วารสารผลิตกรรมการเกษตร
MAEJO JOURNAL OF AGRICULTURAL PRODUCTION
MJU

The Level of Information Literacy and its Influencing Factors of Agricultural Students in Higher Education of Yunnan, China

Qiu Jing Chalermchai Panyadee* Somkid Kaewtip and Pradtana Yossuck

Administrative Science, School of Administrative studies, Maejo University, San Sai, Chiang Mai 50290
* Corresponding author: chalermc@mju.ac.th

(Received: 1 March 2023; Revised: 31 March 2023; Accepted: 22 May 2023)

Abstract

Exploring the influencing factors in the process of improving college students' information literacy is the key to effectively improve the level of college students' information literacy. This paper aims to determine information literacy level of agriculture students in higher education of Yunnan and analyzes the influencing factors of information literacy of agricultural college students in Yunnan province of China by consulting relevant literature and using constructivism theory, and designs a questionnaire, which has passed the reliability and validity test. The 385 college students were selected by hierarchical random sampling in four university. SPSS 21.0 is used to analyze the survey data. The research results show that the information literacy level of agricultural college students was at the middle level, and the academic research ability and information inquiry ability of college students have the lowest score; The research found that grade, GPA, computer level, educational level, need for success, learning style, Information Literacy (IL) course, digital resources, multimedia assignments, title to information quality, conduct collaborative projects, number of published articles, interaction group of students with friends and colleague 14 factors, such as satisfaction on IL facility, have a significant impact on the level of college students' information literacy.

Keywords: Information literacy level, influencing factors, agricultural students, constructivism

Introduction

With the rapid development of modern information technology, information has become an indispensable and important resource in the information age. At the same time, problems such as information explosion, information garbage and information gap have brought great challenges to people's selection of high-quality information. It can be seen that having certain information literacy plays a very important role in people's life, study and work. As the famous American futurist Alvin Toffler pointed out in the book "Powershift: Knowledge, Wealth and Violence at the Edge of the 21st Century", "whoever has knowledge and information will have the power to dominate others."

College students are high-level talents trained by the country. The level of college students' information literacy is related to the construction and development of China's information society, and has been widely concerned and valued by the country and society. The research on "college students' information literacy" mainly focuses on the strategies, teaching methods and evaluation of college students' information literacy, but the research on the

influencing factors of college students' information literacy is less.

In view of this, this paper investigates the information literacy level of agricultural college students in Yunnan province, studies and analyzes the factors that affect the information literacy level of college students, with a view to providing reference and reference for the information literacy research of agricultural college students in Yunnan province.

Research overview

Constructivism

The objectives of this study are to evaluate the level of information literacy among higher education agriculture students in Yunnan and analyze the factors influencing information literacy. Constructivism theory (Fardanesh and SheikhiFini, 2002) emphasizes student-centered, pays attention to the active exploration and discovery of knowledge and the active construction of the meaning of knowledge learned. The cultural model of Montiel-Overall (2007) is a typical study based on constructivism, which emphasizes the impact of cultural and social situations on information literacy. Therefore, researchers should take full account of situational factors, such as educational, social, cultural and economic situations, when using constructivism to study the influencing factors of information literacy.

Research on influencing factors of college students' information literacy

Through consulting relevant literature, the main factors that affect college students' information literacy include four dimensions: individual factors, educational factors, cultural factors and socio-economic factors.

Some researches studied that the level of information literacy of boys is significantly higher than that of girls (Chunxiang, 2020). There is a significant positive correlation between grade and information literacy level (Samson, 2010); however, some scholars (Xing *et al.,* 2022) found that grades have no significant impact on information literacy. Major, ICT use, ICT attitude, completion of computer courses, self-efficacy, student origin, learning motivation, learning interest and significantly affect college students' information literacy (Aesaert *et al.*, 2015; Kim *et al*., 2014;. Yuan, *et al.*, 2010).

New media technology, environment and information, personal participation, hardware facilities, software facilities, family support, library construction, national education policies, curriculum and teachers' teaching methods have a significant positive impact on college students' information literacy. (Changliang *et al.,* 2017; Maybee and Zilinski, 2015; Shuliang and Xianrui, 2018)

Cultural adaptability, different regions, family literacy index, parents' occupation and school level have certain influence on students' information literacy. Scherer (Rohatgi *et al.,* 2016)

Kim *et al.* (2014) and others found that students' satisfaction with using ICT in the classroom has a certain impact on students' information literacy. However, the level of family economic income has no significant impact on college students' information literacy (Yong and Hao, 2020). Huang Yuesheng (Yuesheng and Li, 2020) and other studies (Dazhu, 2019) believe that family factors are important factors affecting college students' information literacy.

