

# Research on Fuzzy Comprehensive Evaluation of College Students' Information Literacy

Kai Zhang<sup>1,2</sup>

1 Department of Pedagogy, Foreign Philology and Translation, Kharkiv State University of Economics, Kharkiv, 61166, Ukraine

2 Examination Centres, Neijiang Normal University, Neijiang, 641100, China

**Abstract:** In order to better improve the information literacy of college students, based on the previous research results, combined with the actual teaching situation of the school, this paper establishes the evaluation system of College Students' information literacy based on the fuzzy comprehensive evaluation method, which is divided into four first level indicators, nine second level indicators and twenty third level indicators. The analytic hierarchy process is used to determine the weight. When determining the weight of the fuzzy comprehensive evaluation index of College Students' information literacy, the subject (teachers, counselors) and object (students) of the evaluation are considered. When determining the weight, the weight of the subject and object is integrated, and the average value is added to obtain the final weight of the research system. This result is relatively fair and scientific. Finally, through the three-layer fuzzy evaluation, the randomly selected data are verified, which proves that the evaluation system is scientific.

**Keywords:** College students; Information literacy; Fuzzy evaluation

## 1. Introduction

As the basic unit of information society, the quality of workers, especially the level of information quality, will greatly affect the comprehensive national strength of a country. Information literacy has not only become an index to evaluate the comprehensive quality of talents, but also the basic survival ability of every member of the society in the information society [1]. For the sustainable development of talents in the era of knowledge economy, quality education emphasizes the development of personality and all-round development, and information literacy is the most important foundation. Therefore, the cultivation of information literacy of contemporary college students is indispensable. In order to successfully carry out information literacy education, in addition to formulating scientific and clear training objectives and operable information literacy evaluation system for college students, there should also be practical evaluation methods to test the effect of information literacy education and provide necessary feedback information for the smooth development of information literacy education. Because of the rich connotation of information literacy, it is very difficult to evaluate it, especially the quantitative evaluation [2]. Therefore, although some evaluation criteria and indicators have been put forward at home and abroad, there are very few cases using these criteria and indicators for actual evaluation. How to deeply evaluate the information literacy has become an important

issue in the field of information literacy education. Based on this, this paper studies the fuzzy comprehensive evaluation method of College Students' information literacy, so as to better cultivate college students' information literacy [3].

## 2. Fuzzy Comprehensive Evaluation of College Students' Information Literacy

### 2.1. Fuzzy comprehensive evaluation system of College Students' Information Literacy

The ability to effectively use network information and create information is called network information literacy. Its main feature is that it takes the network information environment as the platform, modern information retrieval technology and database retrieval as the core content, and global network information resources as the main retrieval objects [4]. It breaks through the boundaries of time and space and realizes the sharing of information resources. Network information literacy is mainly composed of network information consciousness, network information knowledge, network information ability and network information ethics. Network information awareness means that people can realize the important role of network information in work, study and life, have positive internal demand for network information, and have certain sensitivity and insight for network information, which is the guide of network information

literacy [5]. Network information knowledge refers to the individual's mastery of network information source, network information technology and information science, which is the basis of network information literacy. Network information ability is the ability to acquire, evaluate, organize, innovate, disseminate and immunize network information, and it is the core of network information literacy [6]. Network information ethics means that people must abide by certain network information ethics norms in the process of obtaining, utilizing, processing and disseminating network information, consciously resist information pollution, and fully under-

stand computer viruses, computer hackers, network security and network intellectual property rights, which determines the direction of network information literacy[7]. Network information consciousness, network information knowledge, network information ability and network information ethics are logically related and restricted each other, and will not change fundamentally with the change of external environment [8]. In order to better improve the evaluation effect of students' information literacy, firstly, the fuzzy comprehensive evaluation process of students' information literacy is optimized, As shown in the figure 1.

