

In order to facilitate a clearer understanding of the concepts in this study, the following terms are defined operationally or from their lexical definitions.

Information: Information as knowledge, intelligence, facts, or data that can be used, transferred, or communicated.

Literacy: Traditionally, Literacy means the ability to read and write.

Information Literacy (IL): is the set of integrated abilities resulting from long-term "cultivation." It includes identifying authoritative and credible information sources from the diversity of information sources; using the information to create new knowledge; understanding the value and timeliness of information; refining research questions, using more advanced research methods to draw research conclusions; Participating in learning communities; possess specific information retrieval strategies.

ICT: Information and communications technology.

Agriculture Student: a full-time student in college or university, in any major in the field of agriculture.

Higher Education: Refers to all professional education based on secondary education. This study refers only to specialist education and undergraduate education.

Yunnan Agriculture University (YAU) was established in 1938 and has developed into one of the key universities in Kunming Yunnan Province. It is characterized by the remarkable advantages of agricultural science, the distinct characteristics of other disciplines, and the coordinated development of multi-disciplines.

Southwest Forestry University (SWFU): a comprehensive university focusing on forestry and agriculture, local in Kunming Yunnan.

Honghe College (HHC): is a publicly-run comprehensive general undergraduate college local in Mengzi City, the capital of Honghe Hani and Yi Autonomous Prefecture, and is the only undergraduate college in Honghe Prefecture.

Pu'er College (PEC): is a publicly-run comprehensive general undergraduate college, locally on the southwestern border of the motherland- Pu'er City.

Integrated Strategies: mainly revolves around multiple subjects such as college students, teachers, universities, governments, families, and society, and follows the ideas from micro to macro, external promotion to endogenous, generalization to majors, single subject to full-staff education, and proposes to build "student-centered education, teachers as the leading, colleges, and universities as the focus, the whole society participates together, and stimulating the endogenous motivation of college students as the core" is a strategy for improving college students' information literacy.

Continue to promote the construction of information literacy conditions, such as intelligent campuses, practical teaching platforms, and digital resource co-construction; Improve teachers' information literacy level and strengthen the reform of teaching mode; Establish the index evaluation system of college students' information literacy; Create a self-education environment and atmosphere, and deeply integrate information literacy education with general education, professional education, and second classroom education.

CHAPTER 2

REVIEW OF LITERATURE AND RELATED STUDIES

This section investigates the literature according to the following: University of Yunnan: This is the target area of research; the concept of information, literacy; information literacy; information literacy skill; international literacy and higher education; information literacy education model; information standard; All relevant information is meaningful, which will give people a clear understanding of the theoretical background of the research. The compilation of these various literature and literature citations will provide an in-depth, specific, relevant, and sufficient basis, based on which to develop appropriate information literacy for agriculture students in higher education in Yunnan, China, and to provide a reference for improving the information literacy of agriculture students. The following is a review of the literature and related research:

Information

For the meaning of Information, people make a variety of descriptions from different angles: "Information is what is being talked about, news and knowledge" (Pearsall et al., 2007); "Information is obtained data, news, and knowledge during observation or research" (Webster et al., 1972); "Information is the knowledge of things observed" Information is the object of transmission and processing of communication systems, and refers to the specific content of messages and signals" (Cihai, 1999). Although there are many different opinions, in a broad sense, it can be summarized as follows: Information is the knowledge that humans can learn through words, images, sounds, symbols, and data. Generally speaking, Information refers to a description related to objective things, reflects the state of movement of objective things, is emitted, transmitted, and felt through a specific material carrier, affects the recipient's thinking, and is used to guide the recipient's behavior. In essence,

Information is a signal and message that reflects the state, movement, and state of change and patterns of the real world.

Information, energy, and materials are listed as the three significant resources in the world today. Information resources are vital to the development of the country and the nation, to people's work and life, and become an essential strategic resource for national economic and social development. Its development and utilization are the core content of the entire information system. Therefore, a country's material prosperity is almost directly related to its information wealth. With the development of information and communication technology (ICT) and globalization, people can more easily access information anytime, anywhere.

Information appears in different forms and formats, and people can choose to access and retrieve vast amounts of information online. However, this requires selecting the best search skill among the many methods, and the user evaluates the information before selecting the location information. These all-present challenges for users to effectively access and retrieve information and screen and evaluate the authenticity, effectiveness, and reliability. This creates a demand for information literacy (IL) that requires critical thinking and discernment of the entire range of information and its various formats before using it.

Literacy

"literacy" refers to all the necessary skills for a person to play an appropriate role in the skills required by society. The simplest definition of literacy includes the ability to use language; a literate person can read, write, and understand his or her native language (Bawden, 2001). Reading, writing, and familiarity with arithmetic are essential skills in literacy, but today, various other skills are seen as essential. It seems necessary to have the skills to use information, the skills that are active in the communications world, and the skills to use dynamic media-based interaction with IT (Langford, 2000). Similarly, (Kress, 2003) argues that literacy is defined as the term used when people want to communicate and use letters as a record and save

tool. In addition, when people want to communicate by numbers, the word "calculation" is used.

Michell (1999) argues that literacy controls the secondary usage of the language. In addition, cultural historian Graff sees it as a technique or series of techniques for communicating, decoding, and reproducing printed or written materials. The illiterate historian Vincent also defines the term "literacy" as a means of communication and believes that oral learning and expression are other options for literacy (Vincent et al., 1998).

Given the broad definition provided by literacy theorists, introducing a fixed definition for literacy is not an easy task. Literacy has encountered severe problems as a concept, skill, or expected result of related topics. Many interpretations of literacy show no consensus on specific meanings because the scope of literacy encompasses many areas. It should be noted that this is not an independent issue that is intermingled with related phenomena such as economic change, media communication, and educational priorities. In this regard, the definition of literacy has nothing to do with literacy itself but depends more on the behavior and attitude of literacy.

Brock, Bowman & Woolf argue that literacy rates have not led to any change in direction, freedom, and social oppression throughout history. It does not act as an independent force (Brock et al., 1994); it does not bring about economic growth, rationality, or social achievement.

Similarly, UNESCO defines literacy as a feature achieved to varying degrees from zero to the highest level, and its boundaries need to be better defined. In this regard, some people are considered more or less cultural than others. However, it is impossible to refer to culturally and illiterate people as separate groups and extremes (Garner, 2006). Another definition of UNESCO is to describe literate people as those who can read, write and describe simple materials. Therefore, if a person can only read and write, but he or she cannot solve professional and personal problems or has no analytical ability and creativity, he or she cannot be considered to have culture. From the lowest to the highest level, the main result of literacy is the ability to solve problems (Eskandarian et al., 2016). Breivik claims that a new type

of literacy is needed for the information paradigm, which is the best social entity for this workforce (Breivik et al., 1992).

Suppose you think of the basic definition of literacy as literacy. In that case, you can read and write from the computer's display and use the keyboard and billboards (large display panels on the street), TV and mobile phone keys, and paper reading and writing. Very similar. If you extend this definition to the definitions proposed by Jay, Goody, Levin, Vincent, Graff, and Tiner, defining literacy levels can be complicated.

The British "Cambridge International English Dictionary" explains "literacy" as "an ability to read and write" (Procter, 1995). The explanation of "literacy" in "Ci Hai" is the cultivation of regular practice (Cihai, 1999). It also refers to the cultivation of the weekdays, such as artistic literacy; academic literacy.

It can be seen from the definition: Literacy is not formed overnight but is the result of long-term "cultivation." Literacy is not born but cultivated the day after tomorrow. This is the difference between literacy and quality. Quality is more affected by innate factors, and literacy depends more on the environment and education. The cultivation of literacy is a process of gradual development from low to high. As developing people, along with the development of the times, both teachers and students need to constantly improve their literacy at a certain point to meet the needs of social development and their development. Literacy is comprehensive, isolated literacy does not exist, and the cultivation of literacy is consistent with the overall development of human beings.

Information Literacy

Information plays an essential role in modern society. At present, most people think that "information literacy" refers to the ability to find and use information and equate people who do not have "information literacy" with illiterate who are illiterate. Over the years, as the content and extension of information have evolved and evolved, the concept of information literacy is constantly changing.

For example, some people equate information literacy with "digital literacy," "media literacy," "computer literacy," etc., indicating that the concept of information literacy changes with the change of information concept.

The concept of information literacy was first proposed by PG Zurkowski when he was the chairman of the Information Industry Federation (Zurkowski, 1979). It was submitted to the National Action Committee of the Library and Information Science in the United States in November 1974 for the National Planning Report on Library and Information Services. For the first time, information literacy is used, in which people who can apply information resources to their work are called information literate people who have acquired the skills and capabilities to use various information tools and integrate essential information resources. To form an information solution to solve the problem and to equate those who do not have "information literacy" as "information illiterate."

Subsequently, the organizations of education and information science in the United States and other countries have continuously improved and updated the concept of information literacy, and information literacy has also received increasing attention. The American Library Association Chairman's Committee also pointed out in the final report on information literacy released in 1989 that the most valuable resource for the current state is not all kinds of minerals, agricultural products, and various industrial commodities, but those with information literacy and learning to find knowledge (Association, 2000). In the United States Information Literacy National Forum (NFIL), established in the same year (1989), "Information literacy is to know when information is needed, to be able to identify, locate, evaluate and effectively use this information to solve the problem at hand" (Weiner & Jackman, 2010).

Then, the Association of College and Research Libraries (ACRL), a division of the American Library Association, published the "Evaluation Standards for Higher Education Information Literacy" published in 2000 (Association, 2000). In the Information Literacy Competency Standards for Higher Education report, the definition of information literacy continues to borrow the definition of information literacy in the White Paper published by the American Library Association (ALA) in 1989 (Owusu-Ansah, 2005): "Information literacy is a set of abilities that require

personal understanding. When to use information, you can effectively locate, evaluate and use the information you need." Since then, the definition of information literacy has been added to other content, including "suspiciousness, judgment, free-thinking, questioning and understanding," as well as the ability of information-literate citizens in the information society to participate in social activities actively.

Lau's (Lau, 2006) study suggests that the relationship between information literacy and other library education practices can be represented by the following figure 3:

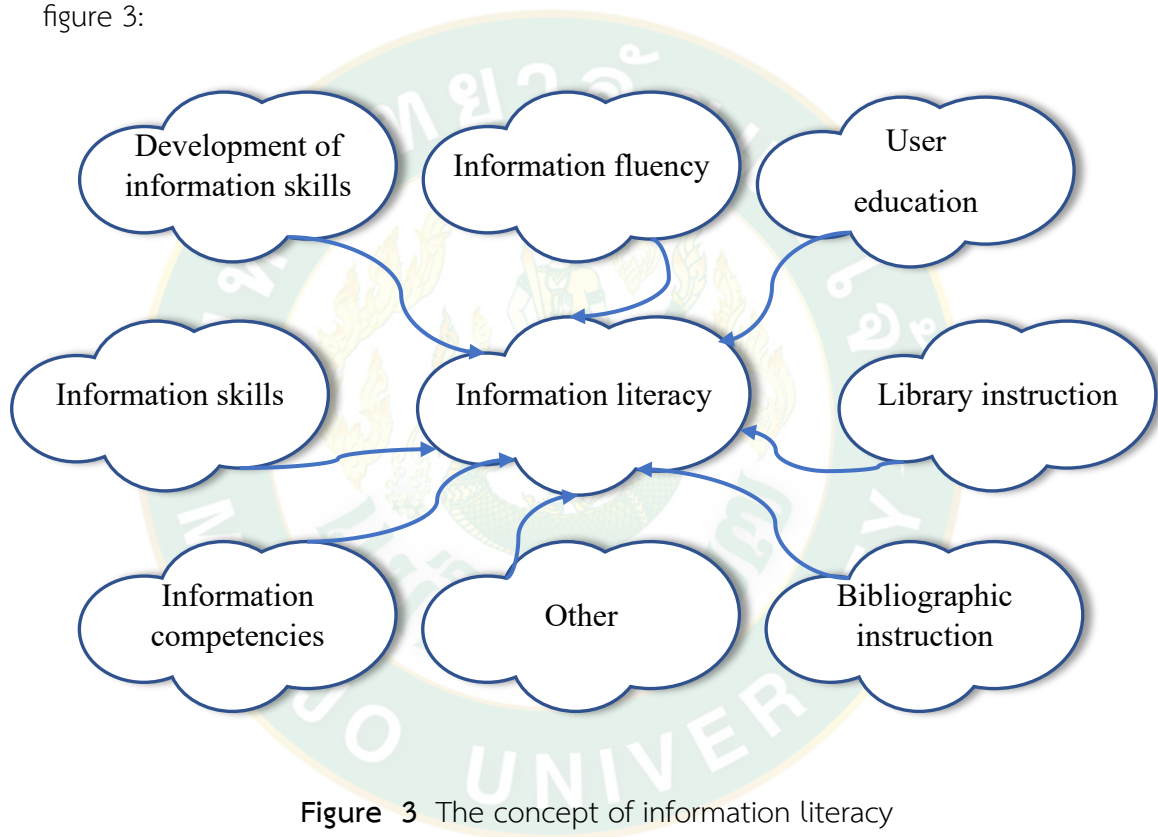


Figure 3 The concept of information literacy

Chinese scholars' research on information literacy theory began in the mid-1990s. While referring to and introducing the concept of foreign information literacy, researchers put forward some elaboration on information literacy in combination with China's national conditions. For example, Wang Jiqing (Jiqing, 2002) systematically introduced the information literacy theory in his book "Information Literacy" and proposed that "information literacy is a kind of education that can be cultivated through education, access to information in the information society, use of information, development of information, etc." Cultivation and ability." Zhu Zhiting

(Zhiting, 2002) believes that "information literacy is the foundation of lifelong learning. This is true for any subject, learning environment, and education at any stage. It has certain information literacy, and learning can obtain learning content. Expand and control your learning more effectively, making learning a more self-directed and controlled process." Chen and Li (Chen & Li, 2002) define information literacy as "the individual's attitude towards information activities and the ability to acquire, analyze, process, evaluate, innovate and disseminate information. It is information for the current task, where to get information, how to get information, how to evaluate information, how to process information, how to disseminate information, and the economic, legal, and social issues surrounding the use of information.

Information literacy is a concept with broad meanings and a concept of continuous improvement with the development of society. Since people's interpretation of information literacy has constantly been changing, and the content is expanding, it has yet to form a consensus.

The concepts of threshold, elemental nutrition, metacognition, and information ecosystem proposed by the Framework provide support and opportunities for me to study the factors affecting the information literacy of minority college students in ethnic colleges from the perspective of humanities and social sciences. To this end, in this paper, "information literacy" is defined as the essential ability that an individual must possess in the information age. It is a lifelong learning or self-learning attitude, method, and ability. The core of this ability is information ability, including recognition and acquisition, evaluation and judgment, collaborative communication, processing and processing, and the ability to generate information, that is, the ability to use information resources to solve problems such as problem-solving, critical thinking, decision-making, and innovation.

Information Literacy Composition

Most of the research on the components and elements of information literacy is carried out simultaneously in the connotation of the concept of information literacy. The US Higher Education, Information Literacy Assessment Standards provides six specific abilities that information literacy should develop (Association, 2000):

1. It is determining the scope of the information needed.
2. Efficiently access the information needed.
3. Critically Evaluate the information and its sources.
4. Incorporate selected information into its knowledge base.
5. Use information effectively to achieve a specific purpose.
6. Understand economic, legal, and social issues related to the use of information and Ethical and legal access to and use of information.

Chinese scholar Zhong Zhixian (Zhong, 2013) proposed the ability of information literacy to be in eight aspects: using information tools, accessing information, processing information, generating information, creating information, using the information to benefit, information collaboration, and information immunization. Sang Xinmin (Sang, 2000) believes that information literacy includes the following six aspects: adequate access to information; proficiency and critical evaluation of information; effective absorption, storage, and extraction of analytical information; multimedia information expression and creative use of information; The ability to transform information into the ability to learn and communicate autonomously; to learn, train, and improve ethics, emotions, legal awareness, and social responsibility as citizens in the information age. Liang Wenbin (Liang, 2001) pointed out: Individual information literacy can be divided into three levels: emotional information literacy, cognitive information literacy, and information skills literacy. Xu Xiaodong (Xiaodong, 2004) pointed out: Information literacy is mainly composed of information consciousness and information ethics, information knowledge, and information ability.

In summary, although the research on the composition of information literacy is not the same, through the literature analysis, the author finds that the research on the composition of information literacy mainly focuses on information consciousness, information knowledge, information ability, and information ethics. Information awareness plays a leading role; information knowledge is the foundation of everything, information ability is the core, and information ethics plays a guaranteed role.

Information literacy and higher education

With the development of information and communication technologies, it is widely used in various fields, education, public services, agriculture, and commerce, thus affecting people from all walks of life. The teaching process is essentially the process of transmitting educational information. Every aspect of teaching and learning requires collecting, processing, and communicating information (Eisenberg, 2008). In the information age, students may rely more on online resources than teachers and other professionals in learning, communicating, and solving problems. Internet massive information brings significant challenges to students and requires students to choose the information they need in the massive information. Therefore, students should be able to position, evaluate, use, and exchange information.

In the 21st century, information literacy must be part of education because it is a prerequisite for cultivating people to have lifelong learning. The "Higher Education Information Literacy Competency Standard" formulated by ACRL clearly states that information literacy is the foundation of lifelong learning and applies to all levels of education, regardless of subject and learning environment. Therefore, the role of information literacy in higher education must be addressed. Cultivating lifelong learners is a core part of the mission of higher education institutions. By developing an individual's ability to reason and think critically, the university should help students develop their careers (Johnson et al., 2009). Higher education institutions are responsible for developing students' independent learning and critical thinking skills. Therefore, higher education institutions should strengthen the ability

and skills of students to learn or learn to learn by developing students' reasoning and critical thinking. Studies have shown that acquiring information literacy skills is mainly through instilling information literacy skills among teachers and librarians (Ranaweera, 2008) rather than through autonomous learning.

Information literacy programs are critical to developing national knowledge in the information society, and their influence is far-reaching. Information literacy increases knowledge and wealth. By sharing information, both parties become more powerful and more prosperous. Both are win-win situations. Creating a learning society encourages people to learn for life, thus forming independent lifelong learners. Information literacy is not only crucial to the knowledge economy but also vital to the socio-political, economic, and cultural development of all countries (Hoque & Alam, 2010)

Information Literacy Education Model

In the past few years, many information literacy models have been developed for education and teaching. In order to be inspired by information literacy education and teaching methods, this study will introduce these models and their development process. Highlight several tested and proven models. Mainly introduce the following models.

Papas' Model

The Papas model aims to improve the teaching methods and strategies of information literacy and to be used in teacher training courses. Henne wrote a standard for the school library program in 1969, integrating various information with classroom skills for library skills training (Kester & Jones, 2004).

PLUS model

PLUS is an information literacy model invented by James Herring, which helps students learn by improving their information literacy (Herring, 2011). PLUS includes four elements such as purpose, location, use, and self-evaluation. The PLUS model is

considered not linear but an iterative model, as students may need to return to the previous or previous stages of the model during information definition, search, and use. Its model structure is shown in Figure 4.

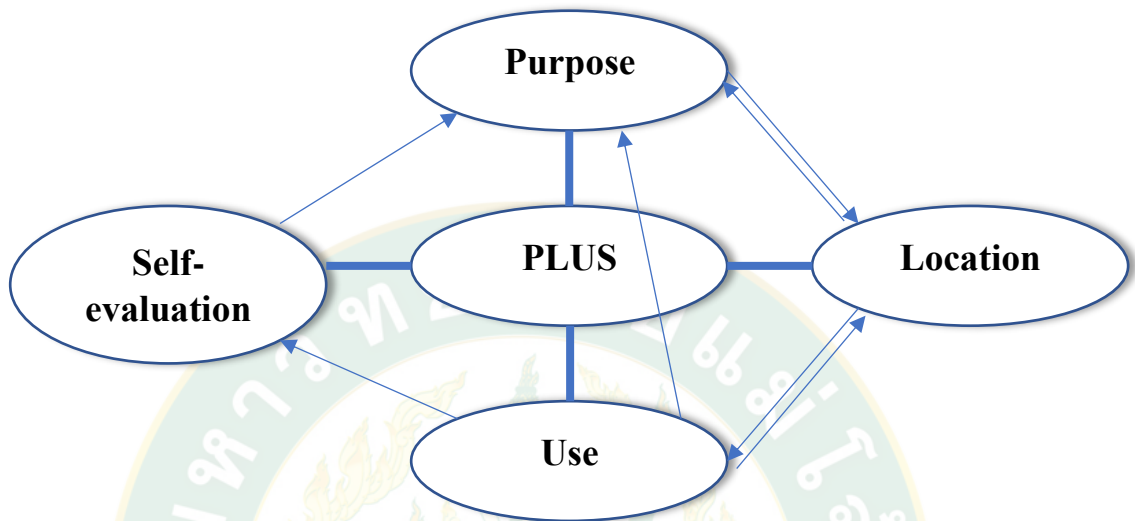


Figure 4 The PLUS Model

Problem-Solving Model: The Big6 Skills

The model was proposed by United States educators Michael Eisenberg and Bob Berkowitz in 1990 (Eisenberg & Berkowitz, 1990). It is one of the accepted models widely used internationally. The model is one of the most straightforward models in the field and is a guiding model that can help users throughout the search process. It is mainly used to solve information problems and present all information to users in the process of solving information problems. Thousands of colleges and universities use it as an information and skills literacy model and core curriculum. Some people refer to Big6 as an information analysis or problem-solving strategy because the Big6 model researchers can handle any problem, task, assessment, or assignment. Moreover, it provides six basic learning steps: (i) task definition; (ii) information-seeking strategies; (iii) location and access; (iv) Information usage; (v) Compounding; (vi) Evaluation. Visually the Big6 Skills Model consists of six steps, and each phase has two sub-steps.

The 8Ws Model

Annette Lamb developed this model in the early 1990s (Lamb and Others, 1997). The novelty of the model's name motivates the student's interest and focuses on the student's point of view. Its model structure is shown in Figure 5.

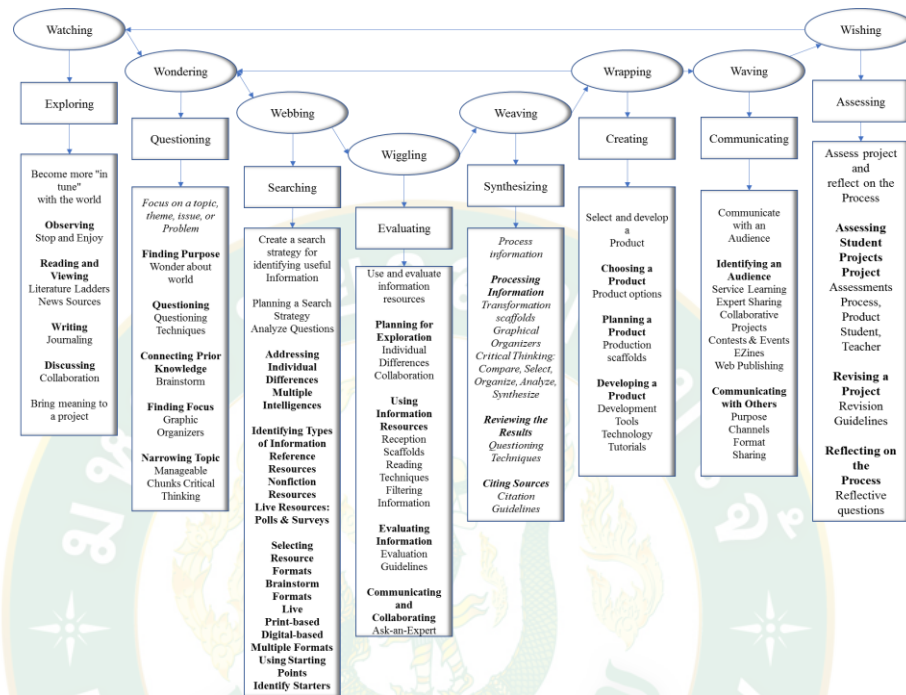


Figure 5 The 8Ws Model for Information Literacy

Empowering 8 Model

The model was produced in 2004 by the National Library of Sri Lanka and the Institute of Information Science (NILIS) in an international seminar on "learning information skills." The model consists of eight phases, and each component has several sub-phases, each performed in a round-robin manner. The user can enter any phase from any point without completing the phases in a linear order. However, if needed, the Successful resolution of information issues requires a thorough flow of all phases (Wijetunge & Alahakoon, 2009). Its model structure is shown in Figure 6:

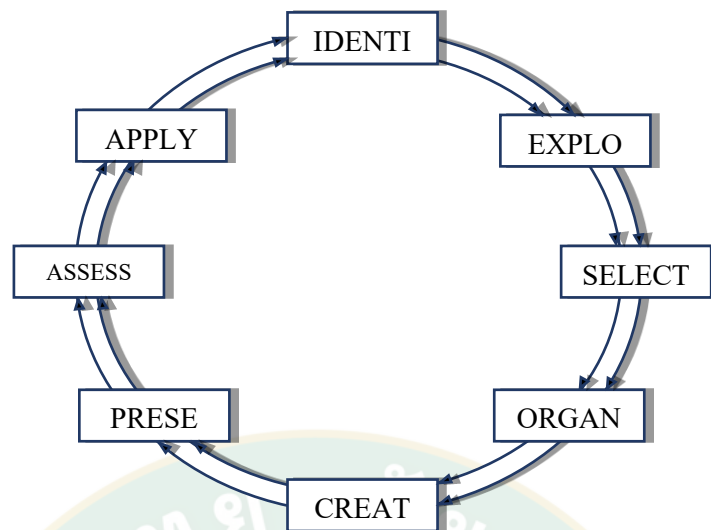


Figure 6 Eight components of Empowering 8 Model

Information Literacy Standard

Internationally familiar information literacy standards include ASSL's Student Learning Information Literacy Standard, IFLA's IL Standard, ISTE's National Education Technology Standard (NETS), and the Higher Education Information Literacy Standard's ACRL standard, ANZIIL standards issued the Australian and New Zealand University Association of University and University Libraries Standards (SCONUL) and the Index System of Information Quality Competence of Universities in Beijing in China.

ACRL Information Literacy Standards

The ACRL standard (Association, 2000) is currently the most popular in the world, providing the expected results of each performance indicator, which is used to assess student learning outcomes. This standard can assess the information literacy skills of teachers, librarians, and higher education students. In implementing this standard, you need to know that different thinking skills should be used to evaluate different learning outcomes, so different tools or methods must be used to assess learning outcomes. The standard consists of 5 standards and 22 specific

implementation indicators, which more comprehensively reflect the content requirements of information literacy.

Filed by the ACRL Board on February 2, 2015, ACRL published Framework for Information Literacy for Higher Education (ACRL, 2016). The Framework offered here is called a framework intentionally because it is based on a cluster of related core concepts with flexible options for implementation rather than on a set of standards or learning outcomes, or any prescriptive enumeration of skills. The Framework is organized into six frames, each consisting of a concept central to information literacy, knowledge practices, and dispositions. The six concepts that anchor the frames are presented alphabetically:

- Authority Is Constructed and Contextual
- Information Creation as a Process
- Information Has Value
- Research as Inquiry
- Scholarship as Conversation
- Searching as Strategic Exploration

The Framework opens the way for librarians, faculty, and other institutional partners to redesign instruction sessions, assignments, courses, and even curricula; to connect information literacy with student success initiatives; to collaborate on pedagogical research and involve students themselves in that research; and to create broader conversations about student learning, the scholarship of teaching and learning, and the assessment of learning on local campuses and beyond.

ANZIL standards

The Australian and New Zealand College of Information Quality Joint Working Group (ANZIL) issued the Australian and New Zealand University Information Quality Competency Indicator System 2004. It consists of 6 first-level indicators, 19 second-level indicators, and 67 third-level indicators (ANZIL, 2004).

SCONUL standards

The Information Quality Competency Model proposed by the National Association of University and University Libraries Standards (SCONUL) in 1998, is not an indicator system in terms of name but is an index system for information quality competence of universities, consisting of 7 first-level indicators, 17 secondary indicators (Bainton, 2001)

IFLA Information Literacy Standards

IFLA Information Literacy Standards Based on Lau, the IFLA standards are grouped under the three essential IL components; it consists of 3 first-level indicators, six second-level indicators, and 23 third-level indicators (Mcneer, 1991)

The Index System of Information Quality Competence of Universities in Beijing

"The Index System of Information Quality Competence of Universities in Beijing" is an essential indicator for evaluating the information literacy of college students in Beijing. It consists of 7 first-level indicators, 19 second-level indicators and 61 third-level indicators. It is the first complete information literacy system in China.

Theoretical Studies

Information behavior is one of the most critical research areas in library and information science. In recent years, as network information has been widely used in many fields, such as communication, sociology, psychology, business, and education, research on information behavior has received more and more attention. However, his research cannot be separated from research fields, such as using tradition. The study of the framework and the practicality of its research results will inevitably be limited. To solve this problem, the researchers provide many different concepts, theories, and models. We can use the learning perspectives in educational psychology and the information-seeking behavior theory in library science to establish the theoretical framework of this research.

Information Literacy and Learning Theories in Educational Psychology

In recent years, educational psychologists believe that a person's ability to learn is not only a decisive factor in internal factors such as intelligence but also related to non-inner factors, such as learning strategies, establishing some theories, and making significant progress in learning strategies.

Educational psychology researchers have studied human learning from different perspectives and have put forward many theories in explaining learning phenomena, such as behavioral learning theories, constructivism learning theories, and constructivism learning theories.

Behavioral Learning Theories

Behavioral learning theory originated from the behaviorist approach, one of psychology's most popular methods (Lohr & Chang, 2005). Behaviorism emphasizes individual behavior's external and visible aspects and does not involve psychological processes.

Behaviorists believe that the conditions and actual behaviors that lead to behavior are objective and visible variables (Lefrancois, 2012). Thoughts, feelings, motivations, and psychological processes cannot be directly observed and do not apply to behavioral science

According to the results of Hean (Hean et al., 2010) and Torre (Torre et al., 2006), behavioral learning theory can be summarized as follows all behaviors can be learned, the environment determines a person's behavior patterns; relatively long-lasting changes in behavior caused by experience or practice.

Behavioral learning theory can be applied to information literacy education. For example, the teaching design model of e-learning can be used to analyze, design, implement, and evaluate acronyms; behaviorism can be used to develop computer programs for information purposes. Literacy Education; is used to explain proficiency learning (Guey et al., 2010); John Carroll believes that, given enough time for learners, all learners are learning at the same level. According to the results of this study, in 1968, Benjamin Bloom proposed a teaching method of learning

(Rahmani et al., 2008), which is a personalized teaching method that allows students to have more time to familiarize themselves with the learning materials, provide additional instructions and help, so that students will eventually master these learning materials.

Cognitive Learning Theories

Cognitive Theories believe that learning is an internal process that may not manifest as an immediate change in apparent behavior. Emphasize the unobservable psychological process individuals use to learn and remember new skills or information.

Cognitive psychology studies human intellectual or psychological activities to analyze advanced psychological processes such as critical thinking, problem-solving, and decision-making. Gestalt learning theory, Ausubel's meaningful speech learning theory, Bandura's social cognitive learning theory, and information process learning theory can be classified as cognitive learning theory (FathiAar & Mahmoodi, 1999).

Ausubel's theory of learning absorption believes that many emotional and social factors, such as motivation, personality, group, society, and teacher characteristics, will affect students' learning. He also believes learning can facilitate learning by adding content to the organization, linking, and cognitive structures. Through conceptual maps, learners engage in targeted efforts to connect and isolate critical concepts (Rahmani et al., 2007). One of the basic principles of Bender's cognitive learning theory is to learn through observation. According to this principle, people understand learning by observing the behavior and performance of others (Shikhi-Fini, 2002).

Constructivism Learning Theories

Constructivism is a theory of knowledge and learning emphasizing the initiative of learners. Learning is how learners generate meaning and construct understanding based on knowledge and experience. This process is often completed in social and cultural interactions. The formulation of constructivism has profound ideological

origins. It has different learning theories and teaching ideas and has essential guiding value for teaching design.

Although there is no universal method for constructivism, most scholars agree with the basic principles of constructivism. We will introduce the basic ideas and assumptions of constructivism.

Knowledge is obtained through experience; learning is the process of personal interpretation of the world (Sheikhifini, 2002); people build their learning content rather than record it; the process of knowledge generation takes place in the natural environment, and formal learning Experience; interacting with others helps to understand the process (Fardanesh & Shaikhi, 2002).

Constructivism learning theories have been applied in information literacy teaching. The constructivist learning theories approach emphasizes student-centered instruction because it helps to improve students' autonomous learning skills (Slavin, 2011). According to the principles of constructivism, learning should be carried out in an accurate and natural environment. Problem-based learning is one of the information literacy teaching strategies.

These three main learning theories apply to certain types of learning. Cognitive learning theory can be used to learn new skills in behaviorism to teach critical thinking and self-centered learning. In contrast, constructivist methods can be used to solve problems and develop communication skills.

Research on Information Literacy Education

With the continuous deepening of information literacy research, information literacy is mainly formed through the individual's acquired learning. Therefore, people actively carry out information literacy education research, thus promoting education and teaching reform.

The research on information literacy education mainly focuses on the status quo of college students' information literacy, teaching practice, teaching strategies, curriculum system, teaching mode, and ways.

Research in status analysis

American scholar Claire McGuinness conducted a two-year study of sociology and architecture students and 12 teachers (McGuinness, 2006). The study found that information literacy development is a spontaneous and gradual process. Maria Pinto uses "information literacy" as a search key to cluster the search literature. This research shows that information literacy research has been carried out in various disciplines, mainly focusing on the core aspects of education, such as education, curriculum, students, ability development, and career development (Pinto, 2015). Ann Grafstein proposed information literacy teaching according to different disciplines and believed everyone involved in the entire educational environment is responsible for information literacy education; librarians are responsible for basic information literacy knowledge and general ability (Grafstein, 2002). Each subject teacher provides professional information, literacy cultivation, ability practice, and improvement. The Chinese central government has developed information literacy-related policies to promote information-related industrialization in China. In China, researchers in educational institutions, libraries, and information science have been involved in discussions about information literacy and have conducted extensive research and practice. Since the early 1980s, the Chinese government has supported and encouraged the teaching of information skills in academic institutions. Sun (2002) found that the Chinese Academy of Sciences Library has much information literacy work and rich experience. As compulsory credits, Tsinghua University offers seven information literacy courses for undergraduate and graduate students each year. Librarians also provide postgraduate information and literature searches for other courses.