Materials and Methods

This study adopted quantitative and qualitative research methods, and selected agricultural college students from four local universities in Yunnan province as the research object, using the hierarchical random sampling method. This study adopts the questionnaire

survey method, which is carried out in the form of paper questionnaires. We calculated a sample size of 385 from a population of 10274 agricultural students (university and college levels) using the Taro Yamane formula (Yamane, 1973) at reliability level 95% (e = ±5%) and a systematic random sampling based on student identification numbers. A total of 385 questionnaires were collected by four local universities in Yunnan, then divided 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. After that, we divided into two groups according to the gender of men and women, conduct random sampling to determine the subjects.

Questionnaire design

The research was carried out in the form of multiple-choice questions. The questionnaire was measured using the five-level Likert scale, which was divided into very agree, agree, general, disagree, and very disagree, and assigned values of 5, 4, 3, 2, and 1 respectively. The level of information literacy is measured by six standards in the Framework for Information Literacy for Higher Education, five questions is designed for each standard, with a total of 30 questions. 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. The level of information literacy in this study are 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.

Reliability and validity test

This study uses Cronbach's alpha to test the reliability of the questionnaire. After calculation, the total Cronbach's alpha is 0.918, indicating that the questionnaire has good reliability and strong explanatory power. The validity of the questionnaire was verified by exploratory factor analysis. After analysis, the Kaiser-Meyer-Olkin (KMO) value of the questionnaire was 0.798, and the P value of Bartlett's spherical test was 0, indicating that there was correlation between the data and the questionnaire was valid. From the results of reliability and validity analysis of the questionnaire, the structure between the observation indicators and items of the questionnaire was reasonable and can better reflect the real situation of college students' information literacy.

Results and Discussion

Information literacy level of college students

This study analyzed the information literacy level of college students, and the results are shown in Table 1.

Table 1 Information literacy level of agricultural college students in Yunnan province

Standard	Min	Max	Mean	Standard deviation of mean (S.D.)	Total average	Level of information literacy
Significance test S1	6	24	15.29	3.14	3.06	Moderate
Significance test S2	8	23	15.32	3.08	3.06	Moderate
Significance test S3	6	24	16.52	3.18	3.30	Moderate
Significance test S4	6	23	14.39	3.21	2.88	Moderate
Significance test S5	5	21	14.15	2.71	2.83	Moderate
Significance test S6	6	24	14.89	3.5	2.98	Moderate
Total	**8**	**22**	**15.1**	**2.34**	**3.02**	**Moderate**

The results of Table 1 showed that the average score of information literacy of 385 college students participating in the survey was 3.02, which is at the Moderate level. Among the six criteria of information literacy, the third one scored the highest, with an average score of 3.3; the average score of information literacy in the fifth standard is 2.83, followed by 2.88 in the fourth standard. It shows that among the information literacy level of college students, college students have certain basic information literacy ability, but their critical awareness of information, information retrieval, effective application of information, academic research and other advanced application abilities are relatively weak. Schools should focus on strengthening the cultivation and improvement of students' information analysis and research ability.

Influencing factors of college students' information literacy

In order to further explore the common influence of college students' personal characteristics, educational factors, cultural factors and economic and social factors on college students' information literacy, this study sets each variable of the above four factors 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 (Table 2).

Table 2 Multiple regression analysis results of dependent variable information literacy level and influencing factors

Model	Unstandardized Coefficients		Standardized Coefficients	Significant level (Sig) P
	B	Std. Error		
(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	0.010**
X_{14} Multimedia assignments	-0.540	1.098	-0.024	0.023*
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

Table 2 Multiple regression analysis results of dependent variable information literacy level and influencing factors (Cont.)