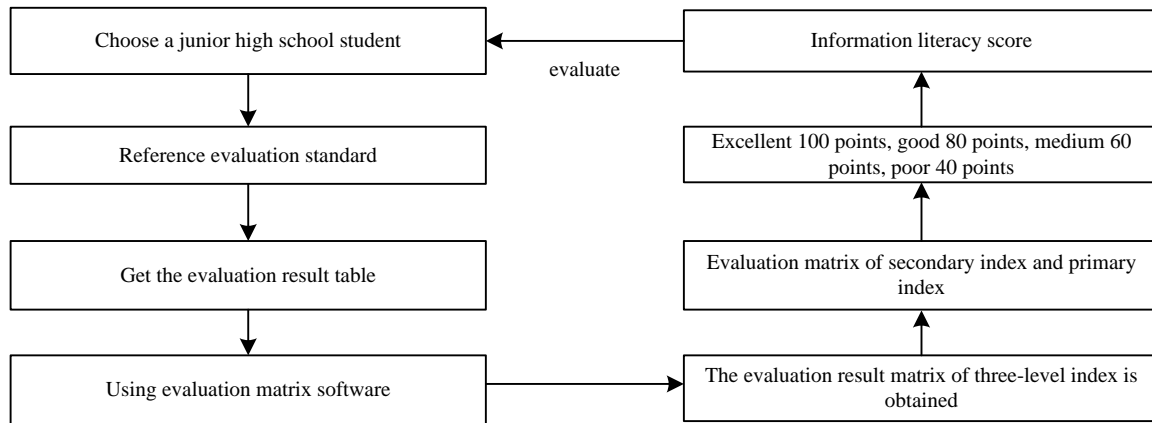


Figure 1. Fuzzy comprehensive evaluation process of college students' information literacy

Information consciousness is the sum of cognition, idea and demand in information activities. College students should have a positive attitude towards using information, which can be divided into two secondary indicators: "information importance" and "information sensitivity". College students should first recognize that information is the first productive force [9]. The ubiquity of information has an important impact on College Students' study and life. Naturally, it is of great importance to their study and life. The importance of information can be divided into: recognizing the importance of information in study and life and recognizing the important way to solve problems when using information [10]. College students should take the initiative to care about current

affairs and all kinds of information around them. Specifically divided into: can actively pay attention to all kinds of information, can actively use information for learning. Information knowledge is an important foundation of information literacy, including traditional scientific and cultural knowledge, English knowledge, information theory knowledge, information technology knowledge, etc. The seven pillars represent the main skills of information literacy, and they are divided into five grades from low to high: novice, advanced beginner, competent, proficient and expert. The whole standard is based on Library basic skills and information technology skills. As shown in the figure 2:

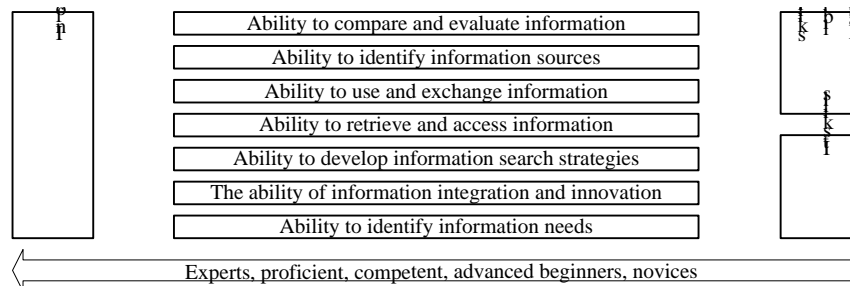


Figure 2. Information literacy evaluation system

This kind of index is divided into "information basic knowledge" and "information tool knowledge". The requirements of college students for the information age cannot be limited to the ability to surf the Internet and watch the news. The basic knowledge of information includes: understanding the connotation and transmission mode of information, understanding network knowledge, and being able to download, upload and exchange information. In addition, the society also requires the college students who are going to work to process simple electronic documents and electronic data. Therefore, the basic knowledge of information also includes the ability to master the basic office software. The knowledge of information tools that colleges and universities

should master for college students mainly lies in the two aspects of "looking" and "looking". "Read" means to understand information. Because of the origin of the Internet and cultural impact, high-tech knowledge and some important knowledge of the Internet are expressed in English. "Seeking" means finding the knowledge you need. In the era of knowledge explosion, it is an inevitable requirement for college students to find the knowledge they really need in the mass of information. Therefore, the knowledge of information tools can be divided into: Mastering Search Tools and using search engines to retrieve information. Based on this, the evaluation standard of College Students' information literacy is formulated, as shown in the table 1.