Liu Jianguo surveyed the teaching content, teaching mode, and teacher structure of information literacy education in 18 universities in Tianjin (Jianguo et al., 2008). The study found that most colleges must establish a general education curriculum system. The teaching content needs logic, and the curriculum needs to be improved. Scientific, the level of teachers is difficult to play. Chen Chunlin proposed improving information literacy education for medical students based on the characteristics of higher medical education for the problems existing in the

information literacy educational curriculum system (Chunlin, Li, and Juan 2008). Chang Zhengxia conducted an empirical study on 690 college students in colleges and universities in Gansu Province (Zhengxia, 2011). The investigation and analysis of college students' current information literacy situation proposed related strategies. Lv Fang et al. analyzed the characteristics of college students' information literacy and the problems existing in current information literacy education (Fang & Hongjun, 2012). Wen Wei's research shows that students' information literacy level positively correlates with employability (Wei, 2013). Song Huilan analyzed the analysis of college students' information literacy questionnaire and concluded that it is necessary to have good information literacy to cultivate college students' creative ability (Huilan, 2010). Different scholars have investigated and analyzed the status quo of information literacy and the existing problems from different angles, which laid a foundation for promoting the reform of information literacy education and educational practice in Chinese universities.

Research in teaching practice

James Madison University has developed a specific information literacy general education to train students in the information literacy of reasoning, writing, and oral communication (Education and Richmond, 1999). In order to enable students to master the basic knowledge of the Internet, online search engines, literature search, and acquisition skills, the Wuhan University Library in China regularly holds "90-minute special lectures" in the electronic reading room every week (Library, 2019).

Carleton College integrates information literacy into teaching professional courses to enhance students' information literacy (Jastram et al., 2014). The College of DuPage has proposed an information literacy action plan covering all classes (Carlson, 1980). The program consists of a library of librarians and teachers of various subjects, comprehensively adjusts the relationship between information literacy and multiple disciplines, and redesigns the content of the curriculum from the perspective of information literacy. University of Rhode Island (URI) information literacy education combined with the overall development of the school, the

information literacy-related courses are integrated into the teaching content of other classes. The library application course content is added to the professional courses, graduation thesis, and design, and gradually make, information Literacy education is integrated into every aspect of teaching (Burkhardt et al., 2000).

Shen Minfang and other researchers found that professional teachers can help improve college students' information quality and innovation ability by arranging specific internship tasks (Minfang & Jiebin, 2012). Wang Renge reformed the teaching method of the literature retrieval course, created the information retrieval network classroom, and integrated information literacy education into the curriculum teaching, which provided an excellent extracurricular learning environment for college students (Renge, 2013). Liu Tingting and others have implemented information literacy education in the design of students' graduation thesis so that students have consolidated their professional knowledge and cultivated information literacy (Tingting et al., 2013). Wei Wen designed the training course to conduct practical research on information literacy training, providing references for improving teachers' information literacy (Wen, 2007).

In recent years, the emergence of Massive Open Online Courses (MOOC) has brought significant challenges to traditional education concepts, teaching models, teacher quality, and information literacy. MOOCs are free online courses and a new open-education curriculum model in higher education. MOOC can learn flexibly because it is not limited by time and space. Many researchers study it in teaching practice to promote the reform of curriculum teaching to improve the quality of education.

The first information literacy education MOOC course was "Art and Design Student Information Literacy," which was run on the Canvas.net website and was established by the American Association of Private Art and Design Colleges. In addition, the University of Maryland, Vanderbilt University, and the Queensland University of Technology Library have adopted an embedded information literacy education model. Wake Forest University's "Common Network Problem Therapy" course was created by its school librarian to educate learners about the basics of network literacy. Course learners are mainly students and alumni, and over 700

learners from more than ten countries are on the web (Fenfang, 2015). With the development of Internet technology, online information literacy cooperation education has also emerged, such as the information literacy education platform of the Stanford University Library and the online guide of the Central Queensland University Library in Australia.

As of April 2014, there were a total of 24 information literacy courses in 7 universities in the United States; 10 in China; 6 information literacy courses in 5 universities in the UK; 2 in Canada; India, and New Zealand, one information literacy education course is offered in France, the Netherlands, and Australia. In the public library information literacy education, the British Library began to provide MOOC services in February 2014, setting a precedent for the National Library of the World to provide MOOC open-access resources. Earlier, British Prime Minister Cameron publicly expressed in February 2013 that he encouraged the British Library to join the MOOC online learning platform (Liping, 2014).

In China, Luo Zhaofeng's "Document Management and Information Analysis" MOOC course at the University of Science and Technology of China cooperated with Netease Cloud Classroom in the spring of 2013. More than 10,000 people have registered to study this course online. In September 2014, Huang Ruhua's "Information Retrieval" of Wuhan University was online on the online method of love for more than a month, and the learners broke through 10,000. The course featured 200 teaching assistants to answer questions and interact online, and achieved good teaching results (Fenfang, 2015). As the main body of library information services, librarians should provide auxiliary support services for information literacy education in libraries under the MOOC environment.

In 2013, Peking University and Tsinghua University joined the MOOCs platform edX initiated by the Massachusetts Institute of Technology and Harvard University (Shuangjin, 2013). Fudan University and Shanghai Jiaotong University also joined Coursera, a MOOCs platform built by Yale, the Massachusetts Institute of Technology, and Stanford (Hao, 2013). In the information literacy course process, Ouqun adopted the hybrid information literacy teaching mode based on MOOCs and carried out

empirical research, which concluded that the teaching mode is very suitable for university information literacy education.

In summary, a large number of researchers mainly research information literacy education from the aspects of current situation investigation and analysis, teaching practice, teaching reform, etc., and put forward valuable suggestions, and at the same time, conducted an empirical study of teaching. The author believes that information literacy education cannot be limited to a specific technology, should expand research methods, effectively use various information means and technical approaches, and actively introduce and integrate multiple training modes, techniques, strategies, and systems to enhance the information literacy of college student's ability.

Assessment of information literacy

In the world, many researchers have evaluated the information literacy of the research subjects by establishing evaluation criteria or using existing evaluation criteria and have achieved specific research results. The following is a representative research literature on information literacy assessment by researchers from different countries.

Foo used the Big6 IL model to test six aspects of middle school students' information literacy (Zhang et al., 2010). The study found that female students scored slightly higher than male students, with the "mission definition" having the highest score and the "information synthesis" having the lowest score. There is a correlation between the information literacy of middle school students and the type of school, the student's family background, learning flow, "information search strategy," "location and access," and "information use." Hodgens demonstrated that health helps promote graduate students' awareness of self-information literacy (Hodgens et al., 2012). After learning the PILOT online information literacy tutorial, they found that they have some confidence in improving their information literacy skills.

Riahinia studied the information literacy (ILC) of the Master of Arts students at the University of Tambit Mulam in Iran (Riahinia, 2012). According to the Kolmogorov-Smirnov test, the study found that students' information literacy scores were average. Librarians are advised to work with students and other teachers to enhance their information literacy. To compare the information literacy team training for ISB influences at Isfahan University, Iran University, Asemi University, Riahinia University, and Beni University graduate students, 30 students were selected by voluntary sampling and divided into experimental groups and controls. The experimental group received six information literacy training. The research results show that information literacy group training is conducive to improving students' information search ability.

Catalano used the ACRL information literacy criteria to assess graduate student information literacy (Catalano, 2010). Studies have shown that students rely heavily on Internet resources, have a better ability to evaluate information resources, and should strengthen guidance in their careers. Islam and Tsuji studied the information literacy skills of graduates of information science and library management at Dhaka University in Bangladesh and found that students' information skills need to be improved (Islam and Tsuji, 2010). Researchers recommend adding information literacy courses to the curriculum, suggesting that countries should use information literacy standards as an assessment tool for higher education, and librarians work with teachers to conduct information literacy and large-scale Information and Communication Technology training.

Resnis studied the information literacy practices of students at the University of Miami. Studies have shown that students prefer online resources such as Google, Ebsco databases, and online library tools, and college students' online research skills are quite different. Researchers have found that the main reason for poor information literacy may be that students do not understand the resources they can use (Resnis et al., 2010). Thirion and Pochet assessed the information literacy level of students and found that the information literacy level of college students was low. The researchers suggested that teachers and librarians should strengthen cooperation, design information literacy courses, and conduct information literacy training on a regular basis (Pochet et al., 2013).

Ferguson, Neely, and Sullivan used the ACRL information literacy criteria to evaluate information literacy for students from the University of Maryland. Studies have shown that students in biology majors get information from the Internet before going to the library (Ferguson et al., 2006). Students think they can quickly develop successful search strategies, but they are not familiar with search concepts such as Boolean operators, truncation, and controlled vocabulary. Recognizing citations, a large number of students do not have the basic principles of applying ethical information. James Madison University designed a multi-choice assessment information literacy exam based on the ACRL information literacy standard for higher education. Jon Mueller of North Central College in the United States provides a number of information literacy assessments on his home page, including evaluation criteria, tasks, metrics, portfolios, examples, and discussion questions. Syracuse University's I School Megan Oak Leaf publishes a number of books on information literacy assessments, including many information literacy assessment programs. The Utah State University Library uses a short survey to assess students' perceptions of the library, such as "one-minute assessments and surveys." Suzanne Julian and Kimball Benson designed a personal feedback system using Birmingham Young University to assess student information literacy.

In 2005, the Beijing University Library Association published the "Beijing University Information Literacy Capability Index System" to establish a seven-dimensional indicator system. In 2005, the China Institute of Science and Technology Information established the "Evaluation Index System for the Comprehensive Level of Information Quality of College Students" and conducted an information literacy assessment for 1036 students in 41 universities (Xiaomu et al., 2006). Liu Yanan designed a scenario-based information literacy experimental test to assess the tester's information ability and level (Yanan, 2015).

The Theoretical Framework of the Study

The theoretical framework of the present study is systematic, not a general conclusion, but a conclusion drawn from the research objects in this field. It is based on the information literacy standard of higher education information literacy standards. In addition, behaviorism, cognitivist, and constructivism learning theory in educational psychology and library science are applied as information-seeking behavior theories.

Framework for Information Literacy for Higher Education (ACRL, 2016) is used to assess the information literacy level of agriculture students in higher education. The study is from the following six aspects: Information Creation as a Process; Information Has Value; Research as Inquiry; Scholarship as Conversation; Searching as Strategic Exploration, and other parts of research.

According to the results of the literature and related theoretical analysis, it can be seen that information literacy is associated with the individual factors, educational factors, and socio-economic and cultural factors of agriculture students. In this study, the factors that affect student's information literacy are individual factors, educational factors, and socio-economic and cultural factors. The factors which affect the students' information literacy will summarize strategies to improve the students' information literacy. The conceptual framework is shown in Figure 7.

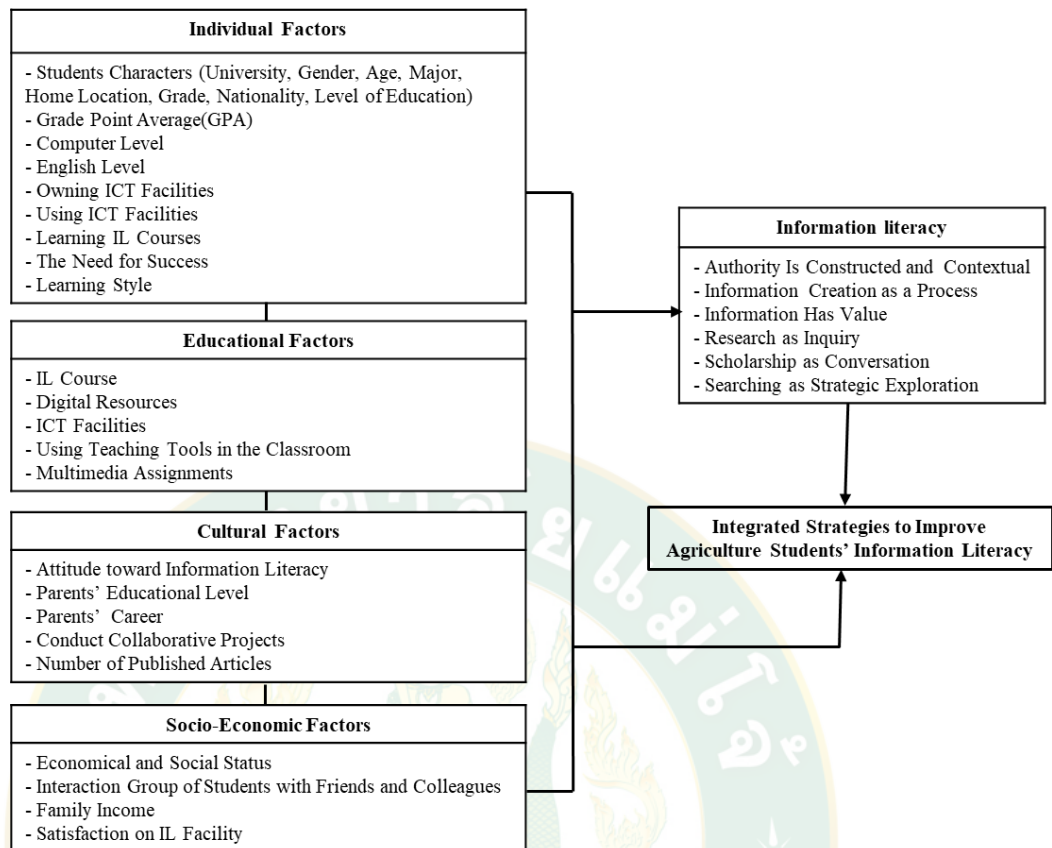


Figure 7 Conceptual Framework of the Study

CHAPTER 3

METHODOLOGY

This chapter mainly describes and discusses the methods used to achieve the research purpose and gives the reasons for choosing a specific method. Research is essentially a complex process. Therefore, for researchers, certain procedures must be followed when collecting, analyzing, and interpreting data to maximize the effectiveness of research results. The sampling technique used to select the subject and the sample itself is discussed. The tools used in data collection are also discussed, and the reasons for using these data collection tools are provided. It also provides information on the study area settings, sampling procedures, and statistical processing of data.

Research methodology is very important to do research. It is a specific process or technique for identifying, selecting, processing, and analyzing information about a topic. It refers to the attitude on which the research stands. Research methodology engages the organized procedure by which the researcher starts from the primary identification of the difficulty to its ultimate conclusions. The function of methodology is to carry on the research work in a scientific and appropriate way. The method of research provides the tools and procedures by which the problem is approached. According to C.R. Kothari (Kothari 1985), research methodology is a means to systematically solve research problems. It is a structure of models, procedures, and techniques used to find the result of a research problem.

This study mainly studies the information literacy of agricultural college students in Yunnan, the understanding of various types of information sources by agricultural college students, and the efficiency of using these information sources, and studies the relationship between the information literacy ability of agricultural college students and their social demographic characteristics.

According to the literature, quantitative research was designed for the survey to achieve research purposes. The survey method was chosen because it produces statistical data and can quantitatively analyze the population studied. This study

selected a sample survey method. Therefore, this study used stratified random sampling techniques to obtain representative samples.

Locale of the study

The scope of place of this present study is YAU, SWFU, HHC, and PEC. Four universities are located in Yunnan, China. The Republic of China map is shown in Figure 8 (Gisempire, 2015).

Yunnan Province (Baiké, 2019) is the provincial administrative region of the People's Republic of China and the provincial capital of Kunming. It is located on the southwestern border of China, bordering at 21°8′-29°15′ north latitude, 97°31′-106°11′ east longitude, adjacent to Guizhou and Guangxi in the east, Sichuan in the north, and Tibet in the northwest. The west is bordered by Myanmar, the south is adjacent to Laos and Vietnam, and the total area of Yunnan Province is 394,000 square kilometers. The Yunnan Province map is shown in Figure 9.

In 2018, the resident population of Yunnan Province was 48.295 million, an increase of 290,000 from the end of the previous year. At the end of 2018, the province's urban population was 2.29 million, and the rural population was 25.205 million. The province's urbanization rate reached 47.81%.



Figure 8 Republic of China map

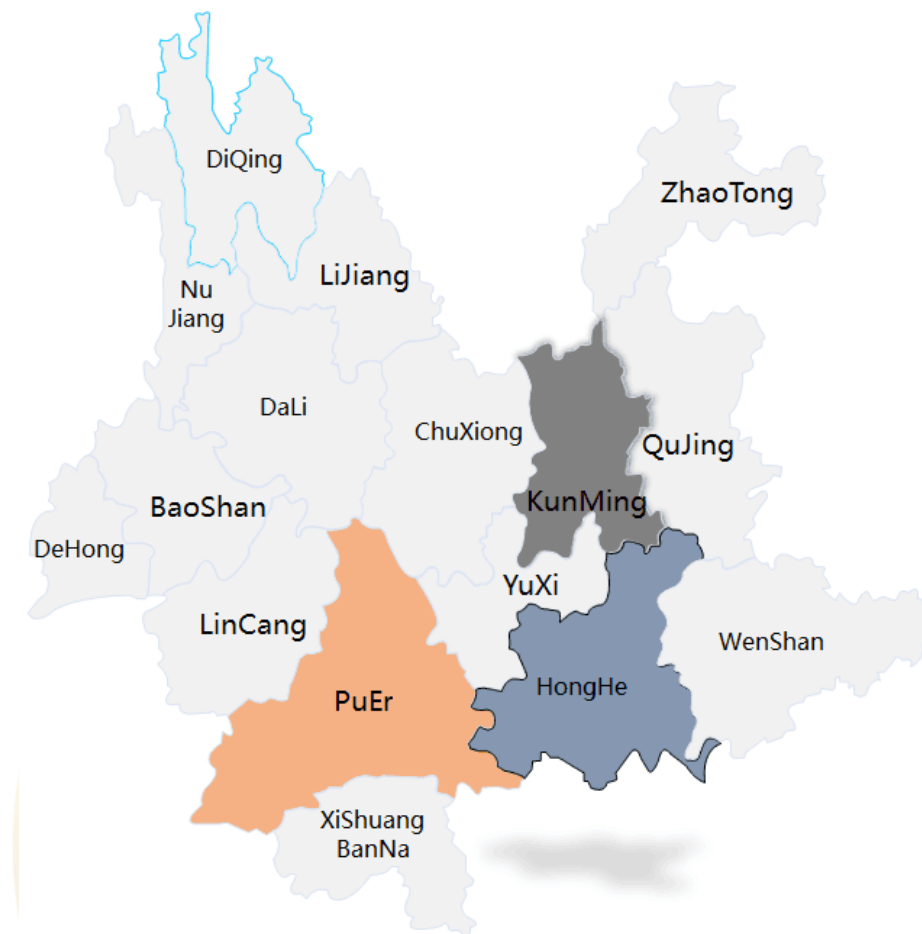


Figure 9 Yunnan Province Map

Higher education refers to all professional education based on secondary education. They adopt the unified national examinations for ordinary higher education institutions and adult higher education institutions, recruiting regular high school graduates as the primary training targets and implementing full-time universities and independent colleges for higher education. Vocational and technical colleges, colleges, radio and television universities, open universities, staff colleges, amateur universities, staff medical schools, management cadre colleges, education colleges and continuing education colleges of colleges and universities, adult education colleges, etc. Universities in Yunnan refer to the geographical location of institutions of higher learning in Yunnan. By 2019, there are 2,688 universities in

China, including 81 universities in Yunnan, and Yunnan colleges and universities account for 3.01% of Chinese universities.

YAU (Yunnan Agriculture University, 2019)

YAU was established in 1938, and it has developed into one of the key universities in Kunming Yunnan Province. The university consists of 22 colleges and has a complete talent training system that is used for all levels of education, from technological academy education to postgraduate education. There are nine disciplines and 36 specialty categories. And these specialties form an excellent educational system, which is characterized by the remarkable advantages of agricultural science, the distinct characteristics of other disciplines, and the coordinated development of multi-disciplines. YAU is striving to develop into a regional, high-level, teaching, and research-oriented university.

The university has established a comprehensive talent cultivation system with programs for postgraduate education, undergraduate education, college education, adult education, and vocational education. Also, it has constructed the perfect theory teaching system, practical teaching system, and the second classroom system on embedded education as well as a teaching quality monitoring system. The university had the authorization for Master's degree programs in 1983; it had the approval for Doctoral degree programs in 2003. In 2007, it established first-level discipline plant protection stations for post-doctoral research. The university has more than 25,000 full-time students and 7,500 students for adult higher education. The university has already cultivated more than 100,000 full-time students and more than 100,000 adult education students for society.

Since 2001, the university has increased its 4,183 scientific research projects with a fund of 1.2436 billion Yuan. It has a distinct feature and unique advantage in the aspects of animal and plant variety breeding, germplasm resources conservation, livestock nutrition, forage and feed, bioindustry with local features, environmental resources and ecological protection, irrigation and water conservation & water-saving agriculture, as well as the agricultural engineering and agricultural information. It has four national-level experimental platforms for scientific research and 46 provincial-

level experimental media for scientific research, 17 key university laboratories for scientific research in the Yunnan Province, and two provincial-level cultivation bases for innovative talents. And it has more than 250 bases for experiment and practice.

SWFU (Southwest Forestry University, 2019)

SWFU was established in 1938. The university actively adapts to the needs of economic and social development and constantly adjusts and optimizes the structure of the college. There are now 23 teaching units. The school has 19,702 full-time undergraduate students, 1,933 postgraduates, 87 doctoral students, and 111 international students. There are 1210 faculty members and 217 individual posts. Among the full-time teachers, there are 100 professors and 299 associate professors. There are 736 graduate tutors, including 86 doctoral supervisors and 650 master tutors.

The university has 85 undergraduate majors, including three national first-class specialty schools, four national excellent agricultural and forestry personnel training programs, three outstanding national engineer training programs, and seven provincial-level specialty programs.

The university has been approved by the National and Local Joint Engineering Research Center for the Effective Utilization of Forest Biomass Resources, the International Joint Research Center for Biomass Materials, the Key Laboratory of Southwest Mountain Forest Resources Conservation and Utilization, the National Plateau Wetland Research Center, and the Yunnan Biodiversity Research. Institute, Yunnan Forest Resources Asset Management, and Forest Rights System Research Base. There is one national long-term scientific research base of the National Forestry and Grassland Bureau, three key laboratories, two engineering technology research centers, one inspection and testing center, three ecological system positioning research stations, and two innovation alliances. There are one provincial engineering laboratory, three provincial engineering research centers, two provincial key laboratories,

One local engineering technology research center, two local international joint research centers, and regional international science and technology cooperation bases. One provincial-level science and technology innovation center for South Asia and Southeast Asia. There are four academician workstations and two expert workstations. There is one collaborative innovation center, nine provincial key laboratories, four engineering research centers, two think tanks, and 2 Kunming Engineering Technology Research Centers. SWFU covers an area of 2,620 mu, with a collection of 1.73 million paper books, 626,000 electronic books, and 24 Chinese and foreign literature databases.

HHC (Honghe College, 2019)

HHC was Mengzi Teachers College, which was founded in 1978. HHC has 923 faculty members, including 682 full-time teachers. Among the full-time teachers are 265 senior professional teachers, including 79 old titles, 186 associate professors, and 105 doctoral degree holders. There are 390 teachers in the degree. The school has 14 colleges and recruits' students from 26 provinces (municipalities, autonomous regions) and Southeast Asian countries. Currently, there are 14,075 full-time students.

The school offers 66 full-time undergraduate majors, which are distributed in the disciplines of literature, history, law, science, engineering, agriculture, economics, management, education, and art. Thirty-two majors have formed a multi-disciplinary undergraduate professional system. The school combines the local economic and social reality and location characteristics to open a profession that serves local economic and social development and highlights regional aspects. The aspects of some disciplines' professional advantages have initially appeared. At present, the school has one regional and national research center for the record of the Ministry of Education, one first-class discipline of Yunnan Province (B-class high-level discipline), and three provincial-level support for master's degree construction disciplines, and school-level project support (a provincial record) There are three master's degree construction disciplines, one provincial-level key construction discipline, seven school-level construction disciplines, seven school-level disciplines, and seven master-level master disciplines. There are one national-level specialty, four

provincial-level specialties, and two provincial-level minor-language majors. There are five undergraduate majors in Southeast Asian languages for GMS countries and two provincial-level supporting industrial upgrading vital professional groups. One internship training base and technology innovation service center, one provincial-level Southeast Asian South Asian language talent training base, two provincial-level experienced comprehensive reform pilots, two provincial-level small-language key construction majors, and four provincial-level teaching teams. One provincial-level innovation and entrepreneurship education reform pilot school and one provincial-level innovation and entrepreneurship education practice base.

PEC (PEC, 2019)

PEC is located on the southwestern border of the motherland and is situated in Pu'er City, the hub city of Kunming International Airport. PEC has 12,420 full-time students (including 305 international students). There are 515 faculty members and 472 full-time teachers (excluding external teachers). There are 284 teachers with master's degrees or above, accounting for 60.4% of the total number of teachers, including 23 teachers with doctoral degrees, and 153 teachers with professional and technical positions, including 39 professors. There are 14 secondary colleges in the school, 72 of which are various types of majors, 33 undergraduate majors, and 39 specialties. Among them, art education, biotechnology, and application are provincial vital majors. The campus covers an area of more than 2,000 acres; the total value of teaching and research equipment is 47.44 million yuan; the paper collection is 850,000 books, and the electronic literature is more than 300,000 copies (as of December 31, 2017); there is a provincial journal "Journal of PEC." There are 30 fixed internship schools and more than 30 off-campus internship training bases, including four regional internship training demonstration bases. Over the past 30 years since its establishment, the college has trained 30,000 graduates and contributed to the local economic development.

Research Methods

In accordance with the proposed objectives of the study, a descriptive research design was employed to assess the activities and management practices involved in the promotion of information literacy among college students for a better understanding. This research design is best suited to describe the nature of the conditions that existed in the study area during the study period and to explore the practical issues and constraints faced by college students in the process of improving information literacy.

Any knowledge it acquires is not for any practical purpose, such as improving the lives of the poor or solving social problems. Gaining knowledge is to improve the general understanding of human beings, thereby expanding the boundaries of human cognition. So, it's a search for knowledge for knowledge's sake. The knowledge it acquires may not have current social applications but may prove helpful in the future. According to Best (1970), descriptive research is concerned with "conditions or relationships that exist, practices that prevail; beliefs, opinions, or attitudes held; processes that are ongoing; effects that are being felt; or trends that are developing. Sometimes descriptive research is concerned with how, what, or what is there in relation to some prior event that affects or influences a current condition or event".

The research collects and analyzes raw data to draw meaningful results and conclusions. The source of the data is the information literacy level, current situation, and influencing factors of agricultural college students from the four college students surveyed.

This study will be conducted from March 10, 2021, to October 31, 2021.

Prior to the development of a strategy for improving university students' information literacy, a group discussion was also held among selected universities with the aim of obtaining information on the strengths, weaknesses, opportunities, and threats of improving university students' information literacy. As emphasized by Ardales (2001), the purpose of a focus group discussion is to gain knowledge about a particular topic or need by interviewing a group of people who are directly affected by the issue. Group discussion data can be used to gather information for a variety of

purposes, such as conducting a needs assessment or assessing a process designed to address a problem in a specific and limited context and identify appropriate solutions. The validity of its findings will be evaluated on the basis of local applicability rather than general validity. Its aim is to improve conditions and practices and, at the same time, those who participate in and be affected by the research process.

Research Tools and Techniques

To answer the objectives proposed by this study and draw meaningful conclusions, the following methods were employed:

Survey Research

This study used the questionnaire method to investigate the influencing factors and levels of college students' information literacy. This method is relatively inexpensive, less time-consuming, easier to use, and best suited for collecting data from universities. Data was collected by using structured interview collection. Data are collected by researchers and hired interviewers or census takers, where questions have fixed or closed-ended answer choices.

The research survey method is used to answer objectives 1 and 2. These objectives focus on describing the influencing factors of college students' information literacy and the description of the status quo of college students' information literacy level, including personal characteristics, educational elements, cultural factors, and socioeconomic factors related to the treatment of information literacy. Opinions, information literacy course setting, information literacy education environment construction, teachers' use of multimedia equipment, multimedia homework assignments, publication of articles, participation in collaborative research projects, communication, and cooperation with peers, etc.; information literacy level of college students.

Objective 1: To determine information literacy level of agriculture students in higher education of Yunnan

A 5-Point Likert Scale of questionnaire was used to determine information literacy level of agriculture students in terms of the following aspects: authority is constructed and contextual; information creation as a process; Information has value;

research as inquiry; scholarship as conversation; searching as strategic exploration. Based on the results of questionnaire, the study can determine information literacy of higher education agriculture students in Yunnan.

Information literacy level: very high (5), high (4), moderate (3), low (2), and very low (1).

$$\begin{aligned} \text{The interval level} &= \frac{\text{maximum value} - \text{minimum value}}{n} \\ &= \frac{5 - 1}{5} = 0.8 \end{aligned}$$

Therefore, the mean scores are shown below:

Mean Scores	Criteria	Interval Scale
1 < Score ≤ 1.8	Very Low Level	1
1.8 < Score ≤ 2.6	Low Level	2
2.6 < Score ≤ 3.4	Moderate Level	3
3.4 < Score ≤ 4.2	High Level	4
4.2 < Score ≤ 5	High Level	5

Objective 2: To find out the factors affecting information literacy of agriculture students in higher education of Yunnan.

The quantitative research method was applied in the second questionnaire, several questions were asked for the demographic background of respondents, and this includes individual factors, educational factors, cultural factors, and socio-economic factors. Based on the results of the questionnaire, we will find out the factors affecting the information literacy of higher education agriculture students in Yunnan.

Research Tools and Techniques

To answer the objectives stated in the preliminary part of this study and to come up with meaningful results, the following were employed:

Survey Research

Survey Research is defined as the process of conducting research using surveys that are sent to survey respondents. The data collected from surveys is then statistically analyzed to draw meaningful research conclusions. This study used survey methods to map the representative characteristics of college students' attitudes and characteristics.

Interview Schedule

This phase of the investigation involved data gathering through direct verbal interaction of the researcher with the respondents through the utilization of a structured interview questionnaire. A set of structured questions and questioning procedures was used in which the researcher asked questions; their sequence and their wording were fixed; that is, they had been carefully thought out and organized, and strictly followed.

The interview schedule aimed precisely to answer the objectives set on the premises of assessing the elements associated with the respondents, which served as the basis for formulating information literacy of agriculture students in higher education in Yunnan.

The interview schedule comprised the following major components:

Part I: Students' Characteristics

A. Individual factors

1. Students Characters
2. Grade Point Average
3. Computer Level
4. English Level

5. Owning ICT Facilities
6. Learning IL Courses
7. Using ICT Facilities
8. The Need for Success
9. Learning Style

B. Educational factors

1. IL Course
2. Digital Resources
3. Using Teaching Tools in the Classroom
4. Multimedia Assignments

C. Cultural Factors

1. Attitude toward Information Literacy
2. Parents' Educational Level
3. Parents' Career
4. Number of Published Articles

D. Socio-Economic factors

1. Interaction Group of Students with Friends and Colleagues
2. Family Income
3. Satisfaction on IL Facility

Part II: Students' information literacy level

1. Authority Is Constructed and Contextual.
2. Information Creation as a Process.
3. Information Has Value
4. Research as Inquiry.
5. Scholarship as Conversation.
6. Searching as Strategic Exploration

The two-part questionnaire was surveyed in four universities from September 15, 2021, to October 27, 2021. Table 1 provides the questionnaire and the corresponding indicators for each item.

Table 1 The Questionnaire and the corresponding indicator specifying each item

Variable	Question	Indicator
Students' Characteristics	Part I	
A. Individual factors		
Students Characters	Q1-Q8	<ol style="list-style-type: none"> 1. -Asks for Gender 2. -Asks for Nationality 3. -Asks for Age 4. -Asks for Place of birth 5. -Asks for Middle school uses the library 6. -Asks for middle school located 7. -Asks for Level of Education 8. -Asks for grade
Grade Point Average	Q9	- Asks for Grade Point Average of students
Computer Level	Q10	- Asks for students' computer pass
English Level	Q11	-Asks for students' English pass
Owning ICT Facilities	Q12	-Asks for Numbers Owning ICT Facilities
Learning IL Courses	Q13	-Asks for Number Learning IL Courses
Using ICT Facilities	Q14-Q18	<ol style="list-style-type: none"> 1. Ask for how many years have you been using computer 2. Ask for how long do you spend online average daily 3. Ask for the average number of times you go to the library per week. 4. Ask for student master and use software. 5. Ask for use school digital library resources.
The Need for Success	Q19-Q21	<ol style="list-style-type: none"> 1. Find out how hard things better. 2. Discover the attitude after failing. 3. Discover the attitude after encountering difficulties.
Learning Style	Q22-Q24	<ol style="list-style-type: none"> 1. Find out favorite way of learning. 2. As I read the article, I like to analyze the subject and its various aspects. 3. Ask for whether students are willing to share ideas.
B. Educational factors		
IL Course	Q1-Q2	<ol style="list-style-type: none"> 1. IL course help to improve information literacy. 2. IL course meet my learning and computer grade examination needs.
Digital Resources	Q3	-Digital resources meet my learning needs.
Multimedia Assignments	Q4	-Ask for assigning multimedia assignments

Table 1 (Cont.)

Variable	Question	Indicator
C. Cultural Factors		
Attitude toward Information Literacy	Q1-Q7	<ol style="list-style-type: none"> 1. Ask for knowing information literacy 2. Ask for their teachers if cite other people's opinions. 3. Ask for their teachers if pay attention to the novelty and practicality of citing other people's resources in classroom teaching 4. Ask for attitude toward information literacy of students' friends forward 5. Ask for receiving spam or harassing calls 6. Ask for using pirated software or books of students' friends 7. Ask for school's computer has anti-virus software and system restore function installed
Parents' Educational Level	Q8	-Ask for parents' educational level
Parents' Career	Q9	-Ask for Parents' Career
Number of Published Articles	Q10	-Ask for Number of Published Articles
D. Socio-Economic factors		
Interaction Group of Students with Friends and Colleagues	Q1-Q3	<ol style="list-style-type: none"> 1. Ask for when they encounter difficulties if get encouragement of their friends. 2. Ask for learn a lot of knowledge from my friends 3. Ask for share experience with classmates and friends
Family Income	4-5	<ol style="list-style-type: none"> 1. Family Income 2. Family's socio-economic status
Satisfaction on IL Facility	6-7	<ul style="list-style-type: none"> - Ask for whether the number of computers in the school meets the learning needs - Ask for convenience of accessing school teaching resources
Students' information literacy level		
Part II		
A. Authority Is Constructed and Contextual		
Define different types of authority	Q1-Q2	<ol style="list-style-type: none"> 1. Authority based on subject expertise societal position. 2. Authority based on special experience
Determine the credibility of sources	Q3	-Use research tools and indicators of authority to determine the credibility of sources.
Developing their own authoritative voices	Q4	-Acknowledge they are developing their own authoritative voices
Develop and maintain an open mind	Q5	-Develop and maintain an open mind when encountering varied and sometimes conflicting perspectives

Table 1 (Cont.)