Model	Unstandardized Coefficients		Standardized Coefficients	Significant level (Sig) P
	B	Std. Error		
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]				

Remarks: * indicates significant difference (P<0.05)
** indicates significant difference (P<0.01)

The results of Table 2 showed the relationship of X_1 age, X_2 GPA, X_3 computer level, X_5 educational level, X_8 need for success, X_9 learning style, X_{11} IL course, X_{13} digital resources, X_{14} multimedia assignments, X_{15} attitude toward information literacy, X_{18} conduct collaborative projects, X_{19} number of published articles, X_{20} interaction group of students with friends and colleague, X_{22} satisfaction on IL facility, all together explained Y with information literacy level (R = 0.693, P<0.05). The relationship of variable group can explain variation of Y at 48% (R^2 = 0.48, P<0.05). The regression model can be written as follows:

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

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

GPA – The better the student's performance, the higher the student's information literacy score. This shows that the better the students' 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 score of information literacy of students who have passed the computer grade examination is significantly higher than that of students who have not passed the computer grade examination. This shows that students who have passed the computer grade examination have more information technology knowledge and 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 and Shuzhen, 2011) showed that students with different levels of education have great differences in information literacy. It has showed 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 stronger the self-efficacy of college students, the stronger their learning habits and self-discipline, and the higher their score of information literacy. This is consistent with the existing research results (Hang *et al.,* 2022; Jinmu and Linzhuo, 2021; Xu and Wang, 2019). Students' self-efficacy has a positive impact on the improvement of information literacy. This 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 certain 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 has a certain impact on 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 and Xianrui, 2018) and others believe that curriculum was the strongest 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 the cultivation of college students' information literacy.

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

Multimedia assignments – The form of assignments assigned by teachers has a certain impact on college students' information literacy. Wang Haiyan and Fu Liping (Wang and Liping, 2006), a scholar, believes that students' information literacy related to teachers' information literacy level. The higher the level of information literacy of teachers, the higher the degree of integration of modern information technology and curriculum teaching. The arrangement of multimedia assignments, essays, research reports, etc., has conducive to improve the information literacy of college students.

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

Conduct collaborative projects – The research of university students' participation in the project has a certain 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 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.

Number of published articles – The more papers published by college students, 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 exercise and cultivate students' information practice, exploration and innovation ability.

Interaction group of students with friends and colleague – cooperation and exchange between college students and their peers can promote the level of 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 on IL facility – The degree of satisfaction of information technology equipment has a certain impact on college students' information literacy. Kim *et al.* (2014) found that students' satisfaction with using ICT in the classroom has a certain impact on students' information literacy.

Conclusion

In summary, the information literacy level of college students in the four universities surveyed is generally not high, and is at the middle level. From the six criteria of college students' information literacy, college students' academic inquiry ability scores were the lowest, indicating that college students' ability to apply professional knowledge to practice is weak, and the integration of teaching and scientific research is not enough. Universities should focus on strengthening the cultivation and improvement of college students' ability to analyze, explore and research information. Among the 22 influencing factors of college students, 14 have a significant impact on their information literacy. They are grade, GPA, computer level, education level, success demand, learning style, IL course, digital resources, multimedia homework, and attitude to information literacy, cooperative projects, number of articles published, communication and interaction between students and friends and colleagues, and satisfaction with information technology equipment. Therefore, colleges and universities should pay attention to improving the students' endogenous motivation, encourage them to participate in the computer grade examination, actively participate in teachers' scientific research projects and independently apply for scientific research projects, and actively write research reports and essays. Universities should include students' application for projects, published articles, and awards into students' comprehensive performance evaluation, and give extracurricular credit awards. Universities should improve the network environment, build smart classrooms, and strengthen the construction of digital resources. At the same time, universities should do a good job of information literacy service support to improve teachers and students' satisfaction with the information literacy education environment; Information literacy education in universities should be differentiated and focused on the curriculum, teaching difficulties and teaching methods according to different education levels and grades, so as to make the teaching content more targeted. The improvement of information literacy of Yunnan agricultural college students can adopt appropriate strategies, but it needs the

long-term support of government agencies for the improvement of information literacy of college students, and the introduction of corresponding 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.

References

Aesaert, K., V.D. Nijlen, R. Vanderlinde, J. Tondeur, I. Devlieger, J.V. Braak. 2015. The contribution of pupil, classroom and school level characteristics to primary school pupils' ICT competences: A performance-based approach. Computers & Education 87: 55-69. Available: https://doi.org/10.1016/j.compedu.2015.03.014.