**Table 1. Evaluation criteria of college students' information literacy**

First level indicators	Secondary indicators	Third level indicators
Information awareness	Information sensitivity	The importance of recognition information in school and life
	The importance of information	Be able to actively pay attention to all kinds of information
Information ethics	Law abiding information	Be able to comply with relevant laws and regulations
	Information normalization	Can distinguish information, health use information
Information knowledge	Basic knowledge of information	Understand the connotation and transmission of information
	Knowledge of information tools	Master English and understand English information
Information skills	Information access capability	Be able to obtain information according to needs
	Information processing ability	The acquired information can be digested in time and incorporated into their own knowledge system

Information skill is one of the necessary skills for college students in the information age. Because getting information, sorting out information and creating information are the three dimensions of information skills, we divide information skills into information acquisition ability, information sorting ability and information creation ability. It is the basic requirement for college students to obtain information according to their own needs, and it is the ideal requirement to actively pay attention to and find valuable information around them. Specifically divided into: according to the needs of access to information, timely discovery of valuable information. We emphasize that college students should be able to sort out the information they get in time, and the sorted information can be transformed into their own. College students should sum up the most core information from a large amount of information, and use certain technical means to protect their information achievements. Specifically, it can be divided into: timely digestion and incor-

poration of the information obtained into its own knowledge system, extraction of main ideas and ideas from external information, and protection of its own information by technical means. College students should sum up the most core information from a large number of information, and use certain technical means to protect their information achievements. Specifically, it can be divided into: timely digestion and incorporation of the information obtained into its own knowledge system, extraction of main ideas and ideas from external information, and protection of its own information by technical means. In order to improve the accuracy of the evaluation, the method of comprehensive scoring is used to increase the number of evaluation grades. In this study, the general four grades of excellent, good, medium and poor were used. Based on the data in the table above, the 1-9 scale method proposed by t.l.satty is further adopted. The specific values as shown in the table 2.

**Table 2. 1-9 contents of scale and importance level**

Scale	Importance level
1	i, j The two elements are equally important
3	The i element is slightly more important than the j element
5	Element i is more important than element j
7	Element i is more important than element j
9	Element i is more important than element j
1/3	The i element is slightly less important than the j element
1/5	Element I is obviously less important than element j
1/7	The i element is stronger than the j element and is not important

1/9	Element i is less important than element j
Note: the scale = (2,4,6,8,1 / 2,1 / 4,1 / 8,1 / 9) indicates that the quality of importance is between the scale = (1,3,5,7,9,1 / 3,1 / 5,1 / 7,1 / 9).	

Based on the above table, the importance of evaluation index is calculated, and the product of elements is calculated by row in judgment matrix C, then:

$$M_i = \prod_{j=1}^n C_{ij}, i = 1, 2, \dots, n \tag{1}$$

Calculate the square root of M:

$$\bar{W}_i = \sqrt[n]{M_i} \tag{2}$$

Normalize the vector:

$$W_i = \frac{\bar{W}_i}{\sum_{j=1}^n \bar{W}_j} \tag{3}$$

The maximum characteristic root of judgment matrix C is calculated:

$$\lambda_{max} = \sum_{i=1}^n \frac{(CW)_i}{nW_i} = \frac{1}{n} \sum_{i=1}^n \frac{\sum_{j=1}^n C_{ij}W_j}{W_i} \tag{4}$$

The evaluation system of College Students' information literacy is a comprehensive evaluation index system with three-level indicators. Information awareness, information knowledge, information skills and information ethics are the first level indicators to evaluate college students' information literacy, and then they are divided into several second and third level indicators. Therefore, this is a three-level comprehensive evaluation. First of all, the single factor evaluation should be carried out, then the first level evaluation should be carried out according to the division of the second level indicators, then the second level evaluation should be carried out according to the division of the first level indicators, and finally the third level evaluation, that is, the final comprehensive evaluation, so as to improve the evaluation accuracy.