Variable	Question	Indicator
B. Information Creation as a Process		
Assess matching degree of information	Q6-Q7	1. Assess the fit between an information product's creation process 2. Search words can accurately match the information
Characteristics of information	Q8-Q9	1. Seek out characteristics of information products 2. Process or reorganize to form own views
Information dissemination	Q10	-Information dissemination with different purposes are available for their use
C. Information Has Value		
Respect the original ideas	Q11	-Give credit to the original ideas of others through proper attribution and citation
Understand intellectual property	Q12	-Articulate the purpose and distinguishing characteristics of copyright, fair use, open access, and the public domain
Access to information sources	Q13	-Recognize issues of access or lack of access to information sources
Protecting personal information	Q14	-Make informed choices regarding their online actions in full awareness of issues related to privacy and the commodification of personal information
Contributors to the information	Q15	-Contributors to the information marketplace rather than only consumers
D. Research as Inquiry		
Maintain an open mind	Q16	-Maintain an open mind and a critical stance
Determine research methods	Q17	-Use various research methods, based on need, circumstance, and type of inquiry
Draw reasonable conclusions	Q18	-Draw reasonable conclusions based on the analysis and interpretation of information
Determine an appropriate scope of investigation	Q19	-Determine an appropriate scope of investigation
Formulate questions for research	Q20	-Formulate questions for research based on information gaps or on reexamination of existing, information
E. Scholarship as Conversation		
Recognize that systems privilege authorities	Q21	-Recognize that systems privilege authorities and process of a discipline disempowers their ability to participate and engage
Recognize scholarly conversation	Q22	-Recognize they are often entering into an ongoing scholarly conversation

Table 1 (Cont.)

Variable	Question	Indicator
Understand the responsibility	Q23	-Understand the responsibility that comes with entering the conversation through participatory channels
Evaluate contributions	Q24	-Value user-generated content and evaluate contributions made by others
Scholarly conversations take place in various venues	Q25	-Recognize that scholarly conversations take place in various venues
F. Searching as Strategic Exploration		
Search strategies	Q26	-Design and refine needs and search strategies
Determine the initial scope of the task required	Q27	-Determine the initial scope of the task required to meet their information needs
Searching language	Q28-29	1.Use different types of searching language 2.Use Boolean logic operators
Understand how information systems	Q30	-Understand how information systems are organized in order to access relevant information

Validity of Research Instrument

This study used two methods of structure validity and content validity to verify the questionnaire. The fact questionnaire in this study was calculated in several stages. The first stage: by consulting relevant literature, a preliminary plan for the information literacy scale was developed, and about 150 questions were collected. The initial goal of the questionnaire was submitted to experts in the field of information literacy, and the expert group evaluated all issues in terms of content, frequency, and similar items and proposed amendments. Modifications were made based on the opinions of experts, and 75 questions were finally selected. In the second stage, 75 designed questions were sent to students. Students are asked to evaluate the validity of the content and form and express their opinions on the appropriate rate of each question based on the indicators and result indicators of the "Higher Education Information Literacy Competency Standards." According to the feedback from the students, the appropriate rate of the question types prepared was 81.2%. And according to the suggestions put forward by the students, changes were

made to inappropriate questions or replaced with other questions. In the third stage, review experts and students are asked to evaluate the revised questionnaire again. According to the feedback, the content validity of the final questionnaire reaches 91%.

The questionnaire was translated into the Chinese language in accordance with the expert's suggestion so that the researcher could effectively communicate with the interviewee during the survey and the actual survey.

Reliability, also known as consistency and reliability, refers to the degree to which measurement tools can measure consistent results, including same dependability, test-retest reliability, rater reliability, and internal consistency reliability. Due to the particularity of test-retest reliability and exact reliability requirements, generally, the reliability test only analyzes the internal consistency reliability, and Cronbach's α value of each latent variable can be calculated with the help of the SPSS software Reliability Analysis module. Validity refers to the accuracy and truthfulness of the measurement results. It is divided into validity scale validity, surface validity, content validity, and construct validity. It usually uses factor cumulative variance contribution rate in factor analysis or KMO, and Bartlett's test results Make judgments.

This study used SPSS 21.0 to test the reliability and validity of the survey results. The analysis results are shown in Table 2.

Table 2 Principal Component Analysis Results of Information Literacy Level

Explained total variance						
Factor	Initial eigenvalue			Extract the sum of squares and load		
	Total	Variance %	accumulation %	Total	Variance %	accumulation %
1	13.535	42.296	42.296	13.535	42.296	42.296
2	1.953	6.105	48.401	1.953	6.105	48.401
3	1.490	4.657	53.058	1.490	4.657	53.058
4	1.204	3.763	56.821	1.204	3.763	56.821
5	1.088	3.399	60.220	1.088	3.399	60.220
6	.961	3.005	63.225	.961	3.005	63.225
7	.897	2.804	66.028			
...			
30	.172	.536	100.000			

Note: Extraction method: principal component analysis.

Table 2 shows that the 30 factors of 6 (standard) factors of information literacy are 42.296%, 6.105%, 4.657%, 3.763%, 3.399%, and 3.005%, which can estimate and explain the variance of 63.225% of the statistical sample information literacy.

Table 3 Reliability analysis results of information literacy level

Measurement standard	Cronbach's α	Cronbach's Alpha based on standardized terms	Total Cronbach's Alpha
Authority is Constructed and Contextual	0.822	0.819	0.918
Information Creation as a Process	0.757	0.750	
Information Has Value	0.873	0.875	
Research as Inquiry	0.871	0.884	
Scholarship as Conversation	0.840	0.842	
Searching as Strategic Exploration	0.780	0.797	

Table 3 shows that the reliability test results of the six evaluation standards of information literacy level, Cronbach's α value is greater than 0.757, while the overall sample Cronbach's α value is as high as 0.918. Therefore, the sample has good consistency and reliability.

Table 4 KMO and Bartlett's test of information literacy level

Kaiser-Meyer-Olkin measure of sampling adequacy		0.798
Bartlett's sphericity Approximate chi-square		461.096
test	df	15
	Sig.	0.000

Table 4 shows that from the KMO and Bartlett's sphere test in the factor analysis, the Approximate chi-square value is 461.096 (df=15), and the sig value is 0 and explains that the questionnaire data is suitable for factor analysis. The KMO statistic (0.798) also shows that the partial correlation of the sample is weak, which is suitable for factor analysis. Therefore, the sample data can better support the measurement scale. That is, the reliability and validity are better.

In order to verify the validity and reliability of the questionnaire on attitude toward information literacy, Cronbach's and KMO values of the questionnaire were analyzed. The results are shown in Table 5 and Table 6.

Table 5 Reliability analysis results of attitude toward information literacy

Cronbach's α	Cronbach's Alpha based on standardized terms
0.873	0.892

Table 5 shows the reliability test results of attitude toward information literacy; Cronbach's α value is 0.873. Therefore, the sample has good consistency and reliability.

Table 6 KMO and Bartlett's test of attitude toward information literacy

Kaiser-Meyer-Olkin measure of sampling adequacy	0.857
Bartlett's sphericity	Approximate chi-square
test	df
	Sig.
	494.182
	21
	0.000

Table 6 shows that from the KMO and Bartlett's sphere test in the factor analysis, the Approximate chi-square value is 494.182 (df=21), the sig value is 0, and explains that the questionnaire data is suitable for factor analysis. The KMO statistic (0.857) also shows that the partial correlation of the sample is weak, which is suitable for factor analysis.

Objective 3: To formulate integrated strategies to improve information literacy of agriculture students in higher education of Yunnan.

In order to answer the third research goal, small group discussion was used to collect information, and SWOT was used to analyze the strengths, weaknesses, opportunities, and threats of college students' information literacy improvement. Through group discussion, researchers and respondents jointly identified internal strengths, weaknesses, external opportunities, and threats to improve college students' information literacy. Based on SWOT analysis results, TOWS is used to propose strategies to improve college students' information literacy.

After collecting quantitative data, after discussion by information literacy experts, it was decided to collect qualitative data in the form of focus group technology from agricultural college students (7 people), teachers undertaking information courses (3 people), professional teachers (3 people), administrators of the Office of Academic Affairs (1 person), leaders of the Information Academy (1 person), school leaders (1 person) and librarians (1 person). A total of 17 respondents participated in the group discussion.

To this end, four groups were arranged to participate in group discussions at the four schools of the respondents, namely YAU, SWFU, HHC, and PEC.

The YAU group discussion is scheduled for September 12, 2021, and the SWFU group is scheduled for September 16, 2021; The HHC team is scheduled for September 20, 2021; the PEC team is scheduled for September 23, 2021.

Therefore, the information collected through these group discussions was carefully recorded on-site and analyzed based on the collected data and the observations of the researchers. The researchers used the following steps during group discussions:

Step 1: Conduct a courtesy visit and hold a preliminary meeting with relevant school leaders to introduce and explain the purpose and objectives of the visit, as well as the upcoming activities.

Step 2: Hold an introductory meeting with school leaders to identify issues and prioritize them. The purpose is to help respondents clearly and comprehensively describe their current situation. The problem will focus on the practice of improving college students' information literacy.

As activity promoters, researchers asked respondents about their strengths, weaknesses, opportunities, threats, and other problems, constraints, and problems in improving college students' information literacy.

Step 3: SWOT matrix analysis

The researchers have prepared a SWOT matrix for internal strengths, weaknesses, and external opportunities and threats in the process of improving college students' information literacy. This is to develop an action plan to address each of these four areas.

Step 4: Design and formulate appropriate strategies to improve college students' information literacy

Use the TOWS method to determine the strengths, weaknesses, opportunities, and threats of improving college students' information literacy, use the TOWS matrix to analyze internal strengths and external opportunities to strengthen weak links, minimize related dangers, and develop an ideal strategy for college students' information literacy improvement. The process is formulated by researchers, and information literacy experts are invited to help them put forward suggestions and recommendations to further improve the strategy.

The Research Process

The research process is divided into three stages, namely: initial stage, research, and final stage.

Initial Stage

This stage was comprised of the activities necessary for the preparation of the actual research. The preparatory phase is essential in order to set the goals and objectives because the study was undertaken, the expected outcomes, and the benefits provided to the research subjects, including the site selection and sampling procedure.

Research Stage

This Stage involves data collection periods, including research studies and in-depth interview methods. The relevant data collected are as follows: 1. demographic characteristics of college students; 2. level of information literacy of college students; 3. main reasons affecting information literacy of college students; 4. Strengths, weaknesses, threats, and opportunities faced by college students in improving information literacy.

A survey study utilizing structured interviews was used to gather information concerning the first five required data. Conduct group discussions to identify issues and constraints faced by agriculture students, including strengths, weaknesses, opportunities, and threats in promoting information literacy among university students. The SWOT matrix is used to evaluate the collected information, and the TOWS matrix is used to formulate strategies suitable for improving college students' information literacy. This research method is conducive to systematically discovering the main problems of improving college students' information literacy and truly reflecting the level of college students' information literacy.

Final Stage

The activities in this phase include the interpretation and analysis of the data and the writing, conclusions, and recommendations of the results.

Sampling Method

If the total area of interest happens to be a big issue, a convenient way in which a sample can be taken is to divide them into a number of smaller non-overlapping areas and then randomly select a number of these smaller areas (usually called clusters) with the ultimate sample consisting of all (or samples of) units in these smaller clusters (Kothari, 1985). In this regard, depending on the quality of distribution of people in the population and based on the intended features of this study, the samples were drawn by following a multi-stage sampling technique, and firstly the faculties were selected by using the clustering sampling method. In this regard, samples were sampled using multi-stage sampling techniques based on the quality of the population distribution and based on the expected characteristics of the study. First, use a cluster sampling method to select a school. Then, the number of samples in each university was selected by proportional stratification, and finally, the students were selected by random sampling. Therefore, four higher education institutions were selected through cluster sampling, and the number of samples from higher education was selected through proportional stratification. They are YAU, SWFU, HHC, and PEC. According to the latest statistics (2019), the total number of full-time agriculture students in four higher educations is 10247 from higher education. And determine the distribution of each category (as shown in Table 7).

Table 7 Number of agriculture students from four higher education in 2019

Type	University	Male	Female	Total
University	YAU	2103	3218	5321
	SWFU	1624	1845	3469
College	HHC	423	269	692
	PEC	325	467	792
Total		4475	5799	10274

Determination of Sample Size

The actual sample size of the respondents was calculated using Taro Yamane's formula with 95% confidence level. Yamane (1967) provides a simplified formula to calculate the sample size. The formula is given as follows:

$$N_{totalsample} = \frac{N}{1 + Ne^2}$$

where: N=Population Size

e=margin of error (e is the percentage, put into decimal form)

Population size: The total number of people in the group you are trying to reach with your survey is called your population size.

The margin of error: A percentage that describes how closely the answer your sample gave to the "true value" in your population. The smaller the margin of error is, the closer you are to answering at a given confidence level.

Confidence level: A measure of how certain you are that your sample accurately reflects the population within its margin of error. Common standards used by researchers are 90%, 95%, and 99%.

$$N_{samplesize} = \frac{N_i}{N} \times N_{totalsample}$$

$N_{R_{samplesize}}$: is the sample size to be selected for the study in the i-th university.

N_i : is number of students in the i-th university.

Using this formula, the total sample size to be selected for the study is 385 at 95% confidence level, and the margin of error is 2.84. YAU sample size is 199, SWFU sample size is 130, HHC sample size is 26, PEC sample size is 30. As shown in Table 8.

Table 8 Sample number of agriculture students from four higher education

Type	University	Number of agriculture student	Sample Size
University	YAU	5321	199
	SWFU	3469	130
College	HHC	692	26
	PEC	792	30
Total		10274	385

Selection of Respondents

Systematic random sampling was employed to select the respondents. The purpose of the sample is to divide the representative population into four groups according to different schools. The population is stratified because the population is not homogeneous, and the respondents are unevenly distributed throughout the study area. Therefore, the following groups were identified: Group A-agricultural students from YAU; Group B-agricultural students from SWFU; Group C-agricultural students from HHC; Group D-agricultural students from PEC. Then divide them into two groups according to gender, and conduct random sampling to determine the interviewees. The sampling results are shown in Table 9.

Table 9 Number of male and female samples in four schools

Type	University	Male n/N	Female n/N	Total n/N
University	YAU	98/2103	101/3218	199/5321
	SWFU	67/1624	63/1845	130/3469
College	HHC	8/423	18/269	26/692
	PEC	10/325	20/467	30/792
Total		183/4475	202/5799	385/10274

This study used systematic random sampling to determine the respondents. The sampling interval number is decided by dividing the population size by the sample size and the regular interval number to determine who in the target population will be sampled.

For example, the population size of YAU male students is 2,103, the sample size is 98, and the sampling interval is 21. This means that you would sample every 21st person in your list of 2,103 students. So, you might start with the first name in the list and then sample every 21st person (e.g., 22, 43, 64, 85, and so on).

Data Collection

Data collection is the process of gathering and measuring information on variables of interest in an established systematic fashion that enables one to answer stated research questions and evaluate outcomes. For this study, primary data were collected, and in order to address the objective of the study, both qualitative and quantitative data were collected. The most common technique for data collection in survey research is using a questionnaire.

In this study, the questionnaire is used to provide the structured data matrix. The primary data is data that is observed or collected directly from first-hand experience. The most common technique for data collection in survey research is using a questionnaire. In this regard, in this study questionnaire is used to provide the structured data matrix.

The questionnaire is designed in two separate parts. In the first part, the demographic features of samples are questioned, such as individual student factors, educational factors, cultural factors, and socio-economic factors. In the second part, information literacy is evaluated based on Information Literacy Capabilities Standards for High Education by using a nominal scale.

Data Analysis

The data analysis of this study adopted qualitative and quantitative research methods. This study used descriptive analysis and multiple regression analysis to analyze the collected data. The external and internal factors affecting college students' information literacy are analyzed by using SWOT matrix and TOWS matrix.

Descriptive analysis

Descriptive statistics, the survey data collected by the respondents were summarized, coded, and input into the spreadsheet software program of the Statistical Package for Social Sciences (SPSS) version 21.0 for analysis, and the frequency, percentage, mean and standard deviation etc.

Regression Analysis

Multiple linear regression models were run to identify and quantify the combined effect of factors associated with college students' information literacy, and to measure the role of each variable in explaining the variance of the dependent variable. It examines the relationship between one dependent variable Y and one or more independent variables X_i .

Factors used as predictors included respondents' college student characteristics, educational factors, cultural factors, and socioeconomic factors. The dependent variable is the information literacy level of college students.

$$y_j = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_i x_i$$

was estimated using the method of least squares. In this method, the residual sum of squares between the regression plane and the observed values of the dependent variable is minimized. The regression equation represents a (hyper)plane in a $k+1$ dimensional space, where k is the number of independent variables $X_1, X_2, X_3, \dots, X_k$, plus one dimension of the dependent variable Y .

SWOT Matrix

SWOT matrix was used in the study area to evaluate and process the gathered information from which strategies were formulated to improve the information literacy of agriculture students in Yunnan higher education. Use the SWOT matrix to evaluate the internal and external aspects impacting agriculture students' information literacy in Yunnan higher education. That identified strengths, weaknesses, opportunities, and threats to improve the information literacy of agriculture students.

TOWS Matrix

TOWS matrix is based on the analysis results of the SWOT matrix. It further analyzes the internal and external factors college students face to improve their information literacy, determines the scores and weights of each element, and constructs the TOWS matrix according to the degree of influence of each factor. By giving full play to the advantages of improving college students' information literacy, overcoming weak factors, utilizing opportunity factors, and defusing threat factors, a series of optional development strategies for improving the information literacy of agriculture students are proposed.

CHAPTER 4

RESULTS AND DISCUSSION

This chapter introduces the results of the study. The presentation of the results follows the methodology based on the objectives of this study. The characteristics and current situation of information literacy of agricultural college students in Yunnan Province were preliminarily investigated. The second is to determine the information literacy level of agricultural college students in Yunnan. Multiple regression analysis was used to determine the relevant factors of information literacy level. This study adopts descriptive research methods. Through investigation and analysis, the survey data are statistically analyzed by SPSS21.0 software, mainly using frequency distribution, percentage, mean and standard deviation, multiple regression analysis and other indicators for discussion, and SWOT method is used to analyze the advantages, disadvantages, opportunities and threats of improving the information literacy level of college students, This paper makes strategic planning for improving the information literacy level of college students by using the TOWS system analysis method, and puts forward targeted suggestions and opinions.

General Characteristic of Respondents

The respondents of this survey are agricultural college students from 4 local universities in Yunnan Province. Statistical analysis results of personal characteristics of respondents (Table 8).

Table 10 Statistical analysis results of personal characteristics of respondents

Variable	Classification	University								total	
		HHC		PEC		SWFU		YAU		F	%
		F	%	F	%	F	%	F	%		
Age	below 20	5	1.3	20	5.19	20	5.19	19	4.94	64	16.62
	20-22	20	5.19	9	2.34	80	20.78	125	32.47	234	60.78
	above 22	1	0.26	1	0.26	30	7.79	55	14.29	87	22.6
gender	Female	18	4.68	20	5.19	63	16.36	101	26.23	202	52.47
	Male	8	2.08	10	2.6	67	17.4	98	25.45	183	47.53
Grade	First	3	0.78	17	4.42	50	12.99	28	7.27	98	25.45
	Second	11	2.86	10	2.6	10	2.6	58	15.06	89	23.12
	Third	12	3.12	3	0.78	45	11.69	59	15.32	119	30.91
	Fourth	0	0	0	0	25	6.49	54	14.03	79	20.52
Nationality	nationality	6	1.56	11	2.86	30	7.79	62	16.1	109	28.31
	Han minority	20	5.19	19	4.94	100	25.97	137	35.58	276	71.69
Educational Level	Undergraduate	0	0	0	0	130	33.77	199	51.68	329	85.45
	College students	26	6.75	30	7.79	0	0	0	0	56	14.55
Computer Level	Failed in the examination	17	4.42	29	7.53	109	28.31	162	42.08	317	82.34
	YCRE	3	0.78	1	0.26	10	2.6	16	4.16	30	7.79
	NCRE	6	1.56	0	0	11	2.86	21	5.45	38	9.87
English Level	Failed in the examination	22	5.71	27	7.01	103	26.75	156	40.52	308	80
	CET4	3	0.78	2	0.52	21	5.45	33	8.57	59	15.32
	CET6	1	0.26	1	0.26	6	1.56	10	2.6	18	4.68
Number Owing ICT Facilities	1	7	1.82	20	5.19	57	14.81	74	19.22	158	41.04
	2	14	3.64	8	2.08	57	14.81	98	25.45	177	45.97
	3	5	1.3	1	0.26	15	3.9	24	6.23	45	11.69
	>3	0	0	1	0.26	1	0.26	3	0.78	5	1.3
Number learned about ICT course	1	17	4.42	26	6.75	98	25.45	151	39.22	292	75.84
	2	8	2.08	3	0.78	19	4.94	29	7.53	59	15.32
	3	1	0.26	1	0.26	10	2.6	13	3.38	25	6.49
	>3	0	0	0	0	3	0.78	6	1.56	9	2.34

Table 10 (Cont.)

Variable	Classification	University								total	
		HHC		PEC		SWFU		YAU		F	%
		F	%	F	%	F	%	F	%		
Residence	City	4	1.04	5	1.3	27	7.01	37	9.61	73	18.96
	Countryside	22	5.71	25	6.49	103	26.75	162	42.08	312	81.04
Middle school located	Poor (remote) land	5	1.3	8	2.08	30	7.79	47	12.21	90	23.38
	General development level township	15	3.9	13	3.38	61	15.84	94	24.42	183	47.53
	More developed areas in counties and cities	6	1.56	8	2.08	33	8.57	49	12.73	96	24.94
	Large and medium-sized developed cities	0	0	1	0.26	6	1.56	9	2.34	16	4.16
Use of the library in the middle school	Yes	19	4.94	22	5.71	76	19.74	94	24.42	211	54.81
	No	7	1.82	8	2.08	54	14.03	105	27.27	174	45.19

It can be seen from Table 10 that the number of students aged 20-22 is the largest among the respondents, 234 (60.78%); the number of students under the age of 20 is the lowest, 64 (16.62%). The proportion of respondents' age groups is consistent with the overall age distribution of Chinese college students. Among the respondents, there were 202 female students, accounting for 52.47%; the number of male students is 183, accounting for 47.53%, and the number of female students is 19 more than that of male students. The highest number of middle school students in the four grade is the third grade, with 119 students, accounting for 30.91%; the second is the first-grade students, with 98 students, accounting for 25.45%; the lowest number is the fourth-grade students, with a total number of 79, accounting for 20.52%. The number of Han students is the largest, with 276 students, accounting for 71.69%; the number of minority students is 109, accounting for 28.31%. This is in

line with the fact that China is a multi-ethnic country with equal access to education, but the proportion of the population is smaller than that of the Han nationality. The number of undergraduate students is the largest, with 329 students accounting for 85.45%; there are 56 junior college students, accounting for 14.55%. The education level of HHC and PEC respondents is junior college.

The computer level of the respondents, "Without taking the exam or failed in the exam" has the most significant number of students, with a total number of 317, accounting for 82.34%; The minimum number of students who passed the YCRE exam was 30, accounting for 7.79%; The lowest computer pass rate in the four universities is PEC. Only one of the 30 respondents has passed the YCRE exam, accounting for 3.3%. HHC has the best passing rate for the computer exam, with six students passing the NCRE exam, accounting for 23.08% of the total respondents of the school, and three students passing the YCRE exam, accounting for 11.54% of the total respondents of the school; the second is YAU, with 18.59% of the respondents passing the computer exam.

English level of the respondents, "Without taking the exam or failed in the exam" has the most significant number of students, with a total number of 308, accounting for 80%; The minimum number of students who have passed CET6 is 18, accounting for 4.68%; The lowest passing rate of the English test in the four universities is PEC. Of the 30 respondents, only three have passed the CET test, accounting for only 1%. YAU has the best rate of passing the English exam, with 43 students passing the CET exam, accounting for 21.61% of the total respondents of the school; the second is SWFU, with 20.77% of the respondents passing CET.

Number Owing ICT Facilities of the respondents, there are the most students with 2 ICT devices, with a total number of 177, accounting for 45.97%; the second is the students with one ICT device, with 158 students, accounting for 41.04%; the number of students with 4 ICT devices is the lowest, with a total number of 5, accounting for 1.3%. The proportion of students with smart phones is 98.1%, indicating that smart phones have been entirely popularized; the second is laptop computers, accounting for 51.16%; the lowest is desktop computers, accounting for 6.75%. Because information technology equipment has penetrated the study and life

of college students, and with the rapid development of the network and the richness of digital learning resources, college students can study anytime and anywhere. Portable electronic devices can better meet the needs of college students study and life, so the number of college students with smart phones is the most, and the number of students with desktop computers is the least.

Number learned about ICT course of the respondents the most students studied one ICT course, with a total number of 292, accounting for 75.84%; The second is the students who have taken two ICT courses, with 59 students, accounting for 15.32%; The number of students who have studied 4 ICT courses is the lowest, with a total number of 9, accounting for 2.34%. Only 3 and 6 students from YAU and SWFU have studied 4 ICT courses respectively. The most significant number of students have studied university computer courses, with 277 students, accounting for 72.07%; The second is the number of students who have studied the science and technology document retrieval course, accounting for 22.23%; The minimum number of students who have studied database courses is 69, accounting for 18.01%.

Because the research object of the project is students majoring in agricultural science, the requirements for information technology ability are low. Several universities surveyed only take information technology courses as general required courses, and the course content mainly focuses on basic computer knowledge and functional skills. The requirements for high-level information technology-related knowledge could be higher. From the perspective of research, for example, PEC and HHC offer introductory computer courses as compulsory courses for college students; the information technology courses of YAU include university computer fundamentals, language courses, databases, and other courses. However, according to the annual class opening situation, the number of optional language and database courses is less than that of introductory computer courses, indicating that college students are more willing to learn introductory courses.

The respondents' residence is the most significant number of students in countryside, with 312 students accounting for 81.04%; the number of students who reside in a city is 73, accounting for 18.96%. Because the interviewees are college students majoring in agricultural science, the students of "development level

ownership" have a deeper understanding of agriculture, are more willing to study agriculture-related majors, and are more inclined to return to "development level ownership" to develop agriculture after graduation from university.

The middle school of respondents is located in the "development level town", with 183 students, accounting for 47.53%; the middle school is located in "Large and medium-sized developed cities" with the least number of students, 16, accounting for 4.16%.

Use of the library in middle school of the respondents, 211 students have used libraries in secondary schools, accounting for 54.81%; the number of students who have not used the library in secondary schools is 174, accounting for 45.19%. Because most students come from cities and towns, the teaching conditions and teaching facilities in cities and towns are relatively weak, the construction of library resources is somewhat insufficient, the collection of books is relatively small, and the experience of the library for students is not very good, which may be the reason why many students have not used the library in middle school.

Measuring Respondents' Information Literacy Level

As one of the objectives of this study, students' information literacy will be measured in this section.

The level of information literacy is measured by six standards in the Framework for Information Literacy for Higher Education, which are STD 1: Authority Is Constructed and Context; STD 2: Information Creation as a Process; STD 3: Information Has Value; STD 4: Research as Inquiry; STD 5: Scholarship as Conversation; STD 6: Search as Strategic Exploration, five questions is designed for each standard, with a total of 30 queries. The highest score of the options is 5 points, the lowest score is 1 point, and the total average score range is 1-5 points. This study's information literacy level is 1-1.8= Very Low; 1.8-2.6 = Low; 2.6-3.4 = Moderate; 3.4-4.2=High; 4.2-5= Very High.

In order to determine the dispersion of the mean value, the standard deviation was used. Statistics is used to measure the degree of data distribution in a set around the mean value. A slight standard deviation means the data is closely aggregated; a significant standard deviation indicates that they are widely distributed—scores of students' information literacy level in four universities (Table 11).

Table 11 Scores of students' information literacy level in four universities

University	Frequency	S.D.	Mean	Level
YAU	199	0.48	3.07	moderate
SWFU	130	0.47	3.06	moderate
HHC	26	0.29	2.72	moderate
PEC	30	0.28	2.73	moderate
Total	385	0.47	3.02	moderate

It can be seen from Table 11 that the mean information literacy level is 3.02, and the level is moderate. The mean of YAU students' information literacy level is the highest, with the mean score of 3.07; The mean of information literacy of YAU students is 0.01 points higher than that of SWFU students; The lowest mean of students' information literacy level is HHC; The mean of PEC students' information literacy level is 0.01 higher than that of HHC students. It showed that the information literacy level of students with the same education level is similar. However, the information literacy level of students with different education levels is quite different. The information literacy level of students in four universities according to the six criteria of ACRL are all moderate. According to the information literacy courses studied by the survey students, most of them have only learned the introductory computer courses and have basic computer operation skills, but lack the learning motivation for the advanced information technology courses; Most of the students come from rural areas, and the rural information education facilities, the

degree of informatization and the provision of information courses are lacking; At the same time, the information technology courses offered by the school are mainly general elective courses, and the cultivation of information literacy and the integration of professional courses are not enough. These all restrict the improvement of students' information literacy, leading to low information literacy.



Table 12 Analysis of information literacy level of college students in four universities

University	Frequency	STD 1			STD 2			STD 3			STD 4			STD 5			STD 6		
		S.D.	Mean	Level	S.D.	Mean	Level	S.D.	Mean	Level	S.D.	Mean	Level	S.D.	Mean	Level	S.D.	Mean	Level
YAU	199	0.66	3.1	moderate	0.61	3.08	moderate	0.63	3.37	moderate	0.6	2.94	moderate	0.53	2.88	moderate	0.73	3.05	moderate
SWFU	130	0.59	3.08	moderate	0.65	3.09	moderate	0.65	3.35	moderate	0.68	2.95	moderate	0.5	2.89	moderate	0.63	3.03	moderate
HHC	26	0.43	2.86	moderate	0.51	2.92	moderate	0.51	2.89	moderate	0.51	2.46	low	0.55	2.4	low	0.55	2.78	moderate
PEC	30	0.67	2.82	moderate	0.57	2.98	moderate	0.56	3.05	moderate	0.63	2.5	low	0.54	2.54	low	0.66	2.47	low
Total	385	0.63	3.06	moderate	0.62	3.06	moderate	0.64	3.3	moderate	0.64	2.88	moderate	0.54	2.83	moderate	0.7	2.98	moderate



It can be seen from Table 12 that:

(1) The mean score of respondents' information literacy according to the first standard of ACRL is 3.06, and the standard deviation is 0.63. YAU students get the highest score of information literacy level according to the first standard of ACRL, the average score of the question is 3.1, the lowest is HHC students, and the mean score of the question is 2.86. The information literacy level of students in the four universities according to the first standard of ACRL is moderate.

(2) The mean of respondents' information literacy according to the second standard of ACRL is 3.06, the level is moderate, and the standard deviation is 0.62. SWFU students get the highest score of information literacy level according to the second standard of

ACRL, with the mean of 3.09, and the lowest score of HHC students, with the mean of 2.92. The information literacy level of the students in the four universities according to the second standard of ACRL is moderate.

(3) The mean of respondents' information literacy according to the third standard of ACRL is 3.3, the level is moderate, and the standard deviation is 0.64. YAU students get the highest score of information literacy level according to the third standard of ACRL, the mean is 3.37, the lowest is HHC students, and the mean is 2.89. The information literacy level of students in the four universities according to the third standard of ACRL is moderate.

(4) The mean of respondents' information literacy according to the fourth standard of ACRL is 2.88, the level is moderate, and the standard deviation is 0.64. The standard deviation is slight, indicating the students' information literacy level is similar. SWFU students get the highest score of information literacy level according to the fourth standard of ACRL, with a mean of 2.95, and the lowest score of HHC students, with a mean of 2.46. The information literacy level of YAU and SWFU students according to the fourth standard of ACRL is moderate, and the information literacy level of HHC and PEC students is low.

(5) The mean of respondents' information literacy according to the fifth standard of ACRL is 2.83, the level is moderate, and the standard deviation is 0.54. SWFU students get the highest score of information literacy level according to the

fifth standard of ACRL, the average score of the question is 2.89, the lowest is HHC students, and the mean is 2.4. The information literacy level of YAU and SWFU students according to the fifth standard of ACRL is moderate, and the information literacy level of HHC and PEC students is low.

(6) The mean of respondents' information literacy according to the sixth standard of ACRL is 2.98, the level is moderate, and the standard deviation is 0.7. YAU students get the highest score of information literacy level according to the sixth standard of ACRL is 3.05, and the lowest score of PEC students, with a mean of 2.47. The information literacy level of YAU, SWFU and HHC students according to the sixth standard of ACRL is moderate, and the information literacy level of PEC students is low.

Table 13 Students' information literacy level according to the six standards of ACRL

Standard	S.D.	Mean	Level
STD 1	0.63	3.06	moderate
STD 2	0.62	3.06	moderate
STD 3	0.64	3.30	moderate
STD 4	0.64	2.88	moderate
STD 5	0.54	2.83	moderate
STD 6	0.70	2.98	moderate
Total	0.47	3.02	moderate

It can be seen from Table 13 that the mean of the respondents' information literacy level is 3.02 among the six standards, the level is moderate, and the third standard has the highest score of information literacy level, with a mean of 3.3. The lowest score of the fifth standard is 2.83, followed by 2.88 in the fourth. It showed that among the information literacy level of college students, their ability to understand, recognize, and judge information is higher than other abilities, which indicates that college students have basic information literacy. Schools should focus

on strengthening the cultivation and improvement of students' ability to analyze and research information.

Table 14 Analysis of differences in the information literacy level of students in four universities

	Sum of Squares	Df	Mean Square	F	Sig
Between Groups	5303.285	3	1767.762	6.586	0.000
Within Groups	102264.419	381	268.411		
Total	107567.704	384			

Use ANOVA to test whether there is a significant difference in the level of information literacy among the four universities. Table 14 shows sig= 0, less than 0.05, indicating significant differences in information literacy among the four universities.