Changliang, Z., W. Xiwei, J. Ruonan and L. Jiaxing. 2017. Research on evaluation indicators and methods of new media information literacy from the perspective of information ecology. Information and Data Work 4: 23-29. [in Chinese]

Chunxiang, LV. 2020. Research on the Current Situation and Countermeasures of College Students' Information Literacy under the Background of "Internet plus" Taking S University as an Example. Chinese Journal of Multimedia and Network Teaching: Electronic Edition 16: 214-217. [in Chinese]

Dandan, C. 2019. Study on the status of information literacy and coping of nursing graduate under diversified teaching methods in Jilin university. Jilin University, Jilin, China. [in Chinese]

Dazhu, L. 2019. Research on the information literacy level and its influencing factors of freshmen in local colleges and universities. Guangxi Normal University, Guangxi. [in Chinese]

Fardanesh, H. and F.A. SheikhiFini. 2002. An Introduction to Constructivism in Psychology and Educational Sciences. Psychology, Education 12(42): 125-146

Haiyan, W. and F. Liping. 2006. Investigation and Analysis of the Information Literacy of Primary and Secondary School Students in Northwest China. China Educational Technology 7: 35-38. [in Chinese]

Jinmu, H. and Z. Linzhuo. 2021. The development stage, influencing factors and stimulating path of learning interest. Curriculum. Textbook and Teaching Method 41(11): 78-85. [in Chinese]

Kim, H.S., H.J. Kil and A. Shin. 2014. An analysis of variables affecting the ICT literacy level of Korean elementary school students. Computers & Education 77: 29-38. Available https://doi.org/10.1016/j.compedu.2014.04.009.

Maybee, C., and L. Zilinski. 2015. Data informed learning: A next phase data literacy framework for higher education. Proceedings of the Association for Information Science and Technology 52(1): 1-4. Available: https://doi.org/10.1002/pra2.2015.1450520100108.

Rohatgi, A., R. Scherer and O.E. Hatlevik. 2016. The role of ICT self-efficacy for students' ICT use and their achievement in a computer and information literacy test. Computers & Education 102: 103-116. Available: https://doi.org/10.1016/j.compedu.2016.08.001.

Samson, S. 2010. Information Literacy Learning Outcomes and Student Success. The Journal of Academic Librarianship 36(3): 202-210. Available: https://doi.org/10.1016/j.acalib.2010.03.002.

Selwyn, N. 1998. The effect of using a home computer on students' educational use of IT. Computers & Education 31(2): 211-227. Available: https://doi.org/10.1016/S0360-1315(98)00033-5.

Shuliang, C. and S. Xianrui. 2018. Investigation and Research on Information Literacy of College Students under the Background of Big Data Taking Liaoning University of Technology as an Example. Academic Annual Meeting of Liaoning Higher Education Association, Liaoning, China. [in Chinese]

Wang, H. and F. Liping. 2006. Investigation and Analysis of the Information Literacy of Primary and Secondary School Students in Northwest China. China Educational Technology 7: 4. [in Chinese]

Xing, Z., H. Aojun, L. Jessie, W. Yaodong and Z Xiyue. 2022. Research on the influencing factors and training strategies of college students' information literacy based on the analysis of three-dimensional overlapping space. China's Education Informatization 28(2): 103-110. [in Chinese]

Xinyu, W. 2022. Research on the Path to Improve the Quality of College Students'Information Literacy Education under the Background of "New Four Disciplines". Journal Chongqing University of Arts and Sciences (Social Sciences Edition) 41(1): 114-126. [in Chinese]

Xu, W. and W. Rui. 2019. The influence of computer self-efficacy on information literacy of preschool education students. Journal of Changjiang Engineering Vocational and Technical College 36(2): 4. [in Chinese]

Yamane, T. 1973. Statistics: An Introductory Analysis. John Weather Hill, Inc. London.

Yong, W. and L. Hao. 2020. Research on the influencing factors of information literacy of university students in xinjiang. Journal Xinjiang Normal University 39(2): 50-57. [in Chinese]

Yuan, Z., X. Xiaojie, Chunjiao and L. Yuan. 2010. An Empirical Study on Information Literacy of College Students A Case Study of Sichuan Province. Library Forum 6: 258-263. [in Chinese]

Yuesheng, H. and L. Li. 2020. Research on the influencing factors of college students' information literacy under the new media environment. Digital Design 9(17): 141-143. [in Chinese]

Yuxia, B., T. Yan and C. Shuzhen. 2011. Investigation on information literacy of college students based on the investigation of Shenyang Pharmaceutical University. Library Science Research: Applied Edition 10: 18-22. [in Chinese]