**2.2. Determination of the evaluation index of College Students' Information Literacy**

As the evaluation of network information literacy is a complex process of multi factors and multi indicators, it cannot be simply distinguished by qualified or unqualified. Therefore, this paper uses fuzzy comprehensive evaluation method to evaluate network information literacy, and uses fuzzy logic to work through fuzzy sets, so as to deal with the initiative and fuzziness of human thinking more naturally, At the same time, the combination of qualitative analysis and quantitative analysis is an effective method. The basic principle of fuzzy compre-

hensive evaluation method is: firstly, determine the factor (grade) set and evaluation (factor) set of the evaluated object; secondly, determine the weight of each factor and their membership vector respectively to obtain the fuzzy evaluation matrix; finally, carry out fuzzy operation and normalization between the fuzzy evaluation matrix and the weight vector of factors to obtain the comprehensive result of fuzzy evaluation. For many problems, we can not use a simple fixed score to evaluate, and for the information literacy evaluation system of college students with many indicators, we can not use very accurate scores to evaluate, these indicators have different degrees of fuzziness. In order to get more reasonable evaluation results, we must take these fuzzy factors into account. For the evaluation of College Students' information literacy, fuzzy evaluation method is more appropriate, and will get more reasonable evaluation results. On the basis of clarifying the connotation of network information literacy, the construction of network information literacy evaluation system should be combined with information literacy standards, follow the principles of operability, conciseness and guidance, and decompose the overall goal layer by layer according to the idea of system engineering. Because there is no unified and authoritative information literacy standard in China, this paper uses American ACRL standard for reference, and tries to reflect the connotation of network information literacy through literature collection, so as to build an evaluation system of network information literacy without repetition and mutual supplement. The hierarchical structure is established. The evaluation matrix is a kind of fuzzy relationship between the factor set and the evaluation set, that is, the reasonable relationship between the influencing factors and the evaluation results. If the k-th factor in  $S_{ij}$  is evaluated, the fuzzy set of evaluation results can be expressed by K, then R can be obtained according to the four level evaluation level. Therefore, when there are q elements in  $S_{ij}$ , the evaluation matrix composed of the evaluation results can be recorded as:

$$R_{11} = \begin{bmatrix} r_{ij11} & r_{ij12} & r_{ij13} & r_{ij1} \\ r_{ij21} & r_{ij22} & r_{ij3} & r_{ij24} \\ \dots & \dots & \dots & \dots \\ r_{ij1} & r_{ijq2} & r_{ij3} & r_{ijq} + \end{bmatrix} \tag{5}$$

The top layer is the target layer (P), the middle layer is the criterion layer, and the bottom layer is the scheme layer. Uses pairwise comparison method and 1-9 comparison scale to construct the two comparative judgment matrix of the elements with dominant relationship be-

tween levels. The scale in the judgment matrix can be obtained by comprehensive weighing according to the survey data, statistics and expert opinions. Secondly, the feature vector  $W_i$  is obtained by using the square root method, the maximum feature root  $\lambda_{max}$  is calculated, and the consistency index CI, RI and CR are calculated. Among them, RI is the average random consistency index value. Whether the matrix has satisfactory consistency is judged. If  $CR=CI/RI<0.1$ , the judgment matrix has satisfactory consistency, otherwise, it is necessary to adjust the judgment matrix. The analytic hierarchy process with excel is mainly the solution of the maxi-

imum eigenvalue and eigenvector. The judgment matrix and single order of the primary indicators  $U_1, U_2, U_3, U_4$  relative to the total target P are calculated and the consistency test is carried out. The results are shown in the table. In the above calculation process, by copying formula and modifying the value of judgment matrix, the single sorting and consistency test of secondary indicators  $U_{11}, U_{12}, U_{13}$  can be calculated. The judgment matrix and single order and consistency test of  $U_{21}, U_{22}, U_{23}$  relative to  $U_2; U_{31}, U_{32}, U_{33}, U_{34}$  relative to  $U_3; U_{41}, U_{42}$  relative to  $U_4$  can be calculated by the same reason, as shown in the table 3.