Table 15 Multiple comparative analysis of information literacy of students in four universities

	University(I)	University(J)	Mean difference(I-J)	Standard error	Sig.	95% Confidence interval	
						Lower limit	Upper limit
LSD	YAU	SWFU	1.640	1.848	0.375	-1.99	5.27
		HHC	12.586*	3.416	0.000	5.87	19.30
		PEC	9.263*	3.209	0.004	2.95	15.57
SWFU	YAU	SWFU	-1.640	1.848	0.375	-5.27	1.99
		HHC	10.946*	3.520	0.002	4.03	17.87
		PEC	7.623*	3.318	0.022	1.10	14.15
HHC	YAU	SWFU	-12.586*	3.416	0.000	-19.30	-5.87
		SWFU	-10.946*	3.520	0.002	-17.87	-4.03
		PEC	-3.323	4.390	0.450	-11.95	5.31
PEC	YAU	SWFU	-9.263*	3.209	0.004	-15.57	-2.95
		SWFU	-7.623*	3.318	0.022	-14.15	-1.10
		HHC	3.323	4.390	0.450	-5.31	11.95

It can be seen from Table 15 that the sig value of the information literacy level of YAU students and HHC students is 0. The sig value of the information literacy level of YAU students and PEC students is 0.04, both of which are less than 0.05, indicating that the information literacy level of YAU and HHC, YAU and PEC students has significant differences; The sig value of YAU students' information literacy level and SWFU students' information literacy level is 0.375. YAU and SWFU students' information literacy level is the same. The sig value of SWFU students' and HHC students' information literacy levels is 0.002. The sig value of SWFU students' information literacy level and PEC students' information literacy level is 0.022, which is less than 0.05, indicating that the information literacy level of SWFU and HHC, SWFU, and PEC students is significantly different. The sig value of HHC students' and PEC students' information literacy levels is 0.45. HHC and PEC students' information literacy level is the same. The information literacy level of students in the same type of university is the same.

The factors affecting information literacy of agriculture students in higher education of Yunnan

This section mainly studies the influencing factors of students' information literacy. Use the research hypothesis to investigate the influencing factors of information literacy.

According to the purpose of the study, and taking into account the personal, family, sociological and demographic characteristics of students, four main hypotheses are put forward based on the theoretical framework of this study:

1. There is a particular relationship between individual factors and students' information literacy.
2. There is a particular relationship between educational factors and students' information literacy.
3. There is a particular relationship between cultural factors and students' information literacy.

4. There is a particular relationship between socio-economic factors and students' information literacy.

The following variables have tested the four main factors.

Personal factors were analyzed and evaluated by variables such as gender, age, home location, grade, nationality, level of education, grade point average (GPA), computer level, English level, numbers owning ICT facilities, number learning IL courses, times of using ICT facilities, the need for success, learning style, etc.

Educational factors are mainly analyzed and evaluated by setting up IL course, digital resources, using teaching tools in the classroom, multimedia assignments and other variables.

Cultural factors are mainly evaluated through such variables as attention to information literacy, parents' educational level, parents' careers, and the number of published articles.

Socio-economic factors have been evaluated mainly through the variables of interaction group of students with friends and colleagues, family income, satisfaction on IL facility, etc.

The first primary assumption: There is a relationship between individual factors and students' information quality

$H_0: P = 0; H_1: P \neq 0$

The results of the significance analysis of personal characteristics and information literacy level are shown in Table 16.

Table 16 Significant analysis of personal characteristics and information literacy level

Variable	Classification	Mean value	Standard deviation	Significance test						Total
				STD 1	STD 2	STD 3	STD 4	STD 5	STD 6	
University	U1	15.36	2.41	0.052	0.0	0.512	0	0	0	0
	U2	15.33	2.34							
	U3	13.63	1.45							
	U4	13.6	1.45							
age	below 20	14.53	2.4	0.0	0.001	0.027	0.0	0.001	0	0
	20-22	14.8	2.33							
	above 22	16.3	1.92							
gender	Female	15.05	2.26	0.251	0.949	0.261	0.371	0.386	0.661	0.672
	Male	15.15	2.44							
grade	First	13.88	2.62	0	0	0.008	0	0	0	0
	Second	14.6	1.78							
	Third	15.5	2.28							
	Fourth	16.48	1.7							
nationality	nationality	14.96	2.53	0.296	0.133	0.137	0.422	0.54	0.638	0.083
	Han minority	15.43	2.26							
residence	City	15.45	2.48	0.177	0.095	0.674	0.083	0.638	0.147	0.157
	Countryside	15.01	2.3							
Educational Level	Undergraduate	15.35	2.38	0.004	0	0.145	0	0	0	0
	Junior college	13.61	1.44							
Computer Level	Failed in the examination	14.85	2.33	0.001	0.001	0	0.069	0.122	0	0
	YCRE	16.19	1.99							
	NCRE	16.24	2.21							
English Level	Failed in the examination	14.94	2.43	0.778	0.002	0.089	0.335	0.0	0.015	0.015
	CET4	15.5	1.75							
	CET6	16.37	2.15							
Number	1	14.97	2.51	0.016	0.028	0.043	0.101	0.15	0.098	0.003
Owning ICT Facilities	2	15.06	2.2							
	3	15.5	2.31							
	>3	16.8	1.79							

Table 16 (Cont.)

Variable	Classification	Mean value	Standard deviation	Significance test						Total
				STD 1	STD 2	STD 3	STD 4	STD 5	STD 6	
Number learned about ICT course	1	14.89	2.42	0.018	0.012	0	0.468	0.607	0.027	0.011
Middle school located	2	15.56	1.92							
	3	15.87	1.98							
	>3	16.61	2.02							
	Poor (remote) land	15.19	2.52	0.867	0.572	0.699	0.906	0.402	0.667	0.764
	General development level township	15.14	2.29							
	More developed areas in counties and cities	14.88	2.27							
	Large and medium-sized developed cities	15.28	2.49							
Use of the library in the middle school	Yes	15.19	2.33	0.433	0.023	0.905	0.21	0.339	0.598	0.381
	No	14.98	2.36							
GPA	excellent	15.68	2.36	0.011	0.003	0.024	0.0	0.002	0.001	0
	average	14.63	2.3							
	poor	14.55	1.84							
The need for success	/	15.1	2.34	0	0	0	0	0.005	0	0
Learning style	/	15.1	2.34	0	0.001	0.0	0.0	0.021	0.003	0
R = 0.641 ^a		R Square = 0.411		F 32.858			Sig 0.000 ^b			

It can be seen from Table 16 that the sig. value equals 0.0 and less than 0.05, indicating that at least one variable in individual factors significantly impacts information literacy. The considerable value of university, age, grade, educational

level, computer level, English level, number learned about ICT course, GPA, number owning ICT facilities ten factors, and information literacy level is less than 0.05, so the ten factors have a significant impact on the information literacy level of college students; However, gender, nationality, residence, Middle school located, Use of the library in the middle school and the level of information literacy are significantly greater than 0.05, so gender, nationality, residence, Middle school located, Use of the library in the middle school have little impact on college students' information literacy.

School and education levels significantly impact the information literacy level of college students, and the information literacy level of undergraduate students is significantly higher than that of junior college students, indicating that the higher the education level, the higher the information literacy level of college students. School factors significantly impact the second, fourth, fifth, and sixth criteria of information literacy evaluation; however, the education level factor significantly affects the sixth criteria of information literacy evaluation. It shows that the level of education is an essential factor that determines college students' information literacy level. The older the age, the higher the level of information literacy, which means the higher the level of information literacy of college students with the increase in age and grade. Age and grade factors significantly impact the six criteria of information literacy evaluation.

The higher the computer level of students, the higher the level of information literacy, and it has a significant impact on the first, second, third, and sixth criteria of information literacy evaluation but has no significant effect on the students' academic research and inquiry ability, indicating that the better the computer is, the stronger the college student's ability of information acquisition, information value judgment, information creation, information inquiry, and information retrieval. The higher the student's English level, the higher the students' information literacy, indicating that improving college students' English is conducive to the improvement of college students' information literacy; English factors have a significant impact on the second, fifth, and sixth criteria of information literacy evaluation, indicating that college students with good English are better at information creation, information

retrieval, and academic research. The more number own ICT Facilities, the higher the information literacy of college students. The Number Owning ICT Facilities factor has a significant impact on the first, second, and third criteria in the evaluation criteria of information literacy, indicating that the more information technology equipment used by college students, the stronger the opportunity for information practice, which is conducive to improving college students' information acquisition, value judgment, and information creation ability. The more significant the number of learned about ICT courses, the higher the level of college students' information literacy. The number of learned about ICT courses has a significant impact on the first, second, third, and sixth criteria in the evaluation criteria of information literacy, indicating that the more information literacy courses students' study, the stronger their ability to obtain authoritative information, create information, judge information value and search information. The better the performance of college students, the stronger the capacity for information literacy level, and it significantly impacts the six criteria of information literacy evaluation. It shows that the better the performance of college students, the stronger their ability to independent learning, and the stronger their knowledge of information value judgment, authoritative information acquisition, information creation, information practical application, information inquiry, and academic research.

The stronger the demand for the success of college students, the higher the information literacy of college students, indicating that improving the interest of college students in learning and stimulating the endogenous motivation of learning is conducive to enhancing the information literacy of college students. The need for success has a significant impact on the six criteria for evaluating college students' information literacy, indicating that stimulating college students' endogenous motivation is the critical factor in improving the level of college students' information literacy.

Whether college students can think independently and discuss with teachers and students when encountering problems are all conducive to improving students' information literacy. The factor of learning style has a significant impact on the six criteria for evaluating college students' information literacy, which shows that the

better the learning habits, the more critical factor can improve the level of college students' information literacy.

The information literacy level of students living in cities is higher than that of students living in rural areas, but there is no significant impact. The information literacy level of male students is 0.1 more elevated than female students, but there is no significant impact. The information literacy level of students in big cities where their middle schools are located is higher than that of students in other places, but not significant; The information literacy level of students who have been to the library in middle school is higher than that of students who have not been to the library, but only 0.21 higher, indicating that whether they have been to the library in middle school has no significant impact on the information literacy level of students.

The second primary assumption: There is a relationship between education factors and students' information literacy.

H0: $P = 0$; H1: $P \neq 0$

The significance analysis of education factors and information literacy level is shown in Table 17.

Table 17 Significant analysis of education factors and information literacy level

variable	Significance test						Total
	STD 1	STD 2	STD 3	STD 4	STD 5	STD 6	
IL Course	0	0	0.002	0	0.024	0	0
Digital Resources	0	0	0.025	0	0.038	0.05	0
ICT Facilities	0	0.017	0.018	0.003	0.087	0.013	0
Using Teaching Tools in the Classroom	0	0.02	0.225	0	0.154	0.007	0
Multimedia Assignments	0.022	0.025	0.028	0	0.025	0	0
	R = 0.467^a		R Square = 0.218		F 26.471		Sig 0.000^b

It can be seen from Table 17 that the sig. value is equal to 0.0 and less than 0.05, indicating that at least one variable in education factors has a significant impact on the level of information literacy. The information literacy level of students is significantly related to the information technology courses offered by the school, the construction of digital resources, the information technology equipment, the use of information technology teaching tools by teachers in the classroom, and the arrangement of multimedia homework by teachers.

From the perspective of the six criteria for the evaluation of college students' information literacy, the construction of digital resources and information technology equipment have no significant impact on the fifth criterion in the assessment of information literacy, indicating that the structure of digital resources and information technology equipment have no significant effect on college students' information retrieval ability, but have a substantial impact on college students' information acquisition, value judgment, information exploration, information creation and academic research ability.

In the classroom, teachers' use of information technology teaching tools has no significant impact on the third and fifth criteria in the evaluation of information literacy, indicating that teachers' use of information technology equipment has a considerable effect on students' ability to obtain authoritative information, create information, explore data and retrieve information.

The setting of information literacy curriculum and the arrangement of multimedia homework have a significant impact on the five criteria in the evaluation of information literacy, indicating that whether the setting of information literacy curriculum is reasonable and the form of homework assigned by teachers has a significant impact on the level of information literacy of college students.

The third main assumption: There is a relationship between cultural factors and students' information literacy.

$H_0: P = 0; H_1: P \neq 0$

The significance analysis of cultural factors and information literacy level is shown in Table 18.

Table 18 Significant analysis of cultural factors and information literacy level

variable	Significance test						Total
	STD 1	STD 2	STD 3	STD 4	STD 5	STD 6	
Attitude toward Information Literacy	0	0.012	0.038	0.067	0.271	0.053	0.01
Parents' Educational Level	0.037	0.09	0.046	0.064	0.525	0.13	0.057
Parents' Career	0.008	0.08	0.038	0.054	0.188	0.053	0.055
Conduct Collaborative Projects	0	0	0.004	0	0.046	0	0
Number of Published Articles	0	0.001	0.007	0	0.026	0	0
	R = 0.474^a		R Square = 0.225		F 27.562		Sig 0.000^b

It can be seen from Table 18 that the sig value is equal to 0.0 and less than 0.05, indicating that at least one variable in cultural factors has a significant impact on the level of information literacy. The level of students' information literacy is significantly related to the attention to information literacy, the conduct collaborative projects, and number of published articles.

From the perspective of the six criteria for the evaluation of college students' information literacy, the attitude of teachers, students, parents, peers and society towards information literacy has a significant impact on the acquisition of authoritative information, information creation and information value judgment of college students, indicating that organization should disseminate positive energy, Build a good information literacy atmosphere.

Parents' Educational Level and Parents' Career only significantly impact the first and third criteria of the evaluation of information literacy level, indicating that the effects of family education impact college students' authoritative information acquisition and value judgment.

Conduct collaborative projects, and the number of published articles significantly impacts the five criteria of information literacy evaluation. It shows that whether college students participate in project research and publish papers substantially affects the level of college students' information literacy. Therefore, college students' participation in project research, writing papers and publishing articles are conducive to improving their practical ability of information literacy, finding and solving problems, and cultivating their exploration spirit and academic research ability. Information literacy education in universities should focus on developing students' information practice abilities.

The fourth primary assumption: There is a relationship between socio-economic factors and students' information literacy.

H0: $P = 0$; H1: $P \neq 0$

The results of the significance analysis of socio-economic factors and information literacy level are shown in Table 19.

Table 19 Significance analysis of socio-economic factors and information literacy level

Variable	Significance test						Total
	STD 1	STD 2	STD 3	STD 4	STD 5	STD 6	
Economic and Social Status	0.965	0.996	0.647	0.346	0.875	0.706	0.916
Interaction Group of Students with Friends and Colleagues	0	0.001	0.001	0	0	0.326	0
Family Income	0	0.129	0.004	0.57	0.89	0.534	0.051
Satisfaction on IL Facility	0	0.041	0.022	0.012	0.171	0.018	0.001
	R = 0.495 ^a		R Square = 0.245		F 41.22		Sig 0.000 ^b

It can be seen from Table 19 that the sig value is equal to 0.0 and less than 0.05, indicating that at least one variable in social and economic factors significantly impacts the level of information literacy. The story of students' information literacy significantly affects the interaction group of students with friends and colleagues and satisfaction with the IL facility. However, it does not significantly impact family income or economic and social status factors.

From the perspective of the six criteria for the evaluation of college students' information literacy, the Interaction Group of Students with Friends and Colleagues has a significant impact on the first, second, third, fourth, and five criteria in the evaluation criteria of information literacy, indicating that college students often communicate and discuss with their peers, which is helpful to cultivate college students' ability of authoritative information acquisition, information value judgment, information creation, information exploration, and academic research. Therefore, universities should build an information exchange platform, encourage students to participate actively and improve their information literacy level in the exchange process.

Family Income only significantly impacts the first and third criteria of information literacy evaluation, indicating that family economic income has little effect on the level of information literacy of college students. However, improving the ability to information value judgment and authoritative information acquisition is helpful.

Satisfaction with the IL facility has no significant impact on the fifth standard of information literacy evaluation. However, the other five means have substantial implications, indicating that the pleasure of information technology equipment has a considerable effect on improving the information literacy level of college students. Colleges and universities should focus on building a good information environment, improving the network environment, and improving the service level.

Analysis of Multivariate Regression

In order to further explore the expected influence of college student's personal characteristics, educational factors, cultural factors, and economic and social factors on college students' information literacy, this study sets each variable in the above four levels as an independent variable, sets the level of information literacy as a dependent variable, and uses the Enter method and multiple regression to analyze the relationship between the four influencing factors and the independent variable. Are shown in Table 20.

Table 20 Multiple regression analysis results of dependent variable information literacy level and influencing factors

Model	Unstandardized		Standardized	Sig.
	Coefficients		Coefficients	
	B	STD. Error	Beta	
(Constant)	0.280	7.001		0.968
X ₁ Grade	3.699	1.171	0.138	0.002
X ₂ GPA	-0.756	0.219	-0.167	0.001
X ₃ Computer level	2.633	1.111	0.099	0.018
X ₄ English level	2.377	1.213	0.079	0.051
X ₅ Educational Level	1.524	0.278	0.0461	0.021
X ₆ Learning IL courses	1.459	1.029	0.062	0.157
X ₇ Number Owning ICT Facilities	0.557	0.213	0.117	0.09
X ₈ Need for Success	2.490	0.668	0.191	0.000
X ₉ Learning Style	1.299	0.541	0.108	0.017
X ₁₀ Owning ICT Facilities	0.288	1.053	0.012	0.785
X ₁₁ IL Course	0.199	0.978	0.010	0.039
X ₁₂ Using Teaching Tools in the Classroom	-0.706	1.097	-0.033	0.520
X ₁₃ Digital Resources	1.897	1.160	0.085	0.0103
X ₁₄ Multimedia Assignments	-0.540	1.098	-0.024	0.023

Table 20 (Cont.)

Model	Unstandardized Coefficients		Standardized Coefficients	Sig.
	B	STD. Error	Beta	
X ₁₅ Attitude toward Information Literacy	1.691	1.013	0.074	0.036
X ₁₆ Parents' Educational Level	-0.071	0.714	-0.005	0.920
X ₁₇ Parents' Career	0.542	0.789	0.036	0.493
X ₁₈ Conduct Collaborative Projects	0.231	1.012	0.021	0.02
X ₁₉ Number of Published Articles	1.403	0.680	0.093	0.040
X ₂₀ Interaction Group of Students with Friends and Colleague	4.023	0.962	-0.199	0.000
X ₂₁ Family Income	0.455	0.747	0.028	0.543
X ₂₂ Satisfaction on IL Facility	-0.101	0.858	-0.006	0.016
	R = 0.693^a	R Square = 0.48	F 153.799	Sig 0.000^b

*Significant difference at ($P < 0.05$)

The results of Table 20 showed the relationship of X₁ age, X₂ GPA, X₃ computer level, X₅ educational level, X₈ need for success, X₉ learning style, X₁₁ IL course, X₁₃ digital resources, X₁₄ multimedia assignments, X₁₅ attitude toward information literacy, X₁₈ conduct collaborative projects, X₁₉ number of published articles, X₂₀ interaction group of students with friends and colleague, X₂₂ satisfaction on IL facility, all together explained Y with information literacy level ($R = 0.693$, $P < 0.05$). The variable group's relationship can explain Y's variation at 48 % ($R^2 = 0.48$, $P < 0.05$). The regression model can be written as follows:

$$Y=0.138X_1-0.167X_2+0.099X_3+0.0461X_5+0.191X_8+0.108X_9+0.01X_{11}+0.093X_{13}+0.093X_{14}+0.093X_{17}+0.199X_{18}+0.093X_{19}+0.199X_{20}-0.006X_{22}+E_i$$

Grade - The higher the student's grade, the higher the student's information literacy score, consistent with the existing research results (Samson, 2010). That may be because senior students spend more time receiving information literacy education than junior students, have more information technology-related knowledge, and have a more vital practical ability and ability to effectively distinguish the authenticity of the information.

GPA - The better the student's performance, the higher the student's information literacy score. That shows that the better the student's learning ability, the stronger their learning initiative, the better their cognitive strategies and self-regulation ability, and the higher their information literacy level.

Computer level - The information literacy score of students who have passed the computer grade examination is significantly higher than that of students who have not passed the computer grade examination. That shows that students who have passed the computer grade examination have more information technology knowledge and a higher ability to explore information, which was conducive to improving the information literacy level of college students.

Educational level - Undergraduate students have higher information literacy scores than junior college students. Studies by several scholars (Dandan, 2019; Xinyu, 2022; Yuxia & Shuzhen, 2011) showed that students with different levels of education have significant differences in information literacy. It has shown that improving the education level of students was the direct way to improve the information literacy level of college students.

Need for success, Learning Style - the more substantial the self-efficacy of college students, the stronger their learning habits and self-discipline, and the higher their information literacy score. That is consistent with the existing research results (Hang et al., 2022; Jinmu & Linzhuo, 2021; Xu & Wang, 2019). Students' self-efficacy has a positive impact on the improvement of information literacy. That shows that

the stronger the college students' self-motivation, the better their learning habits, the higher their learning enthusiasm, and the internal motivation to work towards a specific goal are conducive to promoting the improvement of college students' information literacy level.

IL course - The opening of information literacy courses in colleges and universities particularly impacts college students' information literacy. Liu Xiangyong's research found that the number of hours of information technology courses offered by schools is closely related to students' information literacy. Chen Shuliang (Shuliang & Xianrui, 2018) and others believe that curriculum is the most vital external influence factor of information literacy based on principal component regression analysis. They showed that colleges and universities should strengthen the reform of the information literacy curriculum system, reform the curriculum content, and make it more suitable for cultivating college students' information literacy.

Digital resource - The research found that the construction of digital resources particularly impacts college students' information literacy. Chen Shuliang (Shuliang & Xianrui, 2018), a scholar, believes that the resource construction, resource conditions, and digital environment of university libraries have a particular impact on college students' information literacy.

Multimedia assignments - The form of assignments assigned by teachers particularly impacts college students' information literacy. Wang Haiyan and Fu Liping (Wang & Liping, 2006), a scholar, believe that students' information literacy is related to teachers' information literacy level. The higher the teachers' information literacy level, the higher the degree of integration of modern information technology and curriculum teaching. The arrangement of multimedia assignments, essays, research reports, etc., has been conducive to improving college students' information literacy.

Attitude toward information literacy - The attitude of peers, teachers, students, parents, and the general public towards information literacy affects college students' information literacy to a certain extent. Selwyn (1998) found that students' attitudes to information can be one of the essential indicators for predicting college students' self-efficacy.

Conduct collaborative projects - The research of university students' participation in the project has a particular impact on university students' information literacy. By applying for college students' innovation and entrepreneurship projects, or actively participating in teachers' research projects, and by conducting a targeted collection of information required for scientific research, college students have a deeper understanding of relevant information and have a more direct experience in the analysis, research, acquisition, and utilization of information, which is conducive to cultivating students' knowledge application and creativity and improving their information literacy.

The number of published articles - The more papers college students publish, the higher their information literacy scores. It shows that in the process of writing papers, students understand the importance, principles, and methods of topic selection, which is conducive to students' research and exploration of unknown knowledge by using the knowledge they have learned and exercising and cultivating students' information practice, exploration, and innovation ability.

Interaction group of students with friends and colleagues - cooperation and exchange between college students and their peers can promote information literacy. Through communication with peers, college students can improve their moral cultivation, standardize their behavior, and enhance their sense of self-worth and responsibility in the process of imperceptible influence.

Satisfaction with IL facility - The degree of satisfaction with information technology equipment particularly impacts college students' information literacy. Kim et al. (2014) found that students' satisfaction with using ICT in the classroom has a particular impact on students' information literacy.

Integrated strategies to improve information literacy of agriculture students in higher education of Yunnan

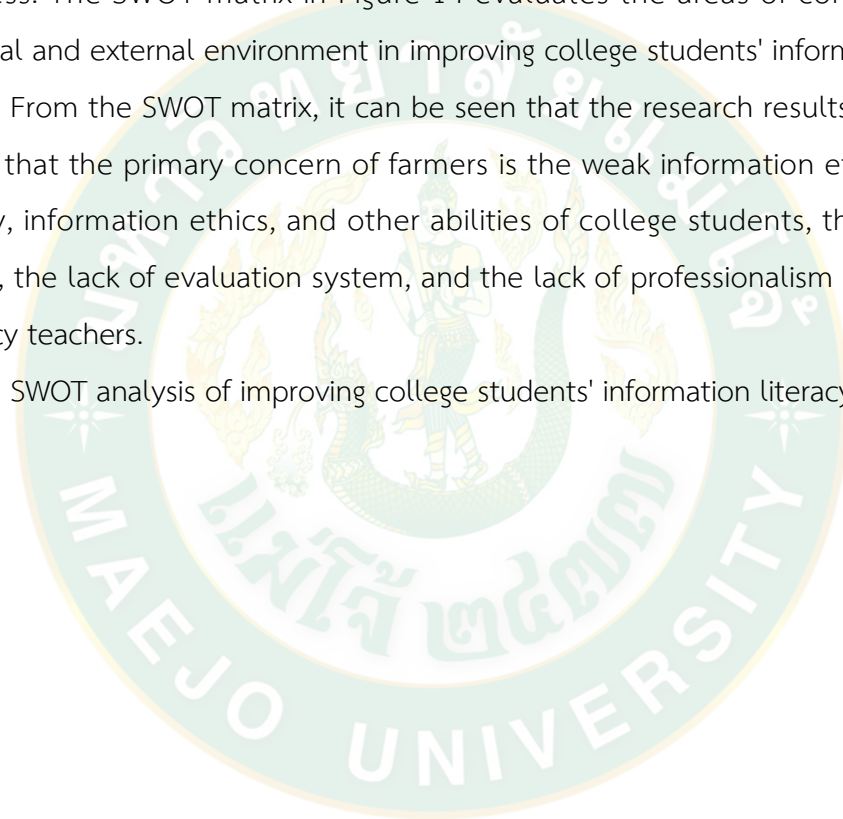
This study used the SWOT matrix to evaluate and process all data collected during face-to-face interviews with respondents, including information collected during group discussions. On September 12-23, 2021, four group discussions were

successfully held in four schools. Before this, a courtesy visit was conducted. An introductory meeting was held with school leaders to introduce and explain the purpose and objectives of the researcher's visit and the upcoming activities.

Participants shared the problems, ideas, views, and experiences encountered in improving college students' information literacy in the group discussion. Then, the researchers prepared a SWOT matrix and classified strengths, opportunities, weaknesses, and threats based on the results obtained during the data collection process. The SWOT matrix in Figure 14 evaluates the areas of concern and the internal and external environment in improving college students' information literacy.

From the SWOT matrix, it can be seen that the research results in this regard show that the primary concern of farmers is the weak information ethics, retrieval ability, information ethics, and other abilities of college students, the shortage of funds, the lack of evaluation system, and the lack of professionalism of information literacy teachers.

SWOT analysis of improving college students' information literacy (Figure 10).



Internal factors

<p>Strengths</p> <p>S1 policy support</p> <p>S2 Abundance of information resources</p> <p>S3 Advantages of specific groups of college students</p> <p>S4 Teachers' information literacy education experience</p>	<p>Weakness</p> <p>W1 college students' information literacy retrieval ability is weak</p> <p>W2 college students have weak awareness of information ethics</p> <p>W3 college students have weak awareness of network security</p> <p>W4 college students are weak in information practice and academic research</p> <p>W5 information literacy teaching mode needs to be innovated</p> <p>W6 Information literacy educators are not professional enough</p> <p>W7 Information literacy education curriculum and content are not specialized enough</p>
<p>Opportunities</p> <p>O1 Smart learning environment support</p> <p>Comprehensive promotion of O2 information literacy education reform</p> <p>O3 Promotion of diversified teaching mode</p> <p>O4 Education informatization continues to advance</p> <p>O5 Implementation of rural revitalization strategy</p>	<p>Threats</p> <p>T1 Lack of information literacy evaluation system for college students</p> <p>T2 students' information literacy level is uneven</p> <p>T3 fund shortage</p>

External factors

Figure 10 SWOT analysis of improving college students' information literacy

Internal evaluation

Strengths

S1 policy support

China attaches great importance to the information literacy education of college students. As early as the 1990s, universities have required to offer the course "Literature". Later, the course name gradually evolved into "Information Retrieval and Utilization." To improve college students' information literacy, the State, the Ministry of Education, Yunnan Province and schools have formulated corresponding action plans and cultivation measures. In 2019, the Ministry of Education issued the "Education Informatization 2.0 Action Plan", which proposed that by 2022, the application level of information technology and the information literacy of teachers and students should be generally improved, and the transformation from improving the application ability of information technology of teachers and students to comprehensively improving their information literacy. Since 2018, the Ministry of Education has for the first time changed the name of "Key Points of Education Informatization Work" to "Key Points of Education Informatization and Network Security Work," clearly putting forward "information literacy" and stressing the importance of information literacy training.

S2. Abundance of information resources

According to the four universities surveyed, all have digital libraries, which include a wide range of collections of documents and many database resources in various forms, including text, images, audio, video, academic journals, and other websites. Massive information resources create an excellent information acquisition environment for cultivating college students' information literacy. The library of Yunnan Agricultural University has 17329.22 million paper books, 6217 paper journals, 333.26 million electronic journals, 2.278 million electronic books, and 31 databases in Chinese and foreign languages. At the same time, it has built a database of degree papers from Yunnan Agricultural University, a database of scientific research papers from YAU, a database of biodiversity in Yunnan, and a database of agricultural culture. It has signed a document delivery service agreement with the National Science and Technology Library and Document Center, CALIS Agronomy Center,

Institute of Botany, Chinese Academy of Sciences and other units; It has six independent learning platforms, three resource libraries, 1 set of practical teaching platform for humanities, economics and management, and 47 sets of various teaching software. SWFU has a collection of 1.9 million paper books, nearly 820000 electronic books, and 22 databases in Chinese and foreign languages. It is a member library of the CALIS Agronomy Center, the National Agricultural University Library, and the Yunnan Provincial University Library. It has established close cooperation with the CALIS National University Document Support Center, the CALIS Yunnan Branch, the National Science and Technology Library and Information Center (NSTL), and other library and information institutions; It has six online teaching platforms and 594 kinds of electronic resources. The library of HHC has a collection of 1.08 million books and 1.8 million e-books. It has seven self-purchased databases, including China Knowledge Network, Weibo Journal, and Superstar. The "Hani research literature database" and "Southeast Asia research literature database" have been initially completed, and the "Yi research literature database" and "Yunnan Vietnam railway literature database," and other local characteristic literature databases are under construction. The school has built a network teaching management platform and teaching resource sharing platform, and introduced a superstar network teaching platform. The library of PEC has 1.136 million books, 113000 e-books, 5 Chinese and foreign databases, and 1T of audio and video resource data. PEC has network teaching platforms, mushroom nail practice system, university foreign language intelligent teaching cloud platform, national curriculum resource center, superstar and other network teaching platforms. According to the survey results, it is confirmed that the teaching resources can meet the learning needs of students. When asked whether the teaching resources of the school can meet the needs of learning, 73% of the students agreed very much, 15% of the students agreed, and 10% of the students generally replied, indicating that 88% of the students thought that the teaching resources provided by the school could meet the needs of learning.

S3 Advantages of specific groups of college students

College students have active thinking, solid executive power, a relatively high education level, and can adapt to information technology innovation and apply the

latest software on time. They are not only the high-frequency users of information but also the beneficiaries of the information age. First, college students have precise needs and goals when using mobile apps, networks, and other new media, such as using the network to obtain information, exchange, and communicate. Give full play to the positive effects of new media, and provide an inexhaustible impetus for colleges and universities to cultivate college students' information literacy. Secondly, as the main body of information literacy education, whether college students have basic information literacy affects the improvement of college students' information literacy to a certain extent. According to the survey and analysis, 84% of the students think they can skillfully use one of the three kinds of software, PowerPoint/Word/Excel, and 16% of the students still disagree or strongly disagree; 83% of the students think they understand "information literacy," while 17% of the students still do not understand "information literacy"; 14% of the students answered that they had written more than one research paper or report. It shows that college students have the essential operation of commonly used software and know information literacy. However, the overall comprehensive ability of information literacy still needs to improve.

S4 Teachers' information literacy education experience

The purpose of information literacy education is to cultivate students' information retrieval skills and computer application technology to improve their understanding of the modern information environment and their consciousness, predictability, and independence in using information, thus improving their comprehensive quality. The four colleges and universities surveyed all taught information technology courses by professional teachers, composed of library staff and full-time teachers of information technology courses. As the document and information center of colleges and universities, the university library has carried out information literacy education for more than 30 years. Through long-term development, the teaching content system is constantly mature and perfect; the teaching staff is more professional and has rich experience in information literacy education; the teaching method is relatively advanced, which has an influential role in promoting college students' information literacy. According to the survey results,

97% of students believe teachers can skillfully use multimedia teaching software (such as PowerPoint, video, and audio) in classroom teaching.

Weaknesses

W1 college students' information retrieval ability is weak

The use of search strategies and the information retrieval ability of college students could be more vital. According to the survey, 61% of students believe that they can independently judge the authenticity, reliability and accuracy of information; It shows that college students cannot select and distinguish correct information from massive data due to insufficient information knowledge reserve, cognitive ability and social life experience. 57% of the students think that they can use Baidu to accurately search out the information they need, while 4% of the students think that Baidu cannot accurately search out the information need; 63% of the students thought that could accurately express the critical words of the required information, while 12% of the students thought that they could not accurately express the critical words of the required information. When asked whether they had used and, or, not and other search symbols for information retrieval, 83% of the students said they had never used them. It shows that college students need help to accurately identify the key words of information, build effective search strategies, and grasp the scope, purpose and quality of information sources.

W2 college students have weak awareness of information ethics

The information morality of college students refers to the ethical requirements, ethical norms, and ethical regulations in information development, information dissemination, information management and utilization, as well as the new ethical relationship formed on this basis. Information morality is mainly embodied in academic information morality and network morality.

Academic information morality mainly reflects the random tampering and falsification of data; Plagiarize and plagiarize others' achievements; When quoting or referring to the achievements of others in the paper, the source is not strictly marked according to the regulations. The survey found that many college students, when writing their papers, quote others' statements in large sections without identifying the

source and use network technology to directly download or randomly assemble them from the Internet in order to complete their assignments or papers; 73% of students think that they will mark the source when quoting others' articles, 25% of students occasionally mark the source, and 2% of students will not mark the source. When asked "how do you use it after searching the relevant information you need online", 9% of the students answered "directly copy and paste", 31% of the students answered "use it after a little processing", and 59% of the students answered "abstract the summary and describe it in their language". 63% of students think that their classmates or friends often use pirated software or books, 30% of students think that their classmates or friends occasionally use pirated software or books, and only 7% of students think that they have never used pirated software or books. These behaviors infringe on the labor achievements of others and are the manifestation of infringing on others' intellectual property rights.

Due to the weak legal awareness of college students in disseminating network information, network crime, network violence, network rumors, and other phenomena occur occasionally. The survey found that 51% of the students thought they were very clear about the relevant laws and policies of information dissemination and use, while 7% still thought they were not clear about the relevant laws and policies of information dissemination and use; 76% of the students agreed to pay attention to observing the network ethics and norms when surfing the Internet, 16% of the students remained neutral, and 8% of the students did not agree. It shows that the information morality of college students is weak, and the cultivation of legal consciousness in the network information dissemination of college students should be strengthened. In recent years, college students' network crime cases have occurred frequently, causing great harm and severe impact on society. The survey found that 37% of college students agreed to "never receive any unverified information from friends", 41% held a neutral attitude, and 22% held a negative attitude. All these indicate that college students need help distinguishing network information's authenticity.

W3 college students have weak awareness of network security

While information technology promotes social development and progress, various challenges and crises are everywhere. Due to the lack of network security awareness, college students are prone to information security, information disclosure, information fraud, information attack, and other behaviors in the process of using network information, which not only endangers the personal safety of information users but also endangers the international and social security. According to the survey, 81% of the students think they pay great attention to protecting personal privacy information while surfing the internet, but 19% still do not include personal privacy information; 84% of students think they often receive spam or harassing calls. It shows that students' awareness of information security and self-protection needs strengthening. Some students said personal privacy disclosure occasionally occurred in network sharing and communication. According to the speech of the relevant personnel of the Chengdu Municipal Procuratorate, based on the data of the telecom network fraud cases in Chengdu in 2020, from the perspective of age, the proportion of people under 20 years of age is 3%, the proportion of people between 20 and 30 years of age is 59%, the proportion of people between 30 and 40 years of age is 25%, the proportion of people between 40 and 49 years of age is 9%, the proportion of people between 50 and 59 years of age is 3%, and the proportion of people over 60 years of age is less than 1%. Young people are the most deceived group; Regarding occupation, students accounted for 6.7%; Regarding gender, 38% of men and 62% of women were cheated. In a speech, the relevant personnel of the Chengdu Youth League Municipal Committee said: "In 2020, there were 65 universities and more than 1 million college students in Chengdu. According to a sample survey, about 38% of college students had received telecommunications fraud calls, short messages, or other forms of information. The fraud content mainly includes education refunds, online shopping, part-time recruitment, and selling exam cheating tools."

W4 college students are weak in information practice and academic research

According to the survey, the ability of college students to apply information synthesis to practice and research could be more vital. From the evaluation of the information literacy level of college students, among the five standards, the average score of academic research ability of college students is the lowest, especially the academic research ability of college students is lower and at a low level. The second is college students' inquiry ability. The inquiry ability of junior college students is also at a low level. When students were asked that they had written one or more research papers or reports, 22.9% of them thought they disagreed very much, 47.5% of them disagreed, 18.4% of them were neutral, and only 11.2% of them agreed; The students answered "know how to write a research paper or report." 17.4% of the students thought they disagreed very much, 44.8% of the students thought they disagreed, 17.9% of the students said they were neutral, and only 19.9% of the students agreed. When asked whether college students often participate in project cooperation or know how to do research, 85.2% of students gave a negative answer. From the interview, the teachers in the classroom mainly focus on theoretical teaching, lack practical education, lack practical guidance for teachers, and few opportunities for field study and participation in project research. Many factors lead to the weak information practice research ability of college students. Universities should build a practice support platform for information literacy practice, provide more practice opportunities, guide students to participate actively, and cultivate students' information practice and research ability.

W5 information literacy education model needs to be innovated

In the era of information 2.0, whether teachers can actively develop teaching resources, properly design teaching processes, effectively organize teaching activities, and accurately evaluate students' learning achievements is very important for improving college students' information literacy. According to the four universities surveyed, the teaching methods are mainly traditional, and the innovative teaching modes (such as micro-class, flipped class, SPOC, online teaching, etc.) are few. 63% of the students think that teachers mainly use online and offline teaching methods

to carry out teaching, but 37% of the students still think that teachers mainly use traditional teaching methods, indicating that some teachers still use classroom teaching and PPT presentation mainly to teach the acquisition and utilization of information resources at a fixed time and a designated place. 71% of the students think that the teacher mainly uses group discussion, design, or report to assign homework, which shows that the teacher pays attention to classroom theory teaching—however, the practice after the class needs to be improved. Students passively accept knowledge and information, which is not conducive to absorbing and internalizing knowledge. Students' autonomous learning ability and information awareness are challenging to improve.

W6 Information literacy educators are not professional enough

With the advent of the era of information and big data, the role of university educators must also be repositioned. University educators are no longer the class leaders with complete information but more of a guide and guides in the online learning environment. They should reflect their unique characteristics. Through creative education activities, teachers can impart knowledge, transmit ideas, and teach and educate people. The purpose of education is to cultivate the educated to be dynamic, conscious creators. Professor Ye Lan, a famous educator, said: "The goal of education is to become adults and achieve people. Teachers' career is to educate people, and personality is an important quality that teachers impart to students, not just simple professional knowledge." When dealing with information and data on campus, a university educator gives students positive or negative feedback, beneficial or harmful effects. Both can directly or indirectly affect the cultivation and improvement of students' information literacy. As Professor Ye Lan advocates, the positive development of human beings is closely related to teachers' education. In the process of understanding, selecting, using, evaluating, reflecting, and creating information, university educators' words and deeds can impact college students' information literacy. Even university educators can lead and guide college students to create a spiritual force and spiritual wealth in the information age, which will "transform" the teachers' thoughts and gains to students so that college students can understand, select, use, evaluate, reflect Become an active subject in the process of

creation. In addition to the essential information ability, university teachers must fully play the role of "teacher" and "educating" in the information literacy education of college students. The constituent elements of university educators' information literacy include basic information literacy, teaching literacy of integrating information technology, professional development literacy, and ethical and moral literacy. That is, college teachers should have correct information awareness, use effective search strategies to obtain relevant information, and evaluate and organize information; The teaching ability and skills needed to integrate teaching resources with information technology for thematic teaching; Develop basic information literacy into lifelong learning ability and continuously improve professional knowledge and skills; Strong awareness of information ethics, access and use of digital resources in a sustainable, safe and ethical manner. Yu Yang's research found that most teachers can skillfully operate the editing of Word documents, the production of PPT, and the editing of Excel tables. According to the survey, 72% of the students and teachers pay attention to the novelty of the cited documents and mark the source of the quotations in the teaching process; It shows that teachers have basic information literacy, but their ability to effectively use information technology and resources for classroom teaching needs to be improved; It needs to be strengthened to make the best use of information-based teaching facilities and enable students to successfully master the knowledge of teachers' teaching in a short time; The level of information ethics needs to be improved.

W7 Information literacy education curriculum and teaching content are not specialized enough

Currently, most of the courses related to information literacy in universities focus on learning and applying computer and network technology. In contrast, the teaching of sentiment and insight into the positive and negative effects of network is relatively small. Nowadays, college students should take computer courses. In the past, junior and senior high school and introductory courses, such as Introduction to computer setup at the time of college entrance, are almost only taught from cognitive computer knowledge and network technology application. They often need more value and meaning in passing credit information to students for society, college

student's growth, and how to improve information literacy and become qualified citizens. With the development of science and technology, contemporary college students have a lot of knowledge and skills to acquire network information. However, they still laced to gain ethical awareness of information and even lack an understanding of the basic concepts of information literacy.

On the one hand, the place and content of education are limited. The education place for college students' information literacy in most universities in China is still defined only in the library, limited to the document retrieval course, rather than generalized to the whole process of higher education. On the other hand, the current education of information literacy in universities also focuses on computer skills, and cultivating information ability could be more vital. Major universities' information literacy education courses remain at the level of introductory public and general elective courses. The main teaching contents include education on how to use the library and college students' simple information retrieval ability. Generally, they focus on teaching retrieval methods and retrieval technology of the Chinese and foreign language databases purchased by the library and ignore the teaching of critical contents such as information resources, information awareness, and information ethics. The teaching content of information literacy courses offered by students at different levels is the same, but the proportion of each part is different, which fails to well penetrate and integrate with different disciplines and majors; In the information age, with the rapid increase in the number of information, the diversity of information forms, and the continuous expansion of the connotation of information literacy, the traditional information literacy education curriculum and teaching content are far from meeting the development of the information age.

Opportunities

Opportunities are an external factor that enables significant stakeholders such as teachers, teaching staff, information professionals, and managers to improve students' information literacy by taking advantage of opportunities.

O1 Smart learning environment support

The Education Informatization 2.0 Action Plan issued by the Ministry of Education requires the realization of "broadband network school-to-school connection" to achieve speed increase and intelligence increase, all schools are connected to the Internet, the bandwidth meets the needs of information teaching, and wireless campus and intelligent equipment applications are gradually popularized. The public service platform of educational resources and the public service platform of education management have achieved integrated development. Today, with the rapid development of information technology, mobile devices (smart phones, tablets) are increasingly popular in daily life and the coverage of wireless networks is broadened. College students can register online anytime and anywhere, regardless of time, location, or network environment. Universities can use the WeChat public platform and mobile digital library to teach information literacy, improve user information awareness, and improve user information literacy.

It is reported that the average rate of fixed broadband and mobile traffic in China in 2020 will drop by more than 95% compared with 2015, and the average network rate will increase by more than seven times. The four universities surveyed have completed the construction of an innovative campus, which provides a decisive prerequisite for cultivating information literacy. "Internet plus education" has attracted more and more attention. Online courses, digital newspapers, and innovative libraries are all integrated and optimized resources of various school departments based on information technology, providing integrated and innovative learning environments for college students and sharing high-quality teaching resources from all over the world, which has virtually improved students' information literacy. From the survey results, 88% of the students answered when asked whether they could access the network anytime and anywhere.

O2 information literacy education reform is comprehensively promoted

In February 2015, the Council of the American Association of University and Research Libraries (ACRL) formally approved the Framework for Information Literacy in Higher Education. The report pointed out that information literacy is no longer a single concept for information but a variety of skills, including media, visual, and data

literacy. The proposal of the Framework puts forward higher requirements for information literacy education in China, and domestic colleges and universities have carried out information literacy education reform one after another, trying to reform information literacy education in multiple ways and means, such as teaching content, teaching form, and teaching methods, to improve students' information literacy. China has attached great importance to information literacy education at all levels and is continuing to promote information literacy education. Since the 1990s, the "literature" curriculum has developed into the current multi-level and multi-form information literacy curriculum. In 2014, the Ministry of Education established a humanities and social science project to study the impact of data literacy. The library of Peking University has improved the information literacy system, which puts forward three significant literacy connotations: digital, media, and data. In 2016, in the 13th Five-Year Plan for Education Informatization, the education system built in the information literacy strategy reflected the characteristics of lifelong, digital, and personalized and better enhance the information literacy of teachers and learners. In 2016, the Ministry of Education of the People's Republic of China issued the overall Framework of the "Core Literacy of Chinese Students Development," which is centered on the "all-round development of people," divided into three aspects, six core literacy elements, and 18 specific literacy indicators. The release of this literacy framework marks that China has entered the era of quality evaluation from the "competence standard" to the "literacy framework." In 2017, China issued the New Generation AI Development Plan, emphasizing the implementation of AI education for all, which also put forward higher and more specific requirements for the ability composition of college students' information literacy. Chen Baosheng (2018) strengthens network capacity and achieves the fundamental goal of establishing morality and cultivating people in colleges and universities, promoting information technology education in universities. By relying on network equipment and conforming to the connotation standard of "ability technology=network strength," he can improve the information dissemination ability in colleges and universities. The

network strength must be grounded and conforms to a certain rhythm to better serve college teachers and students.

O3 Promotion of diversified teaching mode

In 2001, the Ministry of Education issued the Tenth Five-Year Plan of National Education, which proposed to reform teaching methods and methods, build a teaching team that meets the needs of educational informatization, and promote all kinds of schools at all levels to make full use of modern information technology to improve teaching methods and methods. In 2016, the Ministry of Education issued the Opinions on Running an Open University Well, emphasizing modern information technology to develop new achievements, gather high-quality education resources, enrich education and teaching methods, and innovate talent training models. Teachers are encouraged to use information technology to innovate teaching methods and means and integrate disciplines. In 2013, MOOCs officially entered China and integrated information literacy education with MOOCs. Major universities in China have successively provided large-scale open online courses. More and more users can use the Internet to learn high-quality courses from all over the world and universities; many teachers try to use a variety of teaching modes, such as mixed teaching, flipped classroom teaching, and visual learning. Abundant online courses and diversified teaching modes help improve college students' information literacy.

O4 Education informatization continues to advance

In education, new information technology has given birth to a new type of education ecology, changing the education and teaching mode, teaching environment, teaching objects, and teaching content. To this end, China has issued several policy documents to emphasize the vital role of education informatization and put forward practical planning measures to accelerate the process of education informatization and achieve the goal of cultivating new intelligent talents. For example, the Ministry of Education issued the Ten-year Development Plan of Education Informatization (2011-2020) in 2012, which pointed out that "give full play to the supporting and leading role of education informatization in education reform and development, guide the innovation of education concepts and education models with informatization, and strengthen the comprehensive and deep

integration of modern information technology and education." The Education Informatization 2.0 Action Plan issued by the Ministry of Education in April 2018 clarifies that education informatization is the primary connotation and significant feature of education modernization. The Education Informatization 2.0 Action Plan is an effective way to accelerate education modernization. At the same time, the Education Informatization 2.0 Action Plan puts forward higher requirements for teachers' information literacy, from improving teachers' information technology application ability to comprehensively improving teachers' information literacy. Based on this, in 2019, the Ministry of Education launched the first batch of intelligence in China, with the overall improvement of teachers' and students' information literacy as an essential goal of constructing the demonstration zone. College teachers shoulder the dual mission of cultivating talents, scientific research, and innovation and are the key group in promoting education informatization. Maximizing the intrinsic potential of college teachers is the key to accelerating the process of educational informatization. Under the new information technology environment, university teachers should deeply understand the requirements of the era of education informatization, keenly perceive the new characteristics of the new education ecology, understand and master the connotation and knowledge structure of university teachers' information literacy, and strive to improve their information literacy level. Promoting and developing university teachers' information literacy is a critical way to comprehensively improve the level of university teachers' information literacy and accelerate the process of education informatization.

O5 Implementation of rural revitalization strategy

Implementing the strategy of rural revitalization and promoting agricultural and rural modernization is a major strategic deployment for building a moderately prosperous society in all respects and building a socialist modern power. Since 2004, the No. 1 central document has focused on "agriculture, countryside and farmers" for 18 consecutive years.

On February 23, 2021, the General Office of the CPC Central Committee and the General Office of the State Council issued the Opinions on Accelerating the Revitalization of Rural Talents, which pointed out that accelerating the revitalization

of rural talents and cultivating a "three rural" working team that "understands agriculture, loves rural areas and farmers" are not only the work requirements deployed by the central government but also the urgent needs of the grass-roots practice. According to the statistical results of the National Bureau of Statistics, the national population at the end of 2021 will be 1412.6 million, including 498.35 million rural permanent residents, accounting for 35.28% of the total population, and a large proportion of rural permanent residents. Therefore, the key to building a well-off society in an all-round way is to solve the problems of "agriculture, rural areas and farmers." The key to solving the problems of "agriculture, rural areas and farmers" is to implement the rural revitalization strategy, which needs a team of rural talents who "understand agriculture, love the countryside, and love farmers."

The overall quality of China's modern agricultural talent team could be better, the talent structure could be more reasonable, and the brain drain is serious, which will affect the promotion of agricultural modernization and the implementation of a rural revitalization strategy. The proportion of ordinary human capital of junior high school and below is too large, the skilled human capital of senior high school and technical secondary school is short, and the innovative human capital of junior college and above is very scarce; Professionals who understand technology and management are scarce.

Agricultural colleges and universities shoulder the historical mission of cultivating modern agricultural talents. Agricultural college graduates are the leading force in implementing rural revitalization, promoting the development of modern agriculture, and solving the "three rural" problems, which is of great significance to the development of modern agriculture. At present, the cultivation of agricultural talents and the demand and supply of agricultural talents do not match, and the phenomenon that farmers do not love agriculture and do not work in agriculture is becoming increasingly prominent. The cultivated agricultural talents cannot effectively connect with the regional economic development, the professional knowledge and ability structure cannot meet the job demand, the theory and practice are out of line, and the shortage of complex and practical talents urgently needed for agricultural modernization still exists therefore, how to effectively solve

relevant problems and improve students' agricultural professional skills and practical ability in order to meet the needs of modern agricultural production. Implementing the rural revitalization strategy and promoting agricultural modernization have created conditions and provided a stage for the practice of college students, which is conducive to improving the information literacy level of college students.

Threats

Threats are external factors, the most difficult to solve, and uncontrollable.

T1 college students' information literacy evaluation standard is missing

With the continuous application of information technology, most countries in the world attach particular importance to the development of information technology in that country, which can increase its international status and enhance the overall quality of its citizens. Moreover, some developed countries, such as the United States and Japan, have begun to integrate information literacy courses into the content of national education courses. The information literacy education support system has become increasingly perfect. Regarding formulating information literacy education standards, China still needs to issue a unified standard, hindering the promotion of information literacy education.

Currently, many studies evaluate college students' information literacy at home and abroad. For example, in 2001, the Association of American and University Research Libraries (ACRL) issued the Evaluation Standard of Information Literacy in Higher Education, which has developed a comprehensive and detailed standard framework for the evaluation of information literacy, and is the most authoritative, representative and most widely used information literacy evaluation standard at present. The standard mainly includes five first-level indicators, 22 second-level indicators and 86 third-level indicators. In 2015, ACRL formulated and issued the Framework for Information Literacy in Higher Education, which provides a theoretical basis for the adaptability and matching of higher education and the information ecosystem. Information literacy is "a set of comprehensive capabilities, including the reflective discovery of information, the understanding of how information is generated and valued, and the use of information in creating new knowledge and

participating in learning community moral activities." The United Kingdom, Australia, New Zealand and other countries have also established general information literacy evaluation standards that meet their national conditions. For example, the British National and University Library Association proposed the information literacy standard and built a 7-element competency standard model of information literacy based on this standard. The ACRL Science and Technology Sub-Committee has formulated the Standard for Scientific and Technological Information Literacy (draft), which stipulates students' information literacy abilities in specific fields such as academic activities and knowledge innovation, to improve the professional information literacy abilities of students, workers, and researchers. The research on information literacy standards in China started relatively late. The most influential evaluation standard of information literacy in China is the Information Literacy Competence Index System of Universities in Beijing jointly developed by Tsinghua University Library and Beijing University of Aeronautics and Astronautics Library, composed of 7 first-level indicators, 19 second-level indicators and 61 third-level indicators.

Currently, a scientific and universal evaluation standard for college students' information literacy has yet to be formed in China, which brings difficulties and challenges to evaluating college students' information literacy level. It restricts the development of college students' information literacy education to a large extent.

T2 students' information literacy level is uneven

The teaching objects of information literacy education in colleges and universities are students of different levels, majors, and grades. There are differences in the ability of college students to use academic information resources to conduct academic research. According to previous research, there are differences in the information literacy and information needs of college students from different academic backgrounds. The first-grade students need better information awareness, and the second and third grade students have mastered the preliminary information retrieval methods, senior students need to write graduation thesis. Therefore, in the process of information literacy teaching, related courses should be carried out according to the different information needs of different disciplines and grades.

T3 fund shortage

The cultivation of information literacy needs to create an excellent, intelligent learning support environment, and the school needs to purchase a large number of digital resources, literature resources, hardware equipment, network teaching platform, and teaching resources, which all require a large amount of funding. Since the project is targeted at local college students, the government has limited funding for local colleges and universities; At the same time, with the arrival of the era of digital resources, the purchase price of electronic resources continues to rise, increasing the budget of university library funds year by year. Under limited teaching investment, schools generally increase the purchase budget of electronic resources by compressing the purchase budget of paper resources but still need help to afford the sharp increase in the price of databases year after year. The electronic resources of university libraries are facing the problem of storage, and the massive digital resources need huge storage space. The digital resources built by teachers' self-built teaching resources, courseware and scientific research works are of great academic value but also exacerbate the problem of insufficient storage space for school electronic resources. It is urgent to purchase large-capacity storage equipment.

As early as 2010, Zhejiang University Library joined forces with more than 30 university libraries to boycott the sharp price increase of Elsevier; at the beginning of 2016, the Peking University Library proposed to boycott the continuous price rise of CNKI (China Knowledge Network), while seeking alternative open access resources. The sharp increase in the price of data vendors has brought enormous financial pressure to university libraries, prompting them to reduce costs through joint procurement and resource sharing to improve the information resource guarantee capacity required for teaching and research while increasing the investment in digital resources.

Currently, most of the teaching content of information literacy involves using Chinese and foreign language databases. The cost of purchasing such databases is relatively high; especially the price of English databases has continued to rise in recent years. Some university libraries usually prioritize purchasing more commonly

used Chinese databases, reducing the number of purchasing English databases, and making it difficult to carry out the teaching tasks, related to English database chapters in the traditional teaching of information retrieval courses.

Construct the TOWS analysis of the improvement of college students' information literacy

The SWOT analysis analyzed the advantages, disadvantages, opportunities and threats of agricultural college students' information literacy improvement. We quoted the TOWS analysis method to analyze the strategies of improving agricultural college students' information literacy, making the proposed strategies more objective, systematic and reliable. The TOWS analysis method was proposed by Weirich, an American strategic management scholar, in 1982 to solve some of the problems encountered in SWOT analysis. Its basic principle: the system can use this analysis and decision-making technology to give full play to its advantages, overcome disadvantages, avoid threats, and grasp development opportunities. As shown in Figure 11, the consistency and mutual adaptation of the system's internal and external factors can give managers and decision-makers a clearer understanding of the development of the system and formulate corresponding development strategies based on this. The first step is to examine the environment, mainly to improve the internal and external environment of college students' information literacy. ① Determine the indicator system to identify the opportunities, threats, advantages, and disadvantages faced by improving college students' information literacy. ② Conduct expert evaluation to determine the score and weight of each factor. ③ Determine the internal and external factors for improving college students' information literacy. In order to avoid the influence of individual expert opinions, Delphi method can be applied. The second step is to arrange the above factors according to the priority or influence degree, and build the TOWS matrix. Its guiding ideology is to give full play to the advantages of improving college students' information literacy, overcome the weak factors, take advantage of the opportunity factors, resolve the threat factors, based on the current, and focus on the future. Under the guidance of this thought, the various factors in the matrix are matched

and analyzed using the comprehensive method of system analysis, and a series of optional development strategies to improve college students' information literacy is obtained.

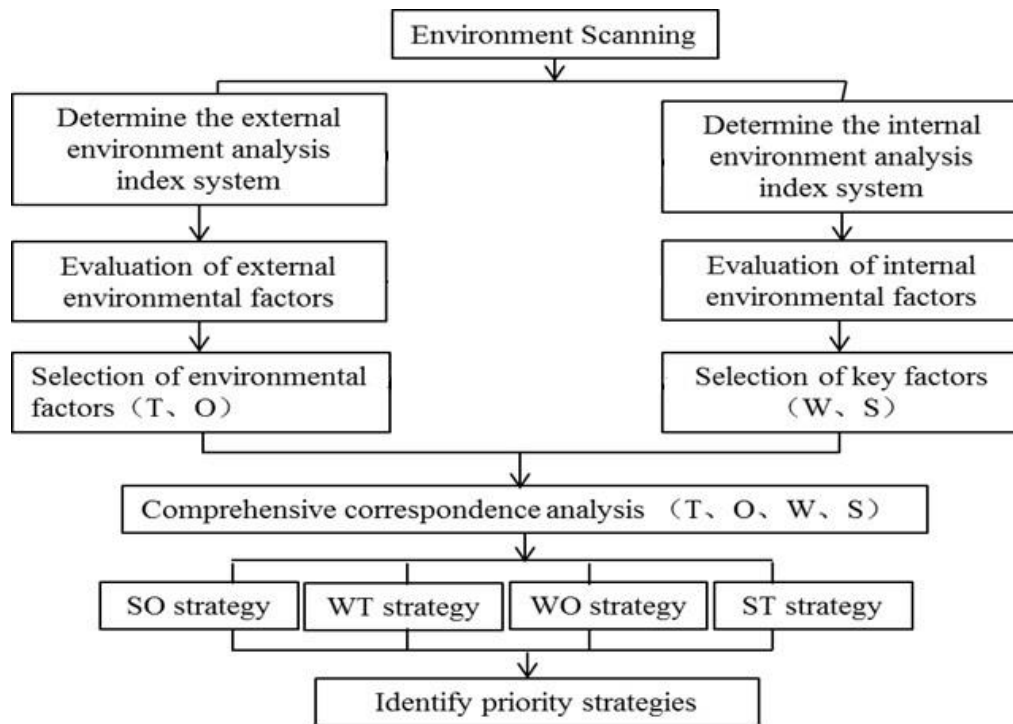


Figure 11 TOWS analysis of the strategy of improving college students' information literacy

Strengths-Opportunities Strategy (SO). Focus on the advantages and opportunities of improving college students' information literacy, to maximize both benefits, namely the "Maxi-Maxi" principle.

Weaknesses- Threats Strategy (WT). Focus on the weak and threatening factors to improve college students' information literacy and strive to minimize the adverse effects of both, which is the "Mini-Mini" principle.

Weaknesses -Opportunities Strategy (WO). Focus on the weak and opportunity factors to improve college students' information literacy, and strive to minimize the negative impact of the former and maximize the beneficial impact of the latter, which is the "Mini-Maxi" principle.

Strengths-Threats Strategy (ST). Focus on the advantages and threats of improving college students' information literacy, and strive to maximize the benefits of the former and minimize the adverse impact of the latter, which is the "Maxi-Mini" principle.

The third step is prioritizing strategic choice, as shown in Figure 12. The four strategies derived from cross-matching system advantages, disadvantages, opportunities and threats are not the final strategic choices for improving college students' information literacy. To determine the final strategy, we must consider the impact of non-key factors on college students' information literacy to make the selected strategy for improving college students' information literacy feasible.

		Internal factors	
External factors		S 1. 2. 3.	W 1. 2. 3.
	O 1. 2. 3.	SO strategy Take advantage of opportunities Exert advantages	WO strategy Take advantage of opportunities Overcoming disadvantages
	T 1. 2. 3.	ST strategy Take advantage of advantages Avoiding threats	WT strategy Overcoming disadvantages Avoiding threats

Figure 12 TOWS Analysis Matrix

Strategies for improving information literacy of agricultural college students

According to the theoretical analysis of TOWS, the main factors affecting the improvement of agricultural college students' information literacy are identified from the external and internal factors, opportunities, threats, strengths, and weaknesses.

The second step is to use expert evaluation to determine the evaluation value and weight of the four factors. The evaluation matrix of internal and external environmental factors for improving college students' information literacy is obtained, as shown in Table 21 and Table 22.

Table 21 Evaluation of internal influencing factors of information literacy improvement of Yunnan agricultural university students

Internal factors – Strength (S)	Weight	Evaluation value	Comprehensive evaluation value
S1 policy support	0.3	3	0.9
S2 Abundance of information resources	0.2	2.5	0.5
S3 Advantages of specific groups of college students	0.35	3	1.05
S4 Teachers' information literacy education experience	0.15	2	0.3
Total	1		2.75
Internal factors -Weak (W)	Weight	Evaluation value	Comprehensive evaluation value
W1 college students' information literacy retrieval ability is weak	0.15	3	0.45
W2 college students have weak awareness of information ethics	0.2	3	0.6
W3 college students have weak awareness of network security	0.2	3	0.6
W4 college students are weak in information practice and academic research	0.15	2	0.3
W5 information literacy teaching mode needs to be innovated	0.1	2	0.2
W6 Information literacy educators are not professional enough	0.1	1	0.1
W7 Information literacy education curriculum and content are not specialized enough	0.1	2	0.2
Total	1		2.45

Table 22 Evaluation of external factors influencing the improvement of information literacy of Yunnan agricultural university students

External factors – Opportunity (O)	Weight	Evaluation value	Comprehensive evaluation value
O1 Smart learning environment support	0.25	2	0.5
O2 Comprehensive promotion of information literacy education reform	0.25	2	0.5
O3 Promotion of diversified teaching mode	0.2	2	0.4
O4 Education informatization continues to advance	0.1	2	0.2
O5 Implementation of rural revitalization strategy	0.2	2	0.4
Total	1		2
External factors –(Threaten)	Weight	Evaluation value	Comprehensive evaluation value
T1 Lack of information literacy evaluation system for college students	0.4	2.5	1
T2 students' information literacy level is uneven	0.3	1	0.3
T3 fund shortage	0.3	2	0.6
Total	1		1.9

Based on the above analysis results, the total value is obtained from the weight and evaluation value. The influencing factors with low comprehensive value in the internal and external environment are eliminated. The influencing factors for improving the information literacy of college students are determined: S3, S1, S2, S4, W2, W3, W1, W4, W5, W7, O1, O2, O3, O5, T1, and T3. The above 15 factors are arranged according to the total value. The TOWS matrix is constructed, Form four potential strategic options (SO strategy, ST strategy, WO strategy, WT strategy), seize their advantages, overcome weaknesses, take advantage of opportunities, resolve

threats, consider the implementation of the strategy, and finally determine ten strategies (Figure 13) to improve the information literacy of college students.

	Strengths (S)	Weakness(W)
	Policy support Abundance of information resources Advantages of special groups of college students Teachers' information literacy education experience	College students' information literacy and retrieval ability are weak College students have weak awareness of information morality College students have weak awareness of network security College students are weak in information practice and academic research The teaching mode of information literacy needs to be innovated Inadequate specialization of information literacy education curriculum and content
Opportunities Smart learning environment support Comprehensive promotion of information literacy education reform Promotion of diversified teaching mode Implementation of rural revitalization strategy	SO strategy 1. Promote the professionalization of college students' information literacy teachers 2. Continue to promote the construction of smart campus 3. Build information literacy practice teaching platform	WO strategy 1. Create a self-education environment and atmosphere for college students' information literacy 2. Build a teaching system with deep integration of general education, professional education, second classroom education and information literacy education 3. Build a diversified information literacy teaching model
Threats (T) Lack of information literacy evaluation system for college students Shortage of funds	ST strategy 1. Develop the evaluation system of college students' information literacy indicators 2. Build a digital resource co-construction and sharing platform	WT strategy 1. Create an atmosphere for the whole society to participate in the information literacy education of college students 2. Give full play to the positive energy of the network

Figure 13 Strategies for improving college students' information literacy

Strategy 1: Promote the professionalization of college students' information literacy teachers

Professor Ye Lan, a famous educator in China, said: "The goal of education is to become adults and achieve people. The career of teachers is to educate people. Personality is an important accomplishment that teachers impart to students, not just simple professional knowledge." Therefore, the influence of university educators on students is more important than teaching professional knowledge but also shapes students' personality and character. The level of teachers' information literacy directly or indirectly affects students' information literacy formation and improvement. Therefore, it is imperative to improve the information literacy level of university educators.

Under the influence of "new intelligence" and education informatization 2.0, integration and innovation are the characteristics of education informatization. University teachers must keep pace with the times and continue improving their information literacy level.

First, colleges and universities should build a backbone teacher team with strong professional background, and a large discipline span, integrating technology, service, teaching, data analysis, resources and platform construction, and improve the structure of professional teachers.

The second is to strengthen the training and practice of teachers' information literacy level. Establish a multi-level training mechanism to target the training, strengthen teachers' information thinking, enhance information awareness, and improve teachers' professional and information literacy. Strengthen teachers' teaching leading ability. Carry out case operation and analysis through expert guidance and explanation, apply knowledge and teaching theory to front-line teaching; digest, absorb and understand teaching points in solving practical problems, enhance teachers' information literacy level, and become the promoters of improving college students' information literacy.

Third, teachers are no longer just the defenders and authorities of knowledge and information in information literacy education for college students. However, more importantly, they should give full play to their role in educating people and

become the organizers, leaders and regulators of student growth. Therefore, teachers spread positive energy in the education and teaching process, set an example, do not touch the moral bottom line, and resolutely resist academic misconduct. Guide students to restrict their information behavior and abide by laws and regulations. Schools can train teachers in information ethics, attach importance to it from the ideology perspective, and then impart information ethics to students so that students can consciously follow it. Under the guidance of teachers' demonstration, more and more students have obtained extensive and comprehensive knowledge, which helps improve college students' information literacy.

Fourth, the leadership and management of colleges and universities should attach great importance to the establishment and improvement of various management systems conducive to the implementation of information literacy evaluation activities, carefully arrange various evaluation activities, develop a scientific evaluation system of teachers' information literacy, and promote the institutionalization and normalization of teachers' information literacy evaluation. When evaluating, we should pay attention to the diversification of subjects, the diversification of evaluation methods, and the timeliness of the feedback of evaluation results.

Fifthly, the school should improve the information literacy assessment, evaluation, and incentive mechanism to clarify the school policy guidance and stimulate the internal motivation of teachers to improve information literacy. The school will give priority to good projects and works through project selection, work display, and other forms, and give spiritual or material rewards to teachers who have made remarkable achievements in information technology in the process of education and teaching; Set up teaching and research projects on information literacy education, encourage and support teachers to use various information technologies to carry out teaching activities, carry out information literacy education research, and improve teachers' current information technology level. At the same time, it is organically combined with teachers' evaluation of excellence, professional title and position promotion to mobilize teachers' internal drive.

Sixth, build a platform for teachers' information literacy exchange and discussion. In order to effectively improve teachers' information literacy, we should take the LAN as the carrier, and build a teaching and research activity platform through reasonable use of campus network resources. Colleges and universities should regularly organize teaching and research activities to discuss and share successful cases and experiences of information-based teaching, to turn their private courses into high-quality, public, and online courses. Teachers regularly watch information technology-related training videos to improve teachers information literacy.

Strategy 2: Continuously promote the construction of smart campus

China's education has entered the era of informatization 2.0, marking the beginning of a new era of China's education informatization. The development of education informatization with Chinese characteristics is shown in front of the education informatization industry. In 2012, the ten-year development plan issued by the Ministry of Education insisting on promoting the development of higher education with informatization can improve its education quality and realize the trend of informatization of higher education. With the continuous development of information technology, artificial intelligence and other high and new technologies, the rapid development of network technology and the increasing popularity of intelligent terminal equipment have created a new educational environment for modern education and teaching, affecting the traditional training mode, teaching form, teaching content and learning methods.