Table 3. 3P-U judgment matrix, single order and consistency test

P	U1	U2	U3	U4	Wi	
U1	1	1/2	1/4	1/3	0.10	$\lambda_{max}=4.13$
U2	2	1	1/2	1	0.22	CI=0.05
U3	4	2	1	4	0.51	RI=0.95
U4	3	1	1/4	1	0.22	CR=0.05

In the construction of evaluation system, weight is an important concept. It indicates the relative importance of an index in the whole evaluation standard system. The number indicating the degree of relative importance is called weight coefficient, weight or weight. The determination of weights can be divided into two categories. One is subjective weighting, whose source information comes from expert consultation, that is, using the knowledge and experience of expert group. The method of weight determination is to adopt the qualitative method of comprehensive consultation score to determine the weight, and then synthesize the statistical data, such as comprehensive index method, expert evaluation method, etc. The other is the objective weighting method, whose source information comes from the statistical data itself, that is, to determine the weight according to the correlation between the indicators or the variation of the value of the indicators, such as principal component analysis and entropy method. Set  $u$  as the set of factors of evaluation object:  $U=\{U_1, U_2, U_3, U_4\}$ . On this basis, we decompose  $U_1, U_2, U_3, U_4$ , namely  $U_1=\{U_{11}, U_{12}, U_{13}\}$ ;  $U_2=\{U_{21}, U_{22}, U_{23}\}$ ;  $U_3=\{U_{31}, U_{32}, U_{33}, U_{34}\}$ ;  $U_4=\{U_{41}, U_{42}\}$ . At the same time,  $V=\{V_1, V_2, V_3, V_4\}$  is set to represent the set of comments. In this paper, the evaluation level is determined as  $v = \{\text{excellent, good, general, poor}\}$ . Let  $a$  be the weight of the evaluation factors on  $u$ , that is,  $A=\{a_1, a_2, \dots, a_n\}$ .  $A$  is the weight distribution set and  $A_i$  is the weight of the corresponding elements. According to the weight of each factor determined by the above analytic hierarchy process, the weight allocation set of the first level factor is  $A = (0.09, 0.21, 0.50, 0.20)$ , the weight allocation set of the second level factor is  $A_{u1}=(0.11, 0.64, 0.25)$ ,  $A_{u2}=(0.34, 0.55, 0.11)$ ,  $A_{u3}=(0.49, 0.16, 0.29, 0.11)$ ,  $A_{u4}=(0.50, 0.50)$ . In order to be simple and practical,

this study decided to use analytic hierarchy process (AHP), combined with qualitative analysis and quantitative analysis, based on rigorous mathematical theory, to ensure the effectiveness of quantitative analysis, and make the weight calculation and evaluation more scientific and objective.

**2.3. Training mechanism of innovative talents in colleges and universities**

Through the in-depth analysis of the essence of information literacy, drawing on the existing information literacy evaluation standards, combined with the characteristics of college students, we have established a set of evaluation index system of College Students' information literacy. The evaluation index of the quantitative research of College Students' information literacy includes: the index is more abstract, the content of the first level index is in-depth and detailed, with the characteristics of measurability and easy operation; the third level index is more specific, which is the reference principle in the evaluation of information literacy. The index system consists of 6 first level indexes and 17 second level indexes. Among them, the first level indicators are information awareness literacy, information knowledge literacy, information ability literacy, information moral literacy, information security literacy and information innovation literacy. Information awareness literacy and information knowledge literacy are habitual skills gradually formed in the process of information use, belonging to the bottom skills; Information ability literacy, information moral literacy and information security literacy are the ability of individual to solve problems formed in the process of information processing, belonging to the middle level skills; information innovation literacy is the ability to reorganize and create informa-

tion, belonging to the high level skills. The specific steps are as follows:

$$\bar{a}_{ij} = R_{ij} a_{ij} / \lambda_{\max} \sum_{i=1}^n a_{ij} \quad (i, j = 1, 2, \dots, n) \quad (6)$$