China's Education Modernization 2035, issued by the CPC Central Committee and the State Council, regards "improving the cultivation and innovation ability of first-class talents" and "accelerating educational reform in the information age" as two of the ten strategic tasks. It has established precise requirements for university talent training mode and intelligent campus construction. Through the construction of intelligent campuses, colleges and universities create a campus environment in which everyone can learn, can learn at all times, and can learn everywhere. Relying on smart classrooms, online teaching platforms, campus social networks, and other information technology platforms, accelerate the promotion of talent training mode,

and realize the organic combination of large-scale education and personalized training; Boost the reform of teaching mode, create an effective classroom, stimulate students' interest in learning and desire for knowledge, improve their self-management ability, and enable them to learn actively.

The construction of an intelligent campus should focus on how to realize the integration of services, the co-construction, and sharing of digital resources, improve the defense ability of network systems, and make management precise and decision-making scientific:

By continuously strengthening the construction of campus network infrastructure, we can achieve the full coverage of campus wired and wireless network access, and the network is stable and smooth; Thoroughly remove browser barriers, continue to promote the construction of mobile terminals and new media, and improve user experience.

Colleges and universities should take the continuous promotion of education informatization as an opportunity to build a network teaching platform, build a digital teaching environment, and provide environmental support for digital teaching.

Strengthen the construction of data centers, promote the establishment of information resources co-construction and sharing platforms, and realize the effective use of resources.

Strengthen the construction of network information security, promote the normalization of network information security work, earnestly fulfill network security responsibilities, and improve information security defense capabilities.

Build a comprehensive data analysis system to support school governance decisions academically.

Strategy 3: build a practical teaching platform for information literacy and consolidate the information literacy ability of college students

Implementing the rural revitalization strategy needs to create a modern agricultural talent team that "understands agriculture, loves rural areas and farmers." Because of the mismatch between the cultivation of agricultural talents cultivated by colleges and universities and the demand for agricultural talent, the phenomenon

that farmers do not love agriculture and do not work in agriculture is increasingly prominent; the cultivated agricultural talents cannot effectively connect with the development of regional economy, the professional knowledge and ability structure cannot meet the post demand, the theory and practice are out of line, and the shortage of complex and practical talents urgently needed for agricultural modernization.

First, give full play to the advantages of disciplines and disciplines to build a high-level practice base. Build several comprehensive sharing practice teaching bases and give full play to the comprehensive education function of the base. Integrate and optimize practical teaching resources, systematically build high-quality teaching platforms in agricultural and forestry colleges, expand and enrich practical teaching places, and provide practical teaching platforms for agricultural students to exchange, acquire and disseminate information, and cultivate students' information practice ability and innovation awareness.

The second is to build a discipline competition platform to cultivate students' information expression and dissemination abilities. Through holding agricultural knowledge contests and popular science activities, explain the characteristics of various plants to teachers and students, and popularize plant science knowledge. It can help students identify plant varieties and characteristics, consolidate theoretical knowledge, and improve students' information integration and expression ability. More importantly, understand and publicize teachers' advanced technology and achievements and lay a solid foundation for future agriculture-related work.

Third, relying on the rural revitalization organization platform, actively participate in the construction of agricultural modernization, invite experts from agriculture-related enterprises to give special lectures, encourage students to go deep into farmers to carry out practical teaching activities, make agricultural students familiar with modern agricultural technology, improve students' awareness and recognition of the specialty, and cultivate new talents who know agriculture and love agriculture. For example, after 23 years of innovative practice, the Academy of Science and Technology has formed a team led by academicians, with teachers and students stationed at the production line, focusing on the bottleneck of agricultural

technology, coming from production to production, and realizing the "four zero model" of zero distance, zero threshold, zero cost, and zero time difference, realizing the close combination of teaching and education, field and classroom, theory and practice, scientific research and promotion, innovation, and service, Radiate and promote the reform of college students' training mode in agriculture-related colleges and universities across the country, cultivate and cultivate a group of new talents who know and love agriculture with equal emphasis on feelings and skills and face the green development of agriculture, and help the comprehensive implementation of the rural revitalization strategy.

Strategy 4: create a self-education environment and atmosphere for college students' information literacy

In the information literacy education of college students, the endogenous motivation of college students is the key, so how to stimulate the endogenous motivation of college students, actively and consciously improve their information literacy, consciously abide by information ethics, have a strong awareness of network security, form critical thinking, rationally face sensitive information on the network, actively learn, and independently choose content that is positive and consistent with the mainstream cultural value orientation of society.

First, colleges and universities should strengthen moral education for college students. The rapid development of the Internet and new media technology produces much information and massive data daily. In the face of massive information, the function and value of moral education are essential for college students to identify the authenticity and validity of information. By building a mobile platform for moral education information, colleges, and universities can guide students to express their views reasonably and legally, observe the contents of students' statements at ordinary times, answer questions and solve doubts in time, and truly achieve ideological and political work at ordinary times and in detail. Through various ideological and political theory courses, moral education will be run through talent training, helping students establish a correct and scientific world outlook, outlook on life, and values. We should strengthen information ethics education, cultivate college students' good information ethics quality and critical

thinking, carefully analyze and deal with various rumors on the Internet, resolutely resist misconduct such as infringement of intellectual property rights and information abuse, and access the Internet in a civilized and healthy manner. Strengthen the construction of moral education teachers, find and cultivate a group of network reviewers, public opinion investigators, and information and psychological tutors in the moral education team, combine the actual situation of students, give full play to the network education function, cultivate the moral quality that students can learn to respect, form a comprehensive moral value concept of self-discipline and heteronomy, avoid the negative impact of the Internet, and improve the effectiveness of moral education.

Second, we should pay attention to the role of campus peers and create an upward and positive information literacy education environment. Students with high levels of information literacy can be selected from the students, and based on training their information awareness, information knowledge, information ability, and information ethics, they can play a role from point to the area, drive other students to participate in information literacy training, and improve the effectiveness of information literacy education.

Third, enhance the consciousness and initiative of college students to improve their information literacy. In the face of massive information, college students should give full play to their subjective initiative, correctly understand the multiple benefits and harms of the network, maintain correct values, excavate valuable information with a conservative attitude, have a solid ability to identify, criticize and guard against network information, and cultivate a high degree of sensitivity and vigilance. At the same time, we should cultivate prudent and rational thinking independently, maintain noble quality at all times, and make our network behavior reasonable, legal, and compliant. College students have become loyal advocates, conscientious followers and firm defenders of the rule of law by actively participating in the legal publicity practice of network information; College students should respect the authority of law, be able to appeal rationally or defend their rights with the help of due process of law when their network information rights and

interests are infringed, and firmly oppose and actively fight against network information crimes.

Fourth, pay attention to the cultivation of information moral self-discipline ability of college students. Cultivating college students' information literacy is a gradual process that must be guided and cultivated. Colleges and universities must strengthen the information moral education of college students, train them to learn to respect the achievements of others, abide by the information moral norms, and form self-discipline moral values. First, the education department should strengthen the top-level design, improve the system and mechanism, actively build an academic integrity system of "full process, full coverage, full range, and zero tolerance," promote the normalization and institutionalization of academic integrity construction, and create an excellent academic and scientific research atmosphere. The second is to strengthen the publicity of information ethics. Strengthening information ethics publicity can help college students establish correct information ethics concepts, enhance information ethics awareness, and increase information ethics-related knowledge. Information ethics publicity should be carried out in a multi-pronged way, combining positive knowledge publicity with negative case education, and supplementing online and offline publicity. With the development of the mobile Internet, new media such as mobile phones and smart devices are becoming increasingly popular. Developing information ethics publicity services for new media such as mobile phones may bring unexpected effects. Third, strengthen information ethics education. Establish a standardized and complete information ethics education system, and incorporate information ethics education into college students' general education compulsory courses. Strengthen the theoretical research on information ethics and morality of college students, establish and improve the information literacy archives of college students, and help college students establish a "rational, self-conscious and positive" information ethics. Make full use of the network platform to establish an information ethics education base, promote the penetration of advanced Chinese culture into the field of moral education, take the Chinese spirit and Chinese values as spiritual guidance, and provide a vital source of power for the cultivation of college students' information literacy. Fourth, improve

the social guidance and regulation mechanism to guide and regulate the information behavior of college students. We should maintain a healthy and civilized information environment by formulating laws and improving relevant information technology to establish an effective information morality heteronomy mechanism. It aims to ensure the health and effectiveness of network information content and its services through extensive social supervision.

Fifthly, it is the endogenous motivation to stimulate college students' awareness of network security self-protection. First, strengthen education on network security laws and regulations. In order to improve the awareness of network security prevention, schools should first strengthen the education and publicity of network security laws and regulations. The Internet is not a place outside the law to improve college students' legal concept of network security. We should take different forms to publicize network security laws and regulations vigorously. Through the publicity and education of network security laws and regulations, we can have a complete understanding of what we can do and what we cannot do so that college students can develop a good habit of complying with network security laws and regulations, and effectively avoid the occurrence of network fraud accidents. Secondly, schools should actively carry out activities related to network security. Through publicity and education on network security, most students have established the basic concept of network security, and everyone is willing to abide by the network security laws and regulations consciously. For example, through National Cyber Security Publicity Week, we can hold cyber security knowledge contests, lectures, and other comprehensive publicity methods. We can also use the school's official WeChat, official account, campus official blog and other new media to push cyber security knowledge, create an environment for cyber security education, purify cyber space and effectively enhance students' cyber security awareness.

Second, colleges and universities should do an excellent job in standardizing and regulating the network environment of college students, setting up a network security management team of colleges and universities, rectifying the anomie behavior of campus network morality, implementing the education system of college students' network security awareness, create a campus network security risk and

control system, improve the network security management system of colleges and universities, and effectively create a safe and civilized information literacy education supporting environment.

Third, enhance college students' awareness of network security protection. In real life, many network frauds cheat money by stealing other people's information. Therefore, we need to strengthen the protection of our information. Therefore, as students in school, we can use our spare time to learn the basic theoretical knowledge of network security and system security strategies, such as encryption and decryption algorithms, firewall working principles and functions, system vulnerabilities and repair methods, virus processing and other knowledge. In order to ensure the security of our computer information, we can also prevent our information from being leaked in the process of online shopping. We can also watch the promotional materials for network security prevention skills through mobile phones to enrich our network security prevention skills. We can also understand the forms of online fraud by paying attention to the news. After we understand the types of online fraud, Even if we encounter similar fraud in our future life, we can clearly distinguish it to prevent our property and personal from being threatened. Generally, online fraud is using social media such as QQ and WeChat to steal our social accounts first, then sending messages to our relatives, friends and classmates in our accounts, asking them to charge for their calls or transfer money. Once these relatives and friends are not on guard, they will allow criminal agents to take advantage of it and achieve the purpose of defrauding money. Therefore, we should pay attention to keeping our various account passwords, improving the account's security settings, not logging in to unknown websites, and not allowing criminals to cheat. If we receive similar fraud information, whether true or false, we should contact the other party to determine the other party's identity. We can ignore it if it is a stranger to prevent disclosing more information. It is widespread for college students to shop online. Many people directly discard their information on the express box without handling it after receiving the express, which is obtained by criminal elements, bringing many security risks to their online consumption.

Strategy 5: build a teaching system with deep integration of general education, professional education, second classroom education and information literacy education

By developing a scientific and reasonable curriculum system, information literacy education will be organically integrated into general education, professional education, and secondary classroom education to reduce the problems of unclear teaching objectives and weak pertinence due to the varying information level of college students. Currently, many colleges and universities' information literacy curriculum system is mainly based on primary computer and document retrieval courses. The teaching content is relatively simple, limited to learning computer software and mastering basic retrieval skills. In order to effectively solve the problems of the uneven level of college students' information literacy, the unsystematic curriculum system, the duplication of teaching content, and the weak practicality, the three aspects of college students' general education, professional education, and the second classroom are organically integrated, that is, the connotation of information literacy education is thoroughly permeated in all grades, disciplines, and the second classroom of the university to improve the information literacy of college students.

First, improve the curriculum system of information literacy training. Information literacy education in colleges and universities should be divided into general information literacy, professional information literacy, and academic research information literacy according to the needs and training objectives of different levels of education. There should be differences and emphasis in the curriculum, the ease of teaching, and teaching methods. The information literacy education of college students should pay more attention to general education and the training of professional technology and practical ability, Cultivate professional and technical talents to meet the needs of economic development; Undergraduate students' information literacy education While doing an excellent job in general education and professional practical ability training, we should increase the basic methods of scientific and academic research, cultivate students' ability to think independently

and solve problems, critical awareness and creative ability, and focus on cultivating academic research practical talents.

General literacy education is the foundation of information literacy education in colleges and universities and is also the necessary literacy ability of college students. It can cultivate students' information acquisition ability, information ethics, and security knowledge through new students' entrance education, information literacy general education courses, special lectures, and other ways. For example, Fudan University Library helps general education through discipline services. The Shenzhen University Library has carried out the O2O innovation practice of first-year students' entrance education in response to undergraduate students' varying information literacy levels. Professional information literacy should introduce students to professional information acquisition channels such as professional books, periodicals, electronic resources, and related websites, how to evaluate the credibility of professional literature, the retrieval skills and use specifications of professional information, the use of professional information, and the writing of professional papers, and lay a good foundation for students' independent learning and lifelong learning. Academic information literacy focuses on cultivating college students' choice of academic information tools, mastering the basic methods of academic research, having the ability to retrieve, analyze and evaluate academic documents, having strong critical thinking, being able to abstract, sublimate, express, and disseminate information, and having the quality and ability to conduct academic research and other innovative work independently.

The second is adopting different training modes for different grades to target the information literacy teaching content. First-year students should be trained in basic information knowledge and essential information processing skills. Emphasis should be placed on cultivating college students' good learning habits, learning interests, and the most basic network knowledge, using library and network information resources, the ability to obtain information, and the awareness of receiving information. In sophomore year, students should be trained in professional classification retrieval and information resource utilization, emphasizing cultivating students' information utilization ability and learning initiative. The third year is to

cultivate students' information creation ability. Through information literacy training platforms and professional courses, students can be trained to acquire professional information and analyze and solve specific problems. Students are encouraged to participate in knowledge competitions, innovative research projects, multimedia competitions, and other activities to train their information retrieval and application abilities. Fourth, cultivate students' comprehensive information literacy ability and carry out information theory education. Students are encouraged to publish academic papers or scientific and technological innovation papers. In the process of writing papers, they should standardize the writing of papers, follow academic ethics, experience knowledge such as intellectual property protection, and experience the importance of information literacy.

The third is to add information literacy courses or professional curriculum syllabi to reflect the information literacy teaching content in the professional elective course module to organically integrate the information literacy teaching content with professional courses. Professional teachers should attach great importance to the cultivation of college students' information literacy, strengthen the cultivation of students' information awareness and information sensitivity, and enable college students to master the relevant knowledge of information literacy and improve their information literacy while learning professional knowledge by setting up information literacy practice links and vocational skills training.

For example, the University of Texas has integrated the related information literacy course's teaching content into the first-year university curriculum to enhance students' understanding of information selection, search, and evaluation. Information literacy learning at the University of Washington conducts relevant information literacy knowledge training according to the course objectives. Students can enjoy more completed and personalized courses when completing course assignments and effectively enhance their information literacy level.

The fourth is the organic integration of the second classroom and information literacy education. Colleges and universities should make full use of the second classroom to strengthen the cultivation of students' information literacy and practical ability. According to students' interests, carry out colorful, practical activities,

including retrieval skills competition, network knowledge activity, summary writing competition, excellent student thesis exhibition, encourage students to participate actively, improve students' literature retrieval ability, writing ability, and independent learning ability, and promote the level of information literacy of college students.

Strategy 6: Build a diversified information literacy teaching model

The concept of constructivism emphasizes the interaction and cooperation between teachers and students and advocates "situational teaching" and "cooperative learning." Teachers create situations for students to stimulate students positive thinking. Realize the goal of active exploration and discovery of knowledge and active construction of the meaning of learned knowledge. Professor Zhu Zhiting proposed that "smart education is to enable teachers to use efficient teaching methods by building a learning environment with technology integration so that learners can obtain appropriate personalized learning services and good development experience, to cultivate talents with a good value orientation, strong acting ability, good thinking quality, and deep creative potential." The deep integration of information technology and education promotes a new round of education reform. The educational environment, teaching mode and the role of teachers and students are being redefined. That is, from the imparter of knowledge to the leader and organizer of knowledge, from the course executor to the course developer, from the teaching craftsman who focuses on teaching materials to the research innovator of education.

First, teachers must change their teaching concepts, take the initiative to meet the new opportunities for teaching development brought by technological change, actively learn information theory knowledge, technology and teaching integration knowledge, actively share technical experience, enrich teaching methods, innovate teaching methods, use new media to serve teaching, and provide guarantee for improving the information literacy level of college students.

The second is to build a new model of digital agricultural and forestry education, vigorously promote the deep integration of agricultural and forestry education and teaching with modern information technology, deeply carry out online and offline hybrid teaching, implement various teaching methods such as discussion,

inquiry and participation, and promote the formation of a new education and teaching model based on information technology. Focus on sharing the domestic and international development trends related to the specialty, introduce cutting-edge knowledge of the discipline, the latest scientific research achievements, and practical experience into the classroom, expand the depth of the curriculum, and broaden students' horizons. For example, to explain the selection of search words and the knowledge points of search strategies, teachers can help students analyze the advantages and disadvantages of existing search methods, refine and summarize, find the corresponding search rules and other contents to achieve the construction, digestion and absorption of knowledge. For example, the writing of the retrieval report allows students to select a research topic according to their majors or interests, conduct a group discussion on the construction of the retrieval strategy and the selection of the retrieval tools, and then implement the retrieval, collect, sort out and analyze the literature and data, and finally draw conclusions. Students must retrieve information in multiple ways, such as by arranging assignments related to a major or a topic to form a chain of documents, encouraging students to retrieve and learn independently, and integrating the knowledge they have learned. It is conducive to training students' scientific research methods and thinking, and promotes collaborative research learning and information creation ability.

Third, improve the curriculum assessment and evaluation system and establish a diversified assessment and evaluation system. Pay attention to the organic combination of formative evaluation and summative evaluation. The combination of "teacher evaluation, self-evaluation and mutual evaluation" can be used to evaluate student's learning behavior and learning effect in timely and multiple ways. At the same time, strengthen the guidance and assessment of students' extracurricular reading, homework, discussion, practice and other contents, and focus on cultivating students' ability to understand, select, use, evaluate, reflect, and create information Curriculum evaluation system with emphasis on incentives. For example, students' autonomous preview and testing of teaching resources, participation in answering questions, classroom evaluation, discussion and interaction, practice assignments, particular experiments, thesis writing and publication,

information literacy contests, and scientific research training projects are included in the process assessment.

Strategy 7: Develop the evaluation index system of college students' information literacy

The government departments have an essential mission in cultivating the information literacy of the whole people and constructing a powerful network country. They should issue relevant standards for evaluating college students' information literacy, gradually standardize and purify the network environment, and provide strong support and robust protection for improving the information literacy of college students. Although the Ministry of Education issued the Guiding Opinions on Improving the Work of Education Standardization in 2018, requiring the development of students' information literacy evaluation standards, China still needs to issue a unified information literacy evaluation standard.

First, it is suggested that the relevant departments establish a university information literacy authority, which is composed of domestic and foreign information literacy experts, university presidents, and library leaders, to clarify the information literacy education objectives and discipline positioning and fundamentally attach importance to the information literacy education of college students.

The second is to draw on the valuable research results of information literacy at home and abroad, compare the development process of the classic foreign information literacy's capability index system, and draw on the excellent experience to provide ideas for the development of the information literacy index system applicable to Chinese college students.

Third, carry out valuable and multi-angle research on evaluating college students' information literacy, and optimize the evaluation index system of college students' information literacy. The university can improve students' information literacy through the information literacy competition for college students. According to the new situation of the rapid development of information technology in the digital era, the university can constantly innovate the information literacy competition mode for college students. In particular, it can design the

implementation plan of the competition in combination with the rural revitalization strategy so that the information technology experts, agriculture-related professional "double-qualified" teachers, rural revitalization strategy research experts, and student representatives can become members of the competition jury. It reflects the characteristics of the times of the competition theme, the novelty of the competition mode, and the diversification of the evaluation subjects. Through the competition, college students' information literacy is analyzed from multiple perspectives, and the evaluation index system of college students' information literacy is optimized to improve students' information literacy effectively.

Strategy 8: Build a digital resource co-construction and sharing platform

By providing policy and financial support, the government can guide the whole society, integrate information literacy education resources, build a platform for information literacy training, realize the co-construction and sharing of high-quality information resources, and make up for the limited construction of digital resources and insufficient storage equipment caused by the shortage of funds, which can not effectively meet the demand of teachers and students for information resources.

At present, the information literacy education of most colleges and universities is basically in their own business. The daily operation and maintenance management among WeChat official account, particular websites, and applications is decentralized. The content and update frequency could be more consistent. There needs to be more communication and cooperation among colleges and universities. Significant differences exist between colleges and universities in information literacy education resources and education levels. Resources lack mutual support and overall planning, the utilization of high-quality resources is low, and some resources are wasted or idle for a long time, without forming a situation of open sharing and efficient circulation. From the perspective of the four universities surveyed, each university has rich e-books and digital resources and has built school-based characteristic databases in combination with the discipline characteristics of the university, such as the Yunnan Biodiversity Database, Agricultural Culture Database, and Scientific Research Paper Database built by Yunnan Agricultural University; Xilin Library, a characteristic resource database developed by Southwest Forestry

University; The "Hani research literature database" and "Southeast Asia research literature database" and other local characteristic literature databases of Honghe University; Pu'er local ethnic culture database of Pu'er University. The number, types, levels and disciplines of electronic resources the four universities own differ. In comparison, the number and disciplines of electronic resources owned by Yunnan Agricultural University and Southwest Forestry University are more comprehensive than those of Honghe University and Pu'er University; however, the same database resources have also been purchased, such as the VIP periodical resources integration service platform, the CNKI periodical full-text database, the Wanfang thesis database, and other periodicals. Therefore, the state, provincial education departments, and universities should consider establishing the information literacy education co-construction and sharing platform to realize the co-construction and sharing of digital resources.

First, colleges and universities should strengthen the overall planning and coordination of high-quality library resources to avoid resource waste and repeated construction. Strengthen the management of existing resources and improve and supplement the existing resource system; At the same time, we should tap existing resources, encourage teachers and information workers to design or secondary develop resource databases independently, teaching software, official account, and other resources, and deeply tap local teaching resources; We should strengthen the cooperation between schools and enterprises, build and share high-quality resources, realize the open sharing of high-quality information resources, and solve the problem of shortage of funds in local colleges and universities.

The second is to strengthen the construction of characteristic digital resources. According to local characteristics and in combination with agricultural students' most urgent information needs, colleges, and universities should build agricultural thematic databases to enable agricultural students to obtain agricultural information resources more efficiently. Universities should update digital information resources in real-time to ensure the timeliness of information resources.

The third is to improve the digitalization level of library collection resources, digitize paper resources with great demand and high utilization rate, and improve the utilization rate of information resources.

Fourth, colleges and universities can jointly build and share digital resources by establishing information literacy education resource constructional teams, making courseware, micro-video, and teaching cases.

Strategy 9: give full play to the rich and diverse positive energy of college students' network

Nowadays, the network is inseparable from people's life. In the process of network communication, college students make full use of the Internet to spread the excellent Chinese culture, learn the national moral model, lead the correct value orientation, transmit positive energy, lead the social fashion with advanced models, nourish the cyberspace with excellent Chinese culture, improve the cyberspace, and contribute to strengthening the construction of network civilization and creating an excellent moral environment.

First, make full use of government websites with the highest authority and credibility, mainstream media, and new media dominated by party and government party building to publicize the positive energy of the network and realize the leading role of information literacy values for college students.

Second, colleges and universities should give full play to the exemplary role of the network, guide college students to abide by the network ethics consciously, enhance the credibility of college students' network information, and build a good information culture ecosystem by selecting reasonable education methods in cultivating college students' information ideological education. For example, a classmate Ding of Yunnan Agricultural University has become the publicity ambassador of Yunnan Agricultural University through his efforts, promoting Yunnan Agricultural University's popularity.

Third, we should actively use multi-angle and multi-channel information tools to strengthen the standardization of network information. Through the establishment of theme websites, campus WeChat groups, official accounts, and microblogs, which attract college students to participate, information exchange channels are unblocked;

Make full use of intelligent means such as big data technology and deep recognition learning machine to effectively collect and dynamically monitor false information, create a clean network environment, and guide college students to spread positive network energy.

Strategy 10: Create an atmosphere for the whole society to participate in the information literacy education of college students

The improvement of college students' information literacy needs the joint participation of the government, society and colleges and universities to form an information literacy education atmosphere that is guided by the government, led by colleges and universities, participated by the media and dominated by college students, and effectively promote the excellent development of college students' information literacy education.

First, the government should give full play to the policy leading role in the promotion of information literacy related fields of college students, and do an excellent job in the top-level design of information literacy cultivation of college students under the guidance of socialist core values, which is conducive to unifying social consensus, raising the attention of the whole people on the improvement of information literacy from the ideological perspective, and forming a good information culture atmosphere. Strengthen the construction of mass media, especially the network media platform, provides authoritative, scientific, and authentic information in time, spreads positive energy, and curbs the spread of insufficient information and public opinion. Social forces have a significant impact on the cultivation of college students' information literacy. The society should build a network public opinion position, actively publicize the mainstream culture and positive energy thoughts, improve the ability of college students to distinguish right from wrong and improve their information literacy by adhering to the correct public opinion guidance. For example, local network enterprises, government agencies, and community committees can carry out education practices by carrying out the network's information literacy publicity activities, public lectures and other forms, combining social requirements with college students' needs, and responding to the call of the times.

The second is to encourage and guide the media to participate in the cultivation of college students' information literacy. By making full use of the role of radio, television, the Internet and other media, we can tell the story of China and spread the voice of China. Increase the publicity of information literacy content, fully reflect the public welfare function, grasp the correct direction of public opinion, and carry forward positive energy. For example, the program "Network Lecture" is broadcast on the website of the central network security and information office, which is the mainstream social media platform. It not only meets the audience's entertainment needs, but also strengthens the leading role of the mainstream media.

Third, colleges and universities should do an excellent job in standardizing and regulating the network environment of college students, starting from the education of values, cultivating a team of network talents who are familiar with the characteristics of network information dissemination and have firm ideals and beliefs, set up a team of administrators of network communication in colleges and universities, build a mature campus network platform, advocate and educate college students to establish correct network values, so that college students can understand and distinguish various types of network information more rationally. They can make more reasonable use of various network tools.

Fourth, we should give full play to the shaping role of family education in the cultivation of college students' information literacy, create a good information environment in daily life, establish a correct network attitude, and establish a harmonious and healthy family information environment; Increase the support of information and communication technology equipment and enhance the confidence of college students in using information and communication technology.

Conclusion

The strategy for improving the information literacy level of college students is mainly based on the multiple subjects of college students, teachers, universities, governments, families and society, and follows the ideas of micro-macro, external promotion to endogenous, generalization to professional, single subject to complete education, It proposes to build a strategy for improving college students' information literacy, which is "government guidance, university guidance, social participation, family guidance, college students as the main body, and stimulating college students' endogenous motivation as the core". The main strategies adopted by each subject are as follows.

Government

-Establish and improve relevant policies

a. Formulate a national programmatic document for college students' information literacy. By specifying the content of college students' information literacy and the standard formulation requirements, all parties' responsibilities to cultivate and improve college students' information literacy are clarified. It includes the responsibilities of governments at all levels, relevant government departments, and educational institutions in cultivating college students' information literacy. It is necessary to clarify the government's funding policy to support the improvement of college students' information literacy and the ways and means of assessing the participation of various departments.

b. Establish a monitoring and evaluation system for policy implementation. The government needs to monitor and track and evaluate the implementation of various policies related to improving college students' information literacy and use scientific monitoring and evaluation methods to continuously provide feedback on the implementation of the policies and adjust the policies.

c. Improve the social guidance standard mechanism to guide and standardize the information behavior of college students. Maintain a healthy and civilized information environment by formulating laws and improving relevant information technology.

d. The Department of Education of Yunnan Province should fully consider the current development situation of the region, based on the overall development level of regional education informatization, and formulate local policies suitable for the region's development after thoroughly reading the relevant national policies.

-Increase financial support

a. Establish special funds for education informatization of local colleges and universities in Yunnan Province. The Yunnan Provincial Government should incorporate the funds needed for the education informatization of local colleges and universities in Yunnan Province and the infrastructure construction funds of the schools into the provincial government's financial budget and clearly define the scope of its use to earmark the funds for specific purposes and avoid the lack of funds.

b. Establish a supervision mechanism for the use of funds. Track the flow of information construction funds, strictly control the use of various funds for information construction, and ensure the implementation of special funds.

-Develop the evaluation index system of college students' information literacy.

a. Establish an information literacy authority in colleges and universities, composed of domestic and foreign information literacy experts, presidents of colleges and universities, and library leaders, to clarify the objectives and discipline orientation of information literacy education and fundamentally attach importance to the information literacy education of college students.

b. By widely drawing on the valuable research results of information literacy at home and abroad, comparing the development process of the classic foreign information literacy's ability indicator system, and drawing on excellent experience, it provides ideas for developing the information literacy indicator system applicable to Chinese college students.

School

-Strive for funds for information literacy construction through multiple channels.

- a. Seek financial support from government departments.
- b. Carry out in-depth cooperation with enterprises and social organizations, and strive for more financial support for information construction and information literacy education through corporate sponsorship and social assistance.
- c. Give full play to the role of alum resources by establishing alum funds and the joint establishment of scientific research institutes, attracting outstanding alums, forming a benign development model, and striving for more funds.

-Strengthen the leading role of policy

- a. Establish a scientific evaluation mechanism for teachers' information literacy. The evaluation of teachers' information literacy will be included in the year-end assessment of teachers. The effective teachers will be given material rewards, which will be organically combined with the evaluation of teachers' excellence, professional title, and position promotion to mobilize the internal drive of teachers themselves.
- b. Improve the incentive mechanism for teachers' information literacy and give full play to the guiding role of the incentive mechanism. Teachers are encouraged to actively research information literacy education through particular teaching and research projects of information literacy education, selection of excellent teaching achievements, selection of excellent courseware, and project establishment of network courses.
- c. Establish and improve the incentive mechanism for students' information literacy. Material rewards and credit recognition will be given to students who have passed the computer grade examination and participated in competitions and practical activities in information literacy.
- d. Colleges and universities should combine the actual situation of students, carry out valuable and multi-angle research on the evaluation of college students' information literacy, and develop an evaluation system of information literacy evaluation indicators suitable for the actual situation of the school.

-Transfer network positive energy

a. Universities should give full play to the exemplary role of the network by inviting experts, scholars, and well-known alums to give special lectures, publicize the network ethics, guide college students to consciously abide by the network ethics, and create a good information culture ecosystem.

b. Through campus theme websites, campus WeChat groups, official accounts, and microblogs, we will open up information exchange channels, strengthen the publicity of information ethics and information norms, and guide college students to transmit positive energy to the network. For example, a classmate Ding of YAU has become the publicity ambassador through his efforts, promoting YAU 's popularity.

- Build a scientific and reasonable information literacy curriculum system, and integrate information literacy education into general education, professional education and secondary classroom education.

a. According to the needs and training objectives of different levels of education, courses in general information literacy, professional information literacy, and academic research information literacy are offered. General literacy education cultivates students' information acquisition ability, information ethics, and information security knowledge through new students' admission education, information literacy general education courses, and special lectures; Professional information literacy trains students' ability of information retrieval, creation, analysis, evaluation and creation by introducing professional information acquisition channels, how to evaluate professional literature, retrieval skills of professional information, use specifications, and writing professional papers; Academic information literacy cultivates students' critical thinking through mastering the basic methods of academic research and the selection of academic information tools, and has the quality and ability of independent academic research and other innovative work.

b. The professional optional course module adds information literacy courses or professional course syllabi to reflect the information literacy teaching content and organically integrate the information literacy teaching content with professional courses.

c. The second classroom education and information literacy education are organically integrated. Colleges and universities make full use of the second classroom to carry out rich and colorful practical activities, including retrieval skills competition, network knowledge activity, summary writing competition, excellent student thesis exhibitions, encourage students to participate actively, improve students' literature retrieval ability, writing ability and independent learning ability, and strengthen the cultivation of students' information literacy practical ability.

-Strengthen the training of teachers' information literacy

a. The training content shall be updated on time, and the training shall be conducted in stages and levels. According to teachers' information literacy, carry out training at different levels to stimulate teachers' interest in learning; the training will be conducted in stages and batches according to the age of teachers and teaching majors.

b. The training method is flexible and combined with various methods. The training forms can be combined with traditional classroom training, lecture training, online course training, online information literacy education, special lectures, and computer training to improve teachers' information literacy comprehensively. We can use the network and class system for training for information awareness, information knowledge, and information ethics; information ability is mainly improved through computer practice.

c. Training in teaching practice and encouraging application in scientific research. The ultimate purpose of training is to promote teachers' application in teaching. Therefore, teachers' information literacy should be tested in teaching practice, and information technology should be fully applied to scientific research to improve scientific research levels.

-Strengthen the construction of campus network infrastructure

- a. Increase network bandwidth to achieve a stable and smooth network.
- b. Accelerate the all-optical network transformation of the campus network, deploy the campus wireless network based on WiFi 6, realize the full coverage of the campus wired wireless network access, and improve the user experience.
- c. Build a smart classroom to realize the normalization of information technology teaching, such as course recording, online live broadcasting, multi-screen teaching, and teacher-student interaction; we will continue to improve facilities and equipment such as computer rooms, multimedia classrooms, and libraries to provide teachers and students with a good information literacy education environment.
- d. Continue to promote the construction of new media in the school and provide effective channels for publicizing the deeds of advanced typical characters and spreading the positive energy of the network.

-Strengthen the construction of network security

- a. Strengthen the education and publicity of network security laws and regulations. By carrying out activities related to network security, for example, take advantage of the National Cyber Security Publicity Week to carry out cyber security knowledge contests, lectures and other ways to publicize cyber security-related knowledge. Push network security knowledge using the school's official WeChat, official account, official campus blog, and other new media.
- b. Install information filtering software, such as establishing a wrong information database or content filtering engine to filter lousy information.
- c. Install firewall on the server to improve the information security defense capability.

-Build a professional technical team of information literacy

- a. Strengthen the construction of information literacy teachers through targeted training.
- b. Pay attention to the introduction of talents and provide a talent guarantee for information literacy education.

c. Carry out in-depth cooperation and provide technical support through cooperation with the company.

-Colleges and universities should do a good job in standardizing and improving the network environment of college students

a. Cultivate a network talent team that is familiar with the characteristics of network information dissemination and has firm ideals and beliefs

b. Establish a team of administrators of network communication in colleges and universities

c. Advocate and educate college students to establish correct network values so that college students can understand and distinguish all kinds of network information more rationally and use all kinds of network tools more reasonably.

-Build digital resources co-construction and sharing platform

a. Universities should strengthen the overall planning and coordination of high-quality resources in the library to avoid resource waste and repeated construction. Strengthen the management of existing resources and improve and supplement the existing resource system; At the same time, we should tap existing resources and encourage teachers and information workers to independently design or secondary develop resource databases, teaching software, official account, and other resources, and deeply tap local teaching resources; We should strengthen the cooperation between schools and enterprises, build and share high-quality resources, realize the open sharing of high-quality information resources, and solve the problem of shortage of funds in local colleges and universities.

b. Strengthen the construction of characteristic digital resources. According to local characteristics and in combination with agricultural students' most urgent information needs, colleges, and universities should build agricultural thematic databases to enable agricultural students to obtain agricultural information resources more efficiently. Universities should update digital information resources in real time to ensure the timeliness of information resources.

c. Improve the digitalization level of library collection resources, digitize paper resources with significant demand and high utilization rate, and improve the utilization rate of information resources.

d. Through establishing information literacy education resource constructional teams among colleges and universities, courseware, micro-video, and teaching cases are produced to realize the co-construction and sharing of digital resources.

-Strengthen the construction of support platform

a. Strengthen the construction of the campus big data center, standardize data management, and improve the utilization rate of data through unified data standards.

b. Build a comprehensive data analysis system to analyze students' consumption behavior through students' consumption logs, analyze students' learning behavior through students' access to the library, borrowing logs, and learning conditions, and analyze students' online behavior through students' online logs to provide academic support for effective decision-making of the school.

c. Build a network teaching platform, guide teachers to build courses independently based on the network teaching platform, and implement online and offline mixed teaching reform.

d. Build an information literacy practice's teaching platform. Through school-school cooperation and school-enterprise cooperation, integrate and optimize practical teaching resources, and build several comprehensive and shared practical teaching bases.

e. Create a discipline competition platform, explain the characteristics of various plants to teachers and students, popularize plant science knowledge, and cultivate students' information practice and inquiry ability through holding agricultural knowledge competitions and popular science activities.

f. Relying on the rural revitalization organization platform, students are encouraged to go into the countryside, go to the grass-roots level and carry out the practice through conducting educational lectures, carrying out rural research, organizing aesthetic education activities and other personal experiences, and trying to integrate into the daily life of most villagers, cultivate new talents who know and love agriculture.

g. Explore the advantages of its discipline resources and build characteristic museums, specimen museums, and exhibition halls. With the help of rich museum resources, it organically integrates subject teaching, comprehensive practical activities, and museum education. Through visiting and learning, students can gain complete professional knowledge and expand their professional knowledge. For example, the Chicken Culture Museum of Yunnan Agricultural University displays the widespread scientific knowledge of chicken origin, species, breeding, behavior, biological scientific knowledge, and the national chicken culture. The wood specimen museum built by Southwest Forestry University has sorted and identified more than 2000 species of specimens belonging to 97 families, 333 genera, and more than 30000 numbers. It fully reflects the diversity of forests and the complexity of tree species in Yunnan and plays an essential role in the national wood specimen museum.

h. Establish a platform for teachers' information literacy exchange and study. Through the exchange and study with experts, scholars, and other teachers, teachers' enthusiasm to use the information to help efficient classrooms has been stimulated, and the professional development of teachers' thinking informatization, education idea informatization, and teaching habit informatization has been effectively promoted.

Teacher

-Teachers should show good ethics and conduct and transmit positive energy.

a. Pay attention to academic norms. In the process of education and teaching, if the achievements and documents of others are cited, they shall be marked according to academic norms to guide students to restrict their information behavior.

b. Strengthen students' moral education and information moral education, put moral education through the whole process of information literacy education, and cultivate students' good moral literacy.

-Actively participate in all kinds of information literacy training activities at all levels

a. Generate problem awareness. Before the training, the participating teachers actively consider the problems encountered in the teaching process.

b. Ask questions. During the training, the teachers participating in the training and the trainers fully communicated and jointly raised questions.

c. Problem-solving: the participating teachers should analyze the problem in detail, then find the path to solve the problem through independent learning and collaborative learning, formulate the action plan to solve the problem, and implement the plan.

d. Communication, feedback and reflection: After the problem has been initially solved, necessary communication, feedback and reflection should be carried out to facilitate teachers to re-examine their growth in solving the problem to find the deficiencies and summarize the experience and lessons. Finally, teachers can acquire knowledge and skills and improve their information literacy.

-Strengthen cooperation and exchange

a. Teachers and teachers cooperate. Teachers share the same educational objects, face and analyze the problems in information teaching, explore how to apply information technology to education and teaching practice, share successful teaching experiences, and learn from each other in the actual teaching process to achieve joint development.

b. Cooperation between teachers and students. Teachers and students should establish a relationship of dialogue, communication, understanding, and cooperation, create a democratic and open atmosphere in education and teaching, and teachers should widely listen to students' opinions and suggestions; In the teaching process, teachers should give full play to the advantages of information technology, use flipped classroom and other methods, actively guide students to learn independently, stimulate learning enthusiasm, build a two-way information transmission model between teachers and students, and promote the joint development of teachers and students' information literacy.

c. Cooperation between teachers and society. Teachers must strengthen cooperation with education experts, information subject experts, famous teaching teachers, and excellent teachers through multiple channels, participate in teaching and research activities, share successful cases and experiences of information teaching, learn excellent teaching cases and practices, and promote the improvement of information literacy.

-Actively participate in information literacy practice

a. Actively participate in the evaluation of teaching results. In education and teaching, we should analyze the effect of using information technology to carry out teaching, excavate highlights, refine features, form teaching results, and play a role in demonstration and promotion.

b. Actively participate in the courseware evaluation activities organized by the school.

c. Actively build the courses taught into Muke and online courses.

d. Actively participate in teaching competitions.

e. Actively apply for education and teaching reform projects. Research and analyze the possible problems, measures, and successful experiences in the organic integration of information technology and education and teaching, and promote information literacy's theoretical and practical innovation.

f. Strengthen the training of information practice ability, and improve information practice ability by studying how to make excellent multimedia courseware and build online courses.

-Research on information literacy teaching methods

a. Education stories. Use educational stories and short essays in various forms (video, audio, text, or pictures) to stimulate students' interest in learning emotionally and achieve the expected learning effect.

b. Service experience. The way of "learning by doing" is beneficial for students to go deep into the countryside, serve agriculture, rural areas and farmers under the guidance of professional teachers and librarians, combine classroom teaching with the experience of the natural world, improve the practical ability of information literacy, and cultivate students' sense of social responsibility.

c. Reflective practice. Let students think about a topic, discuss their ideas in groups, and finally share with the class. Improve college students' information literacy by carrying out reflective and practical teaching.

d. Inquiry. By designing large thesis assignments for the overall teaching, students read more literature, summarize, propose research questions, design experiments, interviews, and other independent research and analysis, form their views and complete the thesis writing, to improve students' research literacy.

e. Case-guided. By introducing typical cases around students, such as canceling the degree award due to violations of academic ethics; Due to credulous network information, tuition fees were cheated; Due to the release of unverified information, being criticized for education, cultivate students' ethics and standardize students' online behavior.

-Research on the evaluation of diversified information literacy courses

a. Combination of summative evaluation and formative evaluation. The combination of "teacher evaluation, self-evaluation and mutual evaluation" can be used to evaluate student's learning behavior and learning effect in timely and multiple ways. At the same time, the guidance and assessment of students' extracurricular reading, homework, discussion, practice and other contents can be strengthened.

b. Quantitative evaluation turns to qualitative evaluation. Student-centered, extensive use of qualitative feedback, student work evaluation, research journal, reflective writing, self or peer evaluation, performance, and report to carry out information literacy course evaluation.

-Carry out the research of curriculum teaching content reform

a. The course teaching content is combined with the discipline. Closely follow the characteristics of agricultural college students, introduce agriculture-related knowledge into the teaching content, and carry out information practice research.

b. Carry out the analysis of students' information literacy ability and learning situation. According to the analysis results of the learning situation, organize the teaching content in a targeted way to make the teaching more targeted.

c. Pay attention to the cultivation of transferable skills and academic skills. The teaching content should reflect the integration, focus on cultivating students' individual experience, encourage students to think about how to use their skills, guide students to formulate research objectives, implement plans, and complete tasks such as practical information acquisition, information evaluation, information organization, and information generation.

d. Strengthen information ethics education. Integrate information ethics education into the teaching content of the course, mainly including information release, academic integrity, academic norms and thesis writing, information security, and privacy protection, to improve the information ethics of college students.

e. The teaching content of the course introduces the knowledge of the frontier of the subject, the latest scientific research achievements, practical experience, and other knowledge to expand the depth of the course and broaden the students' vision.

College student

-Enhance the consciousness and initiative of information literacy improvement.

a. Establish correct emotions, attitudes, and values through information literacy education.

b. Combine the development of the times with personal needs, and formulate a personal information literacy development plan.

c. Learn to independently identify and criticize information from different sources, maintain a critical awareness of information, independently identify the true and false information, and have strong identification ability and prevention awareness.

d. Increase the frequency of using information technology equipment to learn relevant knowledge and skills.

e. Respect the legal authority, be able to make rational appeals or defend rights with the help of the due process of law when their information rights and

interests are infringed, and firmly oppose and actively fight against network information crimes.

f. Strengthen information protection, and ensure information security by learning the basic theoretical knowledge of network security and system security strategies.

g. Enrich network security prevention skills by watching the publicity materials of network security prevention skills

h. Learn about the forms of online fraud by paying attention to the news facts to prevent the threat to property and personnel.

- Enhance self-discipline.

a. Learn to control emotions in the network to prevent uncontrolled emotions from causing improper words and deeds.

b. Before making a speech, we should fully consider whether the information we express is normative and appropriate, and whether it will hurt society or others.

c. Plan the daily use of information technology equipment to avoid indulging in the network.

- Actively participate in information practice research.

a. Actively participate in the legal publicity practice of network information and become a loyal advocate, conscientious follower and firm defender of the rule of law.

b. Actively participate in all kinds of competition activities, community activities and project research activities, such as multimedia competition, retrieval skills competition, network knowledge activities, summary writing competition, and excellent student thesis exhibitions, to improve the practical ability of college students' information literacy.

c. Actively participate in campus network learning and communication platform, actively express personal views, and maintain independent thinking and value judgment in communication and interaction.

d. Actively participate in the construction of agricultural modernization, go deep into agricultural enterprises, rural areas and farmers to carry out practical activities, consolidate professional knowledge and improve practical ability.

e. Actively participate in interactive communication in class, cultivate the ability to find and solve problems, and promote joint development.

f. Take the initiative to participate in scientific research activities, learn to actively consult the information want, think and digest the information to create new valuable information and stimulate innovation potential.

g. Actively write research reports and papers, and cultivate their information acquisition, integration, judgment, analysis, processing, practice, and research ability.

-Improve self-cultivation of moral information.

a. Communicate with people with noble moral character, rich knowledge reserves and high information ethics, and improve their own moral cultivation in the process of imperceptible influence.

b. Browse the reports of positive energy to get the essence of information ethics and give full play to the power of example.

c. Carefully study and attach importance to the information ethics laws and regulations, and effectively analyze the cases of information ethics violations and crimes, especially the real cases of college students' information violations and information crimes.

Social

-Develop simple and easy-to-use information technology software. Through school-enterprise cooperation, the company actively constructed educational informatization, developed easy-to-use software according to the actual needs of schools, teachers, and students, and provided guidance and services.

-Give full play to social media's role and publicize the network's positive energy. By making full use of the role of radio, television, the Internet and other media, we can tell the story of China and spread the voice of China. Increase the publicity of information literacy content, fully reflect the public welfare function, grasp the correct public opinion orientation, carry forward the mainstream value, transmit the mainstream ideas, and create a clean and bright network environment.

-The society should build a network public opinion position, actively publicize the mainstream culture and positive energy thoughts, improve the ability of college

students to distinguish right from wrong and improve their information literacy by adhering to the correct public opinion guidance. Such as local network enterprises, government agencies, and community committees. Can carry out education practice by carrying out network information literacy publicities activities, public lectures and other forms, combining social requirements with college student's individual needs, and responding to the call of the times.

-Through extensive social supervision, ensure the health and effectiveness of network information content and services.

Family

-Play the guiding role of family education

- a. Establish a harmonious and healthy family information environment. Parents should establish a correct online attitude, actively guide children's online time, pass on positive online ideas to children, cultivate children's active learning information skills, broaden learning channels, and improve learning effects.
- b. Establish practical family network life standards, regulate the reasonable use time of children, guide them to learn to distinguish lousy information, and strengthen information ethics.
- c. Parents should provide corresponding support if students need to use information technology equipment, such as tablets and laptops, for school hours.

CHAPTER 5

SUMMARY, DIACUSSIONS AND RECOMMENDATIONS

This chapter summarizes the research contents, draws the research conclusions and significance, puts forward strategies to improve college students' information literacy, and puts forward targeted suggestions and opinions for later research.

Summary

This study takes the information literacy of agricultural college students in Yunnan Province as the research foothold, starting from the needs of the times and the necessity of students' development through the analysis of relevant domestic and foreign documents and policies, questionnaires, interviews, and other ways, the current situation and level of information literacy of agricultural college students in Yunnan Province were investigated and studied, and the survey data were analyzed using SPSS21.0 software. The current situation and level of information literacy of college students were obtained. Then the SWOT analysis method is used to analyze the advantages, disadvantages, opportunities, and threats of improving the information literacy level of college students. The TOWS system analysis method is used to plan strategically to improve college students' information literacy levels. This survey adopts quantitative and qualitative research methods, structured questionnaires, and interviews.

The research achieved the following research objectives:

Objective 1: To determine information literacy level of agriculture students in higher education in Yunnan.

Objective 2: To find out the factors affecting information literacy of agriculture students in higher education in Yunnan.

Objective 3: To formulate integrated strategies to improve information literacy of agriculture students in higher education of Yunnan.

The survey method of the study is used to answer objectives 1 and 2. These objectives focus on describing the descriptive characteristics and information literacy status of college students, including their descriptive characteristics, educational factors, cultural factors, and economic and social factors; The information literacy level of college students includes Authority Is Constructed and Context; Information Creation as a Process; Information Has Value; Research as Inquiry; Scholarship as Conversation; Search as Strategic Exploration.

The study was conducted in four universities in Yunnan Province, using the hierarchical random sampling method. Divide the students into four groups: Group A - agricultural students in YAU; Group B - agricultural students of SWFU; Group C - agricultural students of HHC; Group D - PEC agricultural students. Then divided into two groups according to the gender of men and women, conduct random sampling to determine the subjects, and finally determine the total sample size of 385 by using the interview schedule composed of structured questionnaires to collect data as the primary research tool and focus group discussion to determine the strengths, weaknesses, opportunities, and threats that affect the information literacy level of college students. Descriptive statistics are used to describe the data obtained, and multiple regression analysis is used to determine the predictive variables that affect the information literacy level of respondents.

In order to ensure the validity of the contents of the questionnaire, the questionnaire was submitted to experts in the field of information literacy. The expert group evaluated all questions from content, frequency, similarity, and proposed amendments. At the same time, students are invited to evaluate the content and form validity of the revised questionnaire and express their opinions on the appropriateness of each question according to the indicators and outcome indicators of the Higher Education Information Literacy Competency Standard. The evaluation experts and students were invited again to evaluate the revised questionnaire. According to the feedback, the content validity of the final questionnaire reached 91%. Cronbach's α values are more significant than 0.757,

while the sample population Cronbach's α Values are up to 0.918. Therefore, the sample has good consistency and reliability.

Analyze the data obtained according to the research objectives, and use descriptive statistics to describe the variables in the study. Multiple regression analysis was used to determine the predictive variables (independent variables) related to the level of information literacy.

Through individual interviews, the SWOT method analyzes the advantages, disadvantages, opportunities, and threats of improving college students' information literacy. This paper makes a strategic plan to improve the information literacy level of college students by using the TOWS system analysis method and puts forward targeted strategies.

Research results

This study determined the personal characteristics, current situation, and level of information literacy of agricultural college students in Yunnan Province, analyzed the relevant theories and research status of information literacy, collected the personal characteristics, education, culture, social and economic factors that affect the information literacy of college students, and designed the questionnaire. In order to ensure the validity of the questionnaire, a preliminary survey was conducted on the questionnaire. According to the preliminary survey results, expert argumentation, and evaluation opinions, the questionnaire was revised, and 75 questions were finally determined, passing the reliability and validity tests.

1. Descriptive feature analysis results

Most respondents are 20-22 years old, and the proportion of respondents in the age range is consistent with the overall age distribution of Chinese college students. The proportion of male and female students is equal; In terms of grade distribution, the third grade students are the most; In terms of ethnic distribution, the number of Han students is significantly higher than that of minority students, which is in line with the population distribution of national minorities; The respondents have the most undergraduate students; According to the computer proficiency survey of the respondents, 82.34% of the students "Without taking the computer exam or

failed in the computer exam", indicating that the reference rate or pass rate of college students taking the computer proficiency test is not high; According to the respondents' English level, 80% of the students "Without taking the English exam or failed in the English exam," indicating that the reference rate or pass rate of college students taking the English exam is not high. Among the respondents, the students with 2 ICT devices accounted for 45.97%. Because information technology equipment has penetrated students' learning and life, and in order to adapt to different learning and living conditions, college students have at least one smart phone and other information technology equipment.

Among the respondents, residents the most students at countryside, accounting for 81.04%; the most students are located in the "development level town", accounting for 47.53%, and the minor students are located in the "large and medium-sized developed cities," accounting for 4.16%. In line with the enrollment of students, most rural students majored in agriculture. Because the interviewees are college students majoring in agricultural science, the students of "development level ownership" have a deeper understanding of agriculture, are more willing to study agriculture-related majors, and are more willing to return to "development level ownership" to develop agriculture after graduation from university. Because the location of the middle school is "development level partnership," the level of information literacy is significant, because the information technology teaching conditions of the middle schools in rural areas are relatively weak, and the level of information technology education needs to be improved.

Among the respondents, 54.81% of the students used the library in secondary schools and 45.19% of the students did not use it. It shows that the proportion of students using the library in middle school is not ideal, which may be because most students come from cities and towns, the teaching conditions and teaching facilities in cities and towns are relatively weak, the construction of library resources is relatively insufficient, the collection of books is relatively small, and the experience of the library for students is not very good.

Among the respondents, the most significant number of students studied one information technology course, accounting for 75.84%. Because the research object of the project is agricultural students, the requirements for information technology ability are low. Several universities surveyed only take information technology courses as general compulsory courses. The course content mainly focuses on the primary computer and operating skills, and high-level information technology-related knowledge is less than lower-level.

The study's first question, the level of information literacy of agricultural college students in Yunnan Province is measured according to six criteria of ACRL, each of which includes five questions. The items are studied in the form of multiple-choice questions. The questionnaire is measured using the 5-level Likert scale, divided into very agree, agree, neutral, disagree, and significantly disagree, with values of 5, 4, 3, 2, and 1, respectively.

The research shows that the average the total score of the information literacy level of college students in four universities is 92.97 points, the standard deviation is 16.737, and the average score is 3.1, of which YAU (3.19) has the highest score and HHC (2.67) has the lowest score. According to the level evaluation criteria, the information literacy level of students in the four colleges and universities is medium. However, the average information literacy level of PEC and HHC students is 2.69, which is lower than the average value of 3.1 in four universities, and very close to the critical value of 2.6 in the low level segment, indicating that the information literacy level of PEC and HHC students is relatively low.

According to the research results of the first standard of ACRL, the average score of the information literacy level (the first standard) of college students in four universities is 3.3, of which YAU (3.39) has the highest score and PEC (2.99) has the lowest score. According to the level evaluation standard, the information literacy level of students in four colleges and universities according to the first standard of ACRL is the rate level.

According to the research results of the second standard of ACRL, the average score of the information literacy level (the second standard) of four university students is 3.05, of which YNU (3.15) has the highest score and HHC (2.68) has the

lowest score. According to the level evaluation standard, the information literacy level of students in four colleges and universities according to the second standard of ACRL is modeled level.

According to the research results of the third standard of ACRL, the average score of the information literacy level (the third standard) of four university students is 3.3, of which YNU (3.37) has the highest score and PEC (2.95) has the lowest score. According to the level evaluation standard, the information literacy level of students in four colleges and universities according to the third standard of ACRL is modeled level.

According to the research results of the fourth standard of ACRL, the average score of the information literacy level (the fourth standard) of college students in four universities is 2.98, of which SWFU (3.06) has the highest score and PEC (2.52) has the lowest score. According to the level evaluation criteria, the information literacy level of YAU and SWFU university students according to the fourth standard of ACRL is both moderate, and that of HHC and PEC university students according to the fourth standard of ACRL is the level of low level.

According to the research results of the fifth standard of ACRL, the average score of the information literacy level (the fifth standard) of four university students is 2.93, of which YNU (3.02) has the highest score and HHC (2.49) has the lowest score. According to the level evaluation criteria, the information literacy level of YAU and SWFU university students according to the fifth standard of ACRL is moderate, and that of HHC and PEC university students according to the fifth standard of ACRL is the level of low level.

According to the research results of the sixth standard of ACRL, the average score of college students' information literacy level (the sixth standard) in four universities is 3.04, of which YNU (3.15) has the highest score and HHC (2.52) has the lowest score. According to the level evaluation criteria, the information literacy level of YAU and SWFU university students according to the fifth standard of ACRL is moderate, and that of HHC and PEC university students according to the fifth standard of ACRL is the level of low level.

According to the scores of ACRL 6 criteria, the information literacy level of YAU and SWFU college students is higher than that of HHC and PEC college students, and the fifth criterion has the lowest score. It shows that colleges and universities should strengthen the cultivation and promotion of college students' academic research ability.

Use ANOVA to test whether there is significant difference in the level of information literacy among the four universities. The study found significant differences in information literacy among the four universities. However, the level of information literacy between YAU and SWFU students is the same. The level of information literacy between HHC and PEC students is the same. It shows that the information literacy level of undergraduate students is significantly higher than that of junior college students, and there is no significant difference in the information literacy level between students with the same education level.

2. Hypothesis test results

The analysis results of the influencing factors of college students' information literacy are as follows:

Among the individual factors, there is no significant difference between students' information literacy and gender, nationality, place of birth, middle school located, middle school uses the library, English level, learning style; There are significant differences between students' information literacy and age, grade, GPA, education level, computer level, number owning ICT facilities, number learning IL courses, using ICT facilities, need for success.

Individual factors, the information literacy of students is significantly different from university, age, grade, educational level, computer level, English level, number learned about ICT course, GPA, number owning ICT facilities; There is no significant difference between gender, nationality, residence, middle school located, use of the library in the middle school.

Educational factors, students' information literacy is significant between IL courses, digital resources, using teaching tools in the classroom, and multimedia assignments.

Cultural factors, students' information literacy has a significant relationship between attitude toward information literacy, number of published articles, and conduct collaborative projects; it has no significant relationship between parents' educational level and parents' careers.

Socio-Economic factors, students' information literacy is significant between interaction group of students with friends and colleagues, and satisfaction on IL facility. It has no significant between family income, economic and social status.

Multiple regression analysis results of each major hypothesis

Assume that the square of the multiple correlation coefficient of 1 equals 0.411. It shows that the change in individual factors can explain 41.1% of the change in information literacy. Multiple regression analysis of variance showed that $\text{sig} = 0$, at least one of the individual factors significantly impacts the level of information literacy.

Assume that the square of the multiple correlation coefficient of 2 equals 0.218. It shows that the change in educational factors can explain 21.8% of the change in information literacy. Multiple regression analysis of variance showed that $\text{sig} = 0$, at least one of the educational factors significantly impacts the level of information literacy.

Assume that the square of the multiple correlation coefficient of 3 equals 0.225. It shows that the change in cultural factors can explain 22.5% of the change in information literacy. Multiple regression analysis of variance showed that $\text{sig} = 0$, at least one of the cultural factors significantly impacts the level of information literacy. Assume that the square of the multiple correlation coefficient of 4 equals 0.245. It shows that changes in socioeconomic factors can explain 24.5% of the changes in information literacy. Multiple regression analysis of variance showed that $\text{sig} = 0$, at least one of the socio-economic factors significantly impacts the level of information literacy.

Results of multiple regression analysis

Use Enter method and multiple regressions to analyze the relationship between the four influencing factors and independent variables.

The square of the multiple correlation coefficients is equal to 0.48. It shows that the changes in four factors can explain 48% of the changes in information literacy. Multiple regression analysis of variance showed that $\text{sig} = 0$, at least one of the four factors significantly impacts the level of information literacy. The results of multiple regression analysis showed that Age; GPA; computer level; educational level; need for success; learning style; IL course; digital resources; multimedia assignments; attitude toward information literacy; conducting collaborative projects; the number of published articles; interaction group of students with friends and colleague; The relationship of the variable group can explain the variation of Y at 48% ($R^2=0.48$, $P<0.05$), factors have a significant impact on students' information literacy. It is explained that to improve college students' information literacy, we should pay attention to strengthening the cultivation of college students' communication and communication ability, enhancing their endogenous motivation, promoting the formation of suitable learning methods, strengthening the use of information technology equipment, enabling college students to master the use of conventional software and basic skills of document retrieval, improving the level of computer skills and advanced document retrieval ability, and strengthening the information acquisition, information understanding, selection, and application of college students. The cultivation of evaluation, reflection, and creativity will create more opportunities for students to participate in teachers' scientific research activities, build an innovative practice platform, write relevant experiences and summaries, and urge students to write more articles, thus improving their information literacy level.

3. Strategies for improving college students' information literacy

This study uses SWOT analysis to analyze Yunnan agricultural college students' strengths, weaknesses, opportunities, and threats in information literacy cultivation and improvement. It uses TWOS system analysis method to plan strategically to improve college students' information literacy. Through in-depth analysis of their internal weaknesses and external threats, and combining internal

strengths and external opportunities, put forward reasonable strategies and suggestions for improving college students' information literacy.

Through the interview, the SWOT analysis method is used to analyze the advantages, disadvantages, opportunities and threats of Yunnan agricultural college students in the process of information literacy cultivation and improvement, including five advantages: policy support, the richness of information resources, the advantages of specific groups of college students, and the information literacy education experience of teachers; 6 disadvantages: college students' information literacy retrieval ability is weak, college students' information ethics awareness is weak, college students' network security awareness is weak, the information literacy teaching model needs to be innovated, the information literacy educators' professional level is not enough, and the information literacy education curriculum and content are not specialized enough; 5 opportunities: intelligent learning environment support, comprehensive promotion of information literacy education reform, promotion of diversified teaching models, continuous promotion of education informatization, and implementation of rural revitalization strategy; Three threats: the lack of information literacy evaluation system for college students, the uneven level of students' information literacy, and the shortage of funds.

Based on SWOT analysis, according to the TOWS analysis, Delphi method is used to determine the weight and evaluation value of the influencing factors. Finally, the TOWS matrix is obtained, and ten strategies to improve the information literacy level of college students are proposed. The strategy mainly focuses on college students, teachers, universities, governments, families, and society and other multiple subjects following micro-macro, external promotion to endogenous, generalization to professional, and single subject to complete education. It proposes to build the information literacy improvement strategy for college students: "Students are the main body, teachers are the leading, colleges and universities are the key point, the whole society is involved, and the endogenous motivation of college students is the core."

1. Promote the professionalization of college students' information literacy teachers

a. Colleges and universities should strengthen the training and practice of teachers' information literacy level, build a platform for information literacy exchange and discussion, and improve teachers' information literacy level.

b. Improve the structure of professional teachers and build a large, professional, and capable backbone teacher team.

c. Give full play to the role of teachers in educating people and become the leader of students' growth through establishing a scientific evaluation system of teachers' information literacy.

d. The school should improve the mechanism of information literacy assessment, evaluation, and incentive, clarify the school policy guidance, and stimulate the intrinsic motivation of teachers to improve information literacy.

2. Continue to promote the construction of smart campus

a. Improve the information technology facilities on campus, improve the network conditions, and continue to promote the construction of mobile terminals and new media, strengthen the construction of brilliant classrooms, and provide environmental protection for modern education and teaching.

b. Promote the establishment of information resources co-construction and sharing platforms to realize the effective use of resources.

c. Strengthen the construction of network information security and improve the system defense capability.

d. Establish a data analysis system to provide academic support for school governance decisions.

3. Build information literacy practice teaching platform

a. Build several comprehensive sharing practice teaching bases and give full play to the comprehensive education function of the base.

b. Integrate and optimize practical teaching resources and systematically build a high-quality, practical teaching platform for agricultural and forestry colleges.

c. Create a subject competition platform to cultivate students' ability to access information expression and dissemination.

d. Rely on the rural revitalization organization platform to cultivate new talents who know and love agriculture.

4. Create a self-education environment and atmosphere for college students' information literacy

a. Strengthen the moral education of college students and cultivate a correct and scientific world outlook, outlook on life, and values; Give full play to the role of campus peers and create an upward and positive information literacy education environment.

b. Adhere to the combination of education and self-education, and stimulate the autonomy of college students' information literacy improvement by implementing educators' leading responsibilities.

c. Through improving the information ethics system and mechanism, strengthening the information ethics publicity and information ethics education, guiding and standardizing the information behavior of college students, and improving the information ethics self-discipline ability of college students.

d. Strengthen the education of network security laws and regulations and the construction of the university network security management team, improve the university network security management system, build the campus network security prevention and control system, and effectively enhance the university students' awareness of network security protection.

5. Build a teaching system that integrates general education, professional education, second classroom education and information literacy education

a. According to the different training levels and objectives, an information literacy curriculum system consisting of general, professional, and academic research information literacy is set up.

b. Take different training modes for different objects to make information literacy education targeted.

c. The information literacy education content is organically integrated into the professional courses so that the information literacy-related knowledge can penetrate all professional subject education.

d. The second classroom education and information literacy education are organically integrated to promote the information literacy level of college students by carrying out practical activities related to information literacy.

6. Building a diversified information literacy teaching model

a. Teachers must change teaching concepts and enrich and innovate teaching methods.

b. Build a new model of digital agriculture and forestry education, implement various teaching methods such as discussion, inquiry, and participation, and focus on improving college students' information literacy.

c. Improve the course assessment and evaluation system and establish a diversified assessment and evaluation system.

7. Develop the evaluation system of college students' information literacy indicators

a. Establish an information literacy authority in colleges and universities to provide a mechanism guarantee for developing an information literacy index system for college students.

b. Research and analyze the research results of information literacy at home and abroad, and provide ideas for formulating the information literacy indicator system applicable to Chinese college students.

c. Research evaluating college students' information literacy from multiple perspectives and optimize the evaluation index system of college students' information literacy.

8. Build digital resources co-construction and sharing platform

a. Strengthen the overall planning and coordination of high-quality resources of the library, avoid resource waste and repeated construction, and realize the open sharing of high-quality information resources.

b. Strengthen the construction of characteristic digital resources, update information resources in real time, and enhance the pertinence and timeliness of information resources.

c. Improve the digitalization level of library collection resources and the utilization rate of information resources.

d. Establish an information literacy education resource constructional team to realize the co-construction and sharing of information resources.

9. Give full play to the rich and diverse positive energy of college students' network

a. Make full use of new media, such as government websites, mainstream media, and party and government construction, to publicize the positive energy of the network and realize the leading role of information literacy values for college students.

b. Colleges and universities should give full play to the role of model and guide students to abide by network ethics consciously.

c. Actively use multi-angle and multi-channel information tools to strengthen the standardization of network information.

10. Create an atmosphere for the whole society to participate in the information literacy education of college students

a. The government should give full play to the leading role of policy and do an excellent job in the top-level design of cultivating college students' information literacy.

b. Strengthen the guiding role of mainstream media. Many measures have been taken to play the leading role of colleges and universities effectively.

c. Give full play to the shaping role of family education in cultivating college students' information literacy. Create an atmosphere for the whole society to participate in the information literacy education of college students.

Conclusion

According to the research results, the following conclusions are obtained.

1. The most significant factor affecting college students' overall information literacy level is the interaction group of students with friends and colleagues, followed by the need for success, GPA, using ICT facilities, learning style, computer level, and the number of published articles. It is explained that to improve the information literacy of college students, we should pay attention to strengthening

the cultivation of college students' communication and communication ability, enhancing the internal motivation of college students, promoting the formation of suitable learning methods, building a practice teaching platform of information literacy, strengthen the cultivation of practice ability information literacy, improve the level of computer skills and advanced document retrieval ability, encourage students to participate in teacher scientific research activities, promote college students to publish academic papers or scientific and technological innovation papers, encourage students to standardize the writing of papers, follow academic ethics, and experience the importance of information literacy in the process of writing papers, to improve the information literacy level of college students.

2. Educational achievements are directly related to the overall level of information literacy, which means that the higher the education level and the better the performance of college students, the stronger their ability to think independently and solve problems, so the higher the level of information literacy.

3. The use frequency and ownership of information technology equipment positively correlate with the overall information literacy level. The information literacy level of college students with longer average online time is significantly higher than those with shorter online time. The higher the number of information technology equipment, the higher the information literacy level of college students. It shows that strengthening the practice training of college students' information literacy helps improve the level of college students' information literacy.

4. Grade has a significant impact on the overall information literacy level. With the increase in grades, the overall level of information literacy is improving, which shows that the university learning atmosphere and information literacy education significantly affect the level of information literacy of college students.

5. There is a significant positive correlation between the application of information technology and students' overall information literacy level. The more information technology tools or platforms students use, the stronger their information awareness and cognition, information science knowledge, information application, and innovation ability.

6. The attitude of society, family, teachers and students, friends and mine to information literacy is significantly positively correlated with overall information literacy. The symbiotic environment of college students takes a positive and upward attitude towards information literacy, and the higher the level of information literacy of college students. It is suggested that when improving the information literacy level of college students, we should create a clean and clear network environment, carry forward positive energy, enable college students to establish a correct view of information, standardize their network information behavior, and enhance their information awareness and information ethics.

7. The information literacy education environment significantly impacts the overall information literacy level. Colleges and universities improve the campus network environment and build smart classrooms by building information literacy digital resource platforms; Teachers use information technology to innovate teaching methods and means; Build a teaching system that integrates general education, professional education, second classroom education and information literacy education, and enrich information literacy courses in multiple ways; Create a good information education environment to provide conditions for the improvement of college students' information literacy.

8. Peer interaction significantly impacts the overall level of information literacy. It shows that colleges and universities should build a communication and exchange platform for information literacy, encourage college students to actively participate in network information dissemination and research activities, and maintain independent thinking and value judgment in interaction with others, rather than blindly follow the crowd's opinions. College students should practice their network information knowledge in the interaction, aggregation and fusion of ideas, integrate the most practical knowledge structure for their development, and form the experience of improving network information literacy to improve the level of information literacy.

9. There is a significant positive correlation between students' self-efficacy and the overall level of information literacy. The higher the college students' self-efficacy, the stronger their information knowledge, awareness, morality, and ability. It

shows that colleges and universities should pay attention to cultivating students' endogenous motivation to improve information literacy, give them the ability of critical think and independently think of information, stimulate their interest in information technology, establish a correct view of information, and standardize their network information behavior. Influence

The improvement of information literacy of Yunnan agricultural college students can adopt appropriate strategies. However, it needs the long-term support of government agencies for the improvement of the information literacy of college students. The introduction of related policies and measures to promote the broad participation of the society, jointly create a clean and positive network environment, promote the self-efficacy of college students to improve information literacy, establish a correct world outlook, outlook on life and values, and improve the ability of differential thinking, Improve the legal awareness and moral awareness, and improve the information literacy level of college students.

The strategies formulated can positively impact the government, society, universities, and agricultural students.

1. By managing existing resources, colleges and universities can tap into potential teaching resources, strengthen cooperation between schools and enterprises, and build a digital resource co-construction and sharing platform to improve the problem of insufficient funds.

2. By offering three different levels of information literacy courses, namely general information literacy, professional information literacy, and academic research information literacy, students can master how to retrieve, analyze and evaluate the use of academic documents, the acquisition, abstraction, sublimation, expression, and dissemination of information, and the writing of academic essays, and improve their information retrieval ability.

3. Through strengthening the moral education, information moral education, and network security education of college students, college students should establish a correct and scientific world outlook, outlook on life and values, and improve the self-discipline ability of information morality and the awareness of network security protection.

4. Through establishing the university information literacy authority, drawing on the excellent research results of information literacy at home and abroad, strengthening the research on evaluating university students' information literacy, and optimizing the evaluation index system of university students' information literacy.

5. Teachers should change teaching concepts, enrich teaching methods, innovate teaching methods, pay attention to the guidance of college students' information literacy, build a diversified information literacy teaching model, and improve teachers' ability to use information technology to carry out education and teaching activities.

6. Schools should focus on strengthening the network moral education of college students and standardize and guide the information morality of college students with the moral standards of the network society.

7. Through formulating the training and planning policies for teachers' information literacy, teachers can establish information awareness of keeping pace with the times, actively learn extensive and comprehensive knowledge, and accumulate teaching wisdom. At the same time, we should have the sensitivity of information identification, the judgment of information value, and the integration of information resources. Actively participate in information technology exchange meetings and special lectures, actively share experiences, and improve teachers' personal information literacy and scientific literacy.

8. Stimulate college students' subjective initiative in learning, improve their academic performance, form conscious compliance with information ethics, and become the maintainer of the information environment, thus improving college students' ethics and safety awareness, aesthetic and discrimination ability, respect and cooperation attitude, and contribute to the overall improvement of college students' autonomous learning ability, innovation ability, lifelong learning ability, and comprehensive quality.

9. Improve university information infrastructure and create a good campus information environment.

10. Build a practical teaching platform for information literacy, provide an environment for information practice for college students, promote college students to use information technology equipment more skillfully, fully master the technology and skills of information literacy, and promote the cultivation of college students' creative practice ability.

11. Colleges and universities should pay more attention to the information literacy education of college students, regard the information literacy education of college students as an essential skill that students should master in the era of the information society, formulate the overall training goal of college students' information literacy ability, and formulate a complete and standardized teaching plan and outline according to this goal.

12. Strengthen the education and guidance of the public's information literacy, create a positive and upward information literacy environment, carry forward positive energy, and promote improving college students' information literacy.

13. Build a communication and exchange platform for information literacy, increase the channels of communication and interaction among college students, and improve information literacy.

Just as Guo Taimin stressed that the improvement of college students' information literacy needs the participation of the whole society and the cooperative construction of college students' information literacy education base to achieve cross-industry, cross-school, and cross-department teaching strategies; Strengthen the construction of information literacy teachers; Reform the curriculum, teaching content and teaching methods of information literacy; Develop information literacy evaluation system; Integrate information literacy education into curriculum teaching, combine it with innovation education, integrate it into extracurricular community activities, run through the whole process of university education, build a comprehensive and integrated information literacy education system, realize the overall improvement of college students' information literacy, and make college students more able to adapt to the development of the times and meet social needs.

Liu Danhe proposed to build an information literacy education system in colleges and universities, create information literacy education, and give full play to the subjective initiative of college students because of the varying level of information literacy training of college students, the imperfect information literacy evaluation system, and the disconnection between information literacy training and practical application; Integrate general education and professional education to cultivate college students' information literacy jointly; Rely on diversified learning platforms to promote the sharing of information literacy resources in colleges and universities.

Zhao Lixiang believes that strategies such as strengthening teacher information literacy training, building information literacy education atmosphere and environment, giving full play to the role of libraries and other resource platforms, strengthening network security education, and deepening the research of evaluation index system of information literacy should be taken to improve the overall level of information literacy of agricultural college students.

Therefore, the strategy for improving college students' information literacy proposed in this study is a systematic and comprehensive intervention measure. According to the actual situation, agricultural college students' information literacy can be improved by stimulating their endogenous motivation, increasing the attention of the government, universities, and society, strengthening the construction of information literacy education environment, and reforming teaching content.

Conceptual Implications of the Study

The presented concepts in this study can be helpful in the sense that improve college student information literacy can be considered from several different points of view.

This study can consider that analyzing the proposed strategies from the following perspectives is meaningful. Politics, economy, technology and social culture

Policy: The government needs government support to implement the information literacy promotion strategy for college students. With the advent of the information age, the country attaches more and more importance to information literacy education. It has introduced a series of systems, For example, the Education Informatization 2.0 Action Plan, the Key Points of Education Informatization and Network Security, the Guiding Opinions on Further Strengthening the Information Literacy Education in Colleges and Universities, and the Specification for the Construction of Digital Campus in Colleges and Universities (for Trial Implementation) emphasize the importance of information literacy training. The concept of strategy formulation meets national development needs. It is consistent with the national policy guidance so that it can ensure the implementation and effective implementation of the strategy proposed in this study.

Technology: The implementation of the strategy requires technical support from professional technicians. For example, to create an information literacy education environment, it is necessary to increase network bandwidth, improve network speed, and arrange wireless networks to ensure high-speed and smooth network; Purchase large-capacity servers to ensure the storage requirements of resources; Build smart classrooms to realize two-way interaction between teaching and learning; Improve the facilities and equipment of the computer room, build a virtual simulation laboratory, and ensure the teaching needs; Implement network security defense technology to ensure network security. The realization of technologies such as 5G, Internet of Things, big data, cloud computing and artificial intelligence has provided favorable conditions for building an information literacy

education environment with comprehensive perception, intelligence, data, networking and collaboration. Colleges and universities adopt the combination of "external introduction" and "internal training" to form a high-level professional technical service team to ensure the realization of the information literacy environment. First, we will select highly technical teachers to form a technical service team, carry out targeted training, and introduce skilled talents to improve the level of professional and technical services; Second, colleges and universities have carried out in-depth cooperation with operators such as China Mobile, China Unicom, and China Telecom, and the company has provided technical support to achieve joint construction and sharing, and the lack of professional and technical personnel.

Social aspect: The implementation of the strategy helps to build a social learning community, promote typical exchange and cooperation, establish correct values, carry forward positive energy, and create a positive information literacy environment.

It is not easy to evaluate the economic benefits of the strategy, but the effective implementation of the strategy is of great significance:

Students can actively acquire professional information resources, process and process them, cultivate innovative awareness in the professional direction, and improve their creative ability.

College students have good information literacy, master specific information knowledge information skills, and have particular information awareness and information concept, which can promote the cultivation of students' lifelong learning ability.

As the leading force in constructing the information society, college students have higher information literacy through high-quality information literacy education and training, which is the objective requirement of the information age for college students and the urgent need for the sustainable development of the information society.

The above analysis shows that the strategy is practical and feasible.

Impact of policy

The government can realize the management of the society by giving full play to its administrative functions, effectively integrate and allocate resources from all sectors of the society, and providing firm policy, institutional and economic guarantees for cultivating college students' information literacy. Therefore, in the process of cultivating and improving college students' information literacy, the government and universities need to establish a cooperation mechanism, give full play to the advantages of their respective resources, ensure the orderly development of college students' information literacy training project, and achieve better social benefits.

The government plays a vital role in the promotion strategy of college students. The government should include information literacy education in the development plan of the information industry, and formulate relevant supportive policies to promote the effective implementation of the policies. Colleges and universities are important positions of information literacy education. School leaders and general teachers should strengthen the concept of information literacy education and work together to do an excellent job in the research and implementation of information literacy education. In order to implement the formulated strategy, the government, society and universities should strengthen communication and cooperation, and work together to implement the strategic development plan. Therefore, college students can give full play to their subjective initiative by creating a digital information environment and a variety of information practice platforms, actively participate in information research practices, such as discipline competitions, social practices and community activities, and improve information processing ability and group cooperation awareness; Actively enhance the awareness of network rule of law and moral compliance, improve the self-discipline ability of information morality, and promote the improvement of college students' information literacy.

Through the development of strategies to improve the information literacy of college students, the most important is the subjective initiative of college students to improve information literacy, the support of the government, the attention of

colleges and universities, social participation, teachers' information literacy level, and the matching degree of the educational environment and information literacy, which will affect the implementation of the strategy.

Therefore, the factors that lead to the success of the information literacy promotion strategy for college students are as follows:

1. Subjective initiative of college students - It is the internal motivation of students' learning and plays a leading role in improving their information literacy. College students with solid subjective initiative can fully realize the urgency and importance of improving their information literacy, and are willing to take corresponding measures to improve their information literacy. In daily study and life, they take the initiative to find problems, put forward their opinions according to their thinking and observation, and then solve problems. Have a correct world outlook, outlook on life and values, have a strong spirit of innovation, strong self-discipline ability, and regulate their network behavior.

2. Organization and network - Even though every college student has strong information literacy, the information literacy education environment significantly impacts the improvement of information literacy, such as the attitude of society, peers, and teachers toward information literacy, the level of communication, and cooperation. Therefore, college students' information literacy needs to be carried out with the support of other subjects. By building an information exchange platform, establishing academic associations or organizations related to information literacy, and making full use of the complementary effects of disciplines, specialties, and fields to jointly and coherently carry out a series of activities, Each member organization should give full play to its academic leadership role in its field, organize its strength to carry out theoretical research and practical exploration, to activate college students' thoughts, change their ideas, create an information literacy education atmosphere, and stimulate college students' information literacy to improve their self-efficacy.

3. The joint participation of government, universities, society and family - college students are the core of policy implementation. The government, universities, society, and family all provide a guarantee for college students'

information literacy education, and the government is the top designer of college students' information literacy education; Colleges and universities are the main fronts of information literacy education; Social organizations are the guides of information literacy education, and family education is the shaper of information literacy cultivation, forming an information literacy education atmosphere led by the government, led by universities, guided by society, shaped by families, and dominated by college students.

Proposal

This study provides the following development directions for researchers to improve the information literacy level of college students in Yunnan Province.

Government

The government plays an essential role in improving college students' information literacy.

1. Let the government participate in the policy implementation process.

The government is the organizer and leader of the implementation of the policy. It will help the effective implementation of the policy by letting the local government participate in implementing the promotion strategy for college students.

2. Emphasize the importance of promoting college students' information literacy.

When promoting the implementation of the strategy, stakeholders need to know the benefits of the implementation and carry out publicity and training for stakeholders. The training objectives can be extended to all colleges and universities in Yunnan Province.

- a. It is conducive to creating a clean network environment, improving the information literacy of the public, and building a learning society.

- b. It is conducive to the development of the modern social economy, improves the quality of education, health, and human services, and promotes the effective participation of college students in the information society.

- c. It is conducive to improving college students' lifelong learning ability so that they can effectively seek, evaluate, use, and create information and achieve personal, social, professional, and educational goals.

d. It is beneficial for college students to master information skills, have the attitude and method of independent learning, and have the ability to solve problems and innovate; and is conducive to cultivating innovative talents in colleges and universities and improving the effectiveness of education.

3. The government should strengthen the construction of infrastructure and give full play to the role of organization and coordination.

a. The government guides higher education to attach importance to information literacy by issuing relevant policies, formulating laws and regulations, and increasing financial allocations.

B Increase the investment in information literacy funds, set up special funds, improve the fund application system, achieve "earmarked funds for special purposes," improve the facilities and equipment related to information literacy step by step in a planned way, and focus on supporting the technology related to information literacy such as network security prevention technology, intelligent garbage filtering information technology, network acceleration, intelligent interactive equipment research, and development.

c. The education management department shall organize relevant departments to regularly evaluate university students' information literacy education level and give honor and material support to the universities with outstanding achievements.

d. The government can realize the management of the society, effectively integrate and allocate the resources of all parties in the society, and promote cooperation and exchange at different levels and in different forms by giving full play to its administrative functions and macro-guiding role. It can provide firm policy, institutional, and economic guarantees for cultivating college students' information literacy.

Policymakers

The implementation of the strategy involves various government departments at all levels. To effectively implement these strategies, the central and local governments, education departments, and departments need to strengthen communication and coordination and smooth the implementation of policies. To

formulate feasible policies, policymakers and policy stakeholders need to participate in developing strategies as soon as possible.

a. Deepen the understanding of the essential strategic significance of improving college students' information literacy, formulate effective national strategic planning in line with the national conditions, implement effective management, and provide a guarantee for improving college students' information literacy.

b. According to the needs of China's national modernization development, establish an authoritative research institute of information literacy, dynamically update the evaluation standards of college students' information literacy, keep the evaluation criteria up with the times, and make the evaluation results more scientific and operational.

c. Formulate the national programmatic document of college students' information literacy, including the content and standards of college students' information literacy, and more clearly define the responsibilities of all parties to cultivate and improve college students' information literacy, including the responsibilities of governments at all levels, relevant government departments, educational institutions, universities. In developing college students' information literacy, and clarify the funding policy of the government to support the development of college students' information literacy and the ways and methods of assessing the participation of all departments.

d. Establish a monitoring and evaluation system for policy implementation, and use scientific monitoring and evaluation methods to provide feedback on the policy implementation and adjust the policy continuously.

f. When formulating the information literacy training policy for college students in the region, the local government should combine the actual situation, thoroughly read the relevant national policies, and formulate local policies suitable for the region's development.

Universities

As the primary position of information literacy education for college students, colleges and universities need to participate in the implementation of policies and take effective measures and means to improve their information literacy.

a. According to the basis of teachers' information literacy, different disciplines, and the actual needs of teaching work, colleges and universities carry out school-based training at different levels and in a planned way to make the activity targeted and personalized and stimulate teachers' subjective initiative.

b. Create conditions for improving teachers' information literacy by improving campus network conditions, strengthening network security construction, building smart classrooms, and building effective data teaching implementation and evaluation systems.

c. A teacher learning organization based on the Internet. Its internal members have a shared learning vision and learning objectives and form a particular dependency relationship. They communicate, cooperate and share problems to improve teachers' information literacy.

d. Create experimental conditions suitable for the improvement of college students' information literacy, improve the equipment in the computer room, build a virtual laboratory, and pay attention to the training of college students' information literacy practical ability so that students can master and consolidate information literacy skills in the actual operation training.

e. Give full play to the role of "campus blog," "network teaching platform," and "official campus account," build an exchange platform integrating ideology, knowledge, interest, and service, and provide teachers and students with good information platforms for learning and communication.

f. Take multiple measures to stimulate the subjective initiative of college students to improve their information literacy.

- Moral education should be run through talent training to help students establish correct and scientific world outlooks, outlooks on life, and values.

- Strengthen the construction of moral education teachers to guarantee the value and role of moral education.

- We should strengthen information ethics education and cultivate college students' good information ethics quality and critical thinking.

- We should strengthen the publicity of information ethics, help college students establish correct information ethics concepts, enhance information ethics awareness, and increase information moral-related knowledge.

g. Colleges and universities should pay full attention to the integrity of the information ecosystem. Building a good information ecosystem will be conducive to extending, developing, and innovating information literacy education.

College student

As the main body of information literacy improvement, college students' endogenous motivation is the core. The clean and positive network environment depends on external factors such as government, environment, and universities and the subjective initiative of college students' self-improvement. Only by combining environmental education, interactive education, systematic education, and self-education into a reasonably closed loop of information literacy improvement education and thoroughly stimulating college students' autonomy and initiative can education be implemented in detail.

1. Enhance the consciousness and initiative of information literacy improvement.

a. Establish correct emotions, attitudes, and values through information literacy education.

b. Combine the development of the times with personal needs, and formulate a personal information literacy development plan.

c. Learn to independently identify and criticize information from different sources, maintain a critical awareness of information, independently determine the true and false information, and have strong identification ability and prevention awareness.

2. Enhance self-discipline.

a. Learn to control emotions in the network to prevent uncontrolled emotions from causing improper words and deeds.

b. Before making a speech, we should fully consider whether the information we express is normative and appropriate and whether it will harm society or others.

3. Actively participate in different information research practices.

a. Actively participate in the legal publicity practice of network information and become a loyal advocate, conscientious follower, and firm defender of the rule of law.

b. Actively participate in all kinds of competition activities, community activities, and project research activities, such as multimedia competitions, retrieval skills competitions, network knowledge activities, summary writing competitions, and excellent student thesis exhibitions, to improve the practical ability of college students' information literacy.

c. Actively participate in campus network learning and communication platform, actively express personal views, and maintain independent thinking and value judgment in communication and interaction.

d. Actively participate in the construction of agricultural modernization, go deep into agricultural enterprises, rural areas, and farmers to carry out practical activities, consolidate professional knowledge, and improve helpful ability.

4. Improve self-cultivation of moral information.

a. Frequently communicate with people with noble moral character, rich knowledge reserves, and high information moral cultivation, and improve their moral cultivation through imperceptible influence.

b. Browse the reports that represent positive energy, take the essence of information ethics from them, and simultaneously give full play to the power of example.

c. Carefully study and attach importance to the information ethics laws and regulations, and effectively analyze the cases of information ethics violations and crimes, especially the actual cases of college students' information violations and crimes.

Suggestions for further research

The research background of this paper is based on the current, phased, and predictable information development and social life. Aiming at the factors that affect the improvement of information literacy of agricultural college students, this paper proposes strategies to improve information literacy. The research can provide some

reference for the academic community at a certain level. However, in terms of the future development trend, with the gradual deepening and popularization of 5G technology, the promotion of smart cities, innovative campuses, and rural revitalization strategy, the realization of agricultural modernization and other information environment development, social change and transformation may, even more, subvert the current people's cognition and image. Under this trend, the connotation of information literacy will be more diversified and unknown. In addition to the limitations of subjective factors such as the author's research perspective, academic level, and practical ability, this paper still has research deficiencies, which can be studied from the following aspects.

1. Through the action research of participants, it is beneficial to improve the effectiveness of the research strategy on the information literacy of college students since its implementation. Through effective intervention measures, it is helpful to enhance the communication and interaction of all participants and improve the ability of information literacy.

2. When studying the influencing factors of college students, we should consider adding some variables. Such as university students' values, outlook on life, value judgment, information ethics, social responsibility, and information literacy knowledge; The importance of social organizations and groups.

3. This study selects agricultural college students from four universities in Yunnan Province as the research object. The breadth of the survey object needs to be increased, which may lead to the low universality of the analysis results. The next step is to expand the survey scope, make the survey results general, complete the survey data more scientific and reliable, and make the proposed policies more targeted and applicable.

4. Due to the time limitation, this study did not analyze the implementation effect of the proposed policy. It evaluated the feasibility of the policy implementation from economic and social benefits.

Economic standards:

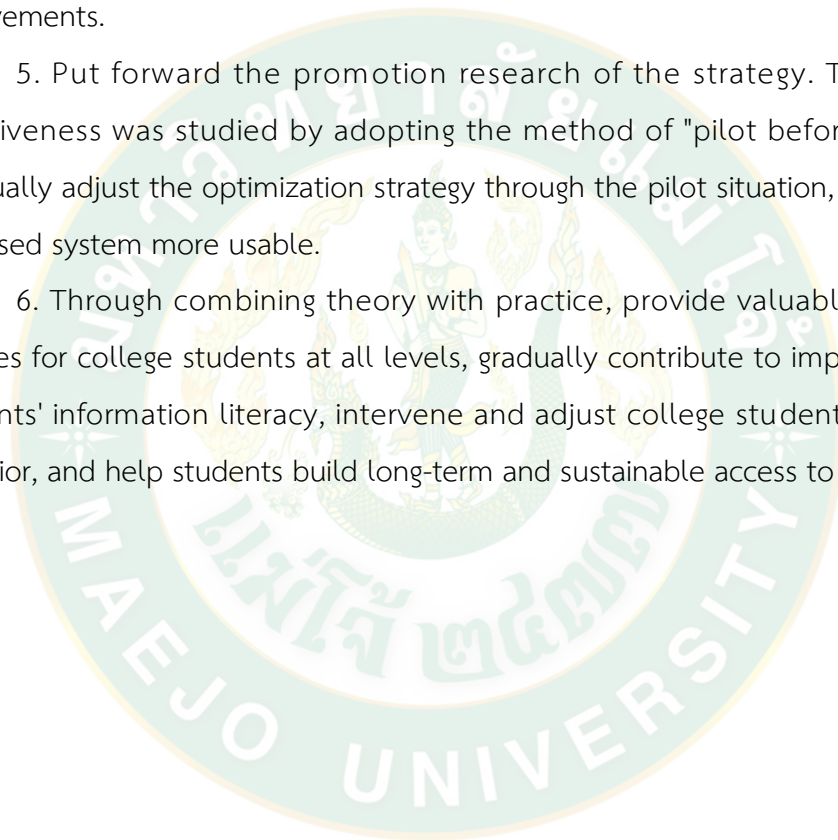
- The formation of an information literacy education ecosystem
- Student's academic performance

- Students' scientific research level, published articles, competitions
- Employment and entrepreneurship of students

Social standards: the ability of the public to self-educate information literacy, especially the ability of college students to self-educate information literacy; The degree of influence of external environmental factors on college students; Construction and implementation of information literacy education ecosystem; Abide by network ethics and respect intellectual property rights and other people's work achievements.

5. Put forward the promotion research of the strategy. The strategy's effectiveness was studied by adopting the method of "pilot before promotion. "Gradually adjust the optimization strategy through the pilot situation, and make the proposed system more usable.

6. Through combining theory with practice, provide valuable information services for college students at all levels, gradually contribute to improving college students' information literacy, intervene and adjust college students' information behavior, and help students build long-term and sustainable access to information.



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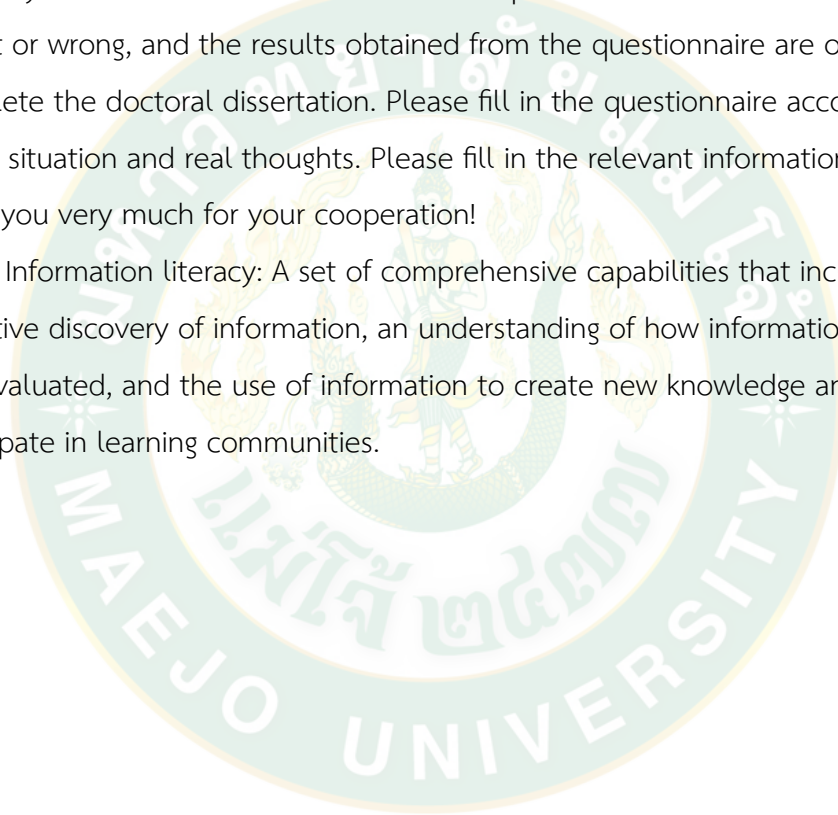
APPENDIXS

Information Literacy Questionnaire for College Students

Dear classmate:

Thank you very much for completing this questionnaire. In order to understand the current level of students' information literacy, this questionnaire was specially developed. Please read the questions and answers carefully, and then fill in the questions one by one according to your views on the narrative. This survey uses an anonymous method. The answers to this questionnaire do not matter whether it is right or wrong, and the results obtained from the questionnaire are only used to complete the doctoral dissertation. Please fill in the questionnaire according to the actual situation and real thoughts. Please fill in the relevant information truthfully, thank you very much for your cooperation!

Information literacy: A set of comprehensive capabilities that includes reflective discovery of information, an understanding of how information is generated and evaluated, and the use of information to create new knowledge and reasonably participate in learning communities.



Part I Individual factors

No Q	Questions
1	University:
2	Gender: A. Female B. Male
3	Nationality:
4	Age Group: A. Under 18 years old B. 18-20 years old C. Over 20 years old
5	Home Location: _____Province
6	Place of birth: A. Urban B. Rural
7	Level of Education: A. Undergraduate B. College students
8	Major:
9	Grade: A. First year B. Second year C. Third year D. Fourth year
10	GPA:
11	Computer Level: A. NCRE:level 1 B. NCRE:level 2 C. YCRE:level 1 D. YCRE:level 2 E. Didn't take the exam F. Failed in the examination
12	English Level: A. CET 4 B. CET 6 C. TOEFL score over 90 D. IELTS score over 6 E. Didn't take the exam F. Failed in the examination
13	Owing ICT Facilities (Multiple choice): A. Smartphone B. Tablets C. Portable D. Stationary computers
14	What you have learned about information technology courses. (You can choose more than one option) A. Basic Computer Science B. Sci-technology article Search C. Database D. Programming
	Using ICT Facilities: 15-19
15	How many years have you been using computer ? A. Less than 1 year B. 1-3 years C. 3-6 years D. More than 6 years
16	How long do you spend online average daily? A. Less than 1 hour B. 1-2 hours C. 2-3 hours D. More than 3 hours

17	The average number of times you go to the library per week. A. Less than 1 time B.1-2 times C.2-3 times D. More than 3 times
18	You master and use software such as PowerPoint/Word/Excel. A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree
19	You are proficient in downloading school digital library resources, and documents in different formats can be opened with corresponding software. A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree
The need for success: 20-22	
20	I will do my best to make things better. A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree
21	When I fail the exam, I will find out why the exam is not good. A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree
22	I have the courage to challenge difficulties. A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree
Learning style: 23-25	
23	<i>I prefer to learn by looking and listening.</i> A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree
24	<i>As I read the article, I like to analyze the subject and its various aspects.</i> A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree
25	<i>I do my best to share my thoughts and opinions with others.</i> A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree

Part II Educational, Cultural, Socio-Economic factors

Educational factors: 1-8	
1	The information technology courses offered by the school can meet my learning and computer grade examination needs. A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree
2	The information technology courses offered by the school are of great help in improving information literacy. A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree
3	The digital and paper teaching resources about agriculture provided by the school can meet my learning needs. A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree
4	There are at least two or more multimedia teaching equipment available in the classroom. A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree
5	Teachers are proficient in using multimedia teaching equipment (such as PowerPoint, Video and audio, etc.) When teaching in the classroom. A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree
6	Teachers often use mixed online and offline teaching? A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree
7	Teachers often assign multimedia assignments? A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree
8	When teachers assign homework or exams, they often have homework or exam questions in the form of dissertations, designs and reports. A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree
Cultural Factors: 9-26	
9	You know the core journals of agriculture. A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree
10	You know a lot about "information literacy". A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree
11	Teachers often cite other people's opinions / articles in the classroom teaching. A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree
12	Teachers often pay attention to the novelty and practicality of citing other people's resources in classroom teaching. A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree

13	<p>When a teacher teaches a certain theory in class, he can always present his own unique opinion.</p> <p>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</p>
14	<p>Your friends or classmates forward unverified information or remarks online.</p> <p>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</p>
15	<p>Do you often receive spam or harassing calls?</p> <p>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</p>
16	<p>Your friends or classmates often use pirated software or books.</p> <p>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</p>
17	<p>The computer in the school's computer room has anti-virus software and system restore function installed.</p> <p>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</p>
18	<p>You are well aware of the latest developments in your major</p> <p>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</p>
19	<p>You are very clear about the national policies on rural areas, such as digital agriculture, smart agriculture, agricultural informatization, Rural Revitalization Strategy etc.</p> <p>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</p>
20	<p>Parents' highest education level</p> <p>A. Primary school B. Junior high school C. High school</p> <p>D. Junior College student E. Undergraduate F. Postgraduate or above</p>
21	<p>Parent's career</p> <p>A. Unemployed, unemployed, semi unemployed or agricultural workers in urban and rural areas</p> <p>B. Workers or business service personnel</p> <p>C. Individual business or general clerks</p> <p>D. Professional and technical personnel or private enterprise owners</p> <p>E. Senior managers or government leaders</p>
22	<p>Which of the following career types is the most among relatives and friends?</p> <p>A. Unemployed, unemployed, semi unemployed or agricultural workers in urban and rural areas</p> <p>B. Workers or business service personnel</p> <p>C. Individual business or general clerks</p> <p>D. Professional and technical personnel or private enterprise owners</p> <p>E. Senior managers or government leaders</p>

23	I often participate in cooperative projects. <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>
24	I know how to do project research. <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>
25	I know how to write a research report / article. <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>
26	I have published more than one research report / article. <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>
	<i>Socio-Economic Factors : 27-33</i>
27	Whenever I encounter difficulties, I always get encouragement from my friends. <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>
28	I can learn a lot of knowledge and experience from my friends. <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>
29	I often share my learning experience with classmates and friends. <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>
30	Your family's socio-economic status is at an advanced stage. <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>
31	Your family's per capita income is higher than the local average. <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>
32	Whenever I go to the school's reading room or computer room, I always find a computer. <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>
33	I have access to all the school's teaching resources anytime, anywhere. <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>

Part III How to Match the Questions in questionnaire with indicators of IL

No Q	Questions
	<i>Authority is constructed and contextual : 1-5</i>
1	<p><i>You believe more about the price of agricultural products in government website.</i> <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i></p>
2	<p><i>When you screen and evaluate information, the authority of publications and authors is an important indicator to evaluate the credibility of information.</i> <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i></p>
3	<p><i>I have the ability to judge the authenticity, reliability and accuracy of information.</i> <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i></p>
4	<p><i>When you need to write an article on the theme of "digital agriculture", you can summarize your views by consulting a lot of literature.</i> <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i></p>
5	<p><i>When others question your report that "improving farmers' information literacy is the key to solving the" three rural "problems, you may joint research and discussion</i> <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i></p>
	Information Creation as a Process : 6-10
6	<p><i>When farmers want to increase the yield of rice, you will collect information about improved rice varieties and efficient and low-cost cultivation techniques.</i> <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i></p>
7	<p><i>In the process of using Baidu and other search engines, the search words you use can accurately match the information you want to find</i> <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i></p>
8	<p><i>When you have obtained the relevant academic resources on the theme of "agriculture, rural areas and farmers", you will process or reorganize them to form your own views.</i> <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i></p>
9	<p><i>In order to promote a certain agricultural and sideline product, the marketing methods can be audio, video, broadcast, pictures and text.</i> <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i></p>
10	<p><i>When you want to go to the countryside to introduce agricultural related knowledge, you emphasize that the explanation content is easy to understand.</i> <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i></p>

	Information Has Value: 11-15
11	When you cite other people's research results or discussions in your article, you will list them in the form of citations (references). <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>
12	As you know, intellectual property rights generally have a time limit, that is, the legal protection of intellectual property rights has a time limit. <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>
13	When you receive a message like "Congratulations, you won the prize," you first think that the message is false. <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>
14	In the Internet age, you can effectively protect personal privacy, account number, password and other information, and protect personal information security. <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>
15	In the Internet age, you are both a contributor to the information market and a consumer. Do you agree with that? <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>
	Research as Inquiry: 16-20
16	You always keep an open mind and admit that your opinions or conclusions may be biased due to lack of personal knowledge or experience. <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>
17	When you need to write "Yunnan vegetable industry demand report", market research may be the most appropriate method. <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>
18	You can analyze from a pile of disorganized information, extract the gist of the information, and get reasonable conclusions. <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>
19	You should be able to quickly determine the research objects, quantity and methods of the research. <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>
20	You can always find new problems and problems through reading the literature. <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>
	Scholarship as Conversation : 21-25

21	When you participate in academic exchanges in the agricultural field, you dare not express your opinions or suggestions if there are authoritative agricultural experts participating in the academic exchange. <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>
22	When you participate in the exchange on the theme of "The Impact of Rural Revitalization Strategy on Agricultural Development", you can fully understand the content of the theme and express your views around the theme. <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>
23	When you participate in a topic discussion online, you pay attention to online ethics and the objective truthfulness of your views when expressing your views. <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>
24	You can correctly evaluate the academic contributions of others and cite the contributions of others in your information products. <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>
25	If you want to exchange and learn relevant professional knowledge with experts in the agricultural field, there are many ways you can communicate with experts, such as send emails, make phone calls, participate in academic exchanges and so on. <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>
Searching as Strategic Exploration : 26-30	
26	You often use the advanced search function in search engine or database retrieval. <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>
27	In the process of using Baidu and other search engines, the search words you use can be accurate and always match the information you want to find. <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>
28	Suppose you want to study "The Impact of Family Relationships on Academic Achievement of College Students", You can search for the information you need. <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>
29	You often use Boolean logic operators: and, not, or retrieval methods. <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>
30	Google is web search engine. <i>A.Strongly Agree B.Agree C. Neutral D. Disagree E. Strongly disagree</i>

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