Based on this, a new judgment matrix is obtained:

$$A = (\bar{a}_{ij})_{n \times n} \quad (7)$$

Finding the sum of elements of each line in judgment matrix A:

$$\bar{w}_i = \sum_{j=1}^n A \bar{a}_{ij} \quad (i = 1, 2, \dots, n) \quad (8)$$

Further, the maximum feature root and its eigenvector are obtained:

$$w_i = \bar{w}_i / \sum_{i=1}^n \bar{w}_i \quad (i = 1, 2, \dots, n) \quad (9)$$

The weight was calculated by AHP. Analytic hierarchy process is a kind of qualitative and quantitative analysis method, which is systematic and hierarchical, and it is a method to make decisions by using qualitative and quantitative analysis to fuzzy or complex decision-making problems. The specific steps are as follows: the hierarchical hierarchy process is adopted to establish hierarchical hierarchy process system according to the main index factors affecting the information literacy of college students; according to the subordinate relationship between the upper and lower levels, the scale method constructs the judgment matrix, as shown in the table 4:

Table 4. Comparison scale table of judgment matrix

Scale	definition	explain
1	The two elements are equally important	The main diagonal element of the judgment matrix is 1 a <sub>ij</sub> =1/a <sub>ji</sub> / a <sub>ji</sub> =1/ a <sub>ij</sub>
3	The i element is slightly more important than the j element	
5	Element i is more important than element j	
7	Element i is much more important than element j	
9	Element i is more important than element j	This is the highest difference between the two elements
2,4,6,8	The intermediate value of the above two adjacent judgments	

When the judgment matrix is a consistent positive reciprocal matrix, the normalized positive eigenvector corresponding to the maximum eigenvalue is the weight of the influence of each factor in the hierarchy on a factor in the upper hierarchy. The characteristic root of matrix is calculated by Excel software, and then the consistency is checked. When all the judgment matrices pass the consistency test, the eigenvector corresponding to the largest eigenvalue can be obtained; otherwise, the judgment matrix or comparison scale should be appropriately modified. The constructed judgment matrix and the modified judgment matrix are as shown in the table 5..

$$B_1 = \begin{pmatrix} 1 & 1/2 & 1/4 \\ 2 & 1 & 1/2 \\ 4 & 2 & 1 \end{pmatrix} \quad (10)$$

$$B_2 = \begin{pmatrix} 1 & 1/5 & 1/3 \\ 5 & 1 & 2 \\ 3 & 1/2 & 1 \end{pmatrix} \quad (11)$$

$$B_3 = \begin{pmatrix} 1 & 1/3 & 1/5 \\ 3 & 1 & 1/2 \\ 5 & 2 & 1 \end{pmatrix} \quad (12)$$

$$B_4 = \begin{pmatrix} 1 & 1/3 & 2 \\ 3 & 1 & 5 \\ 0.5 & 1/5 & 1 \end{pmatrix} \quad (13)$$

$$B_5 = \begin{pmatrix} 1 & 1/2 & 1/5 \\ 2 & 1 & 1/4 \\ 5 & 4 & 1 \end{pmatrix} \quad (14)$$

The consistency index C.I. was further calculated and compared with the critical value when C.R. < 0.1.

$$C.I. = (\lambda_{\max} - n) / (n - 1) \quad (15)$$

Calculate the random consistency ratio.

$$C.R. = \frac{C.I.}{R.I.} \quad (16)$$

Where R.I. is the corresponding average random consistency ratio.

Table 5. average random consistency index RI

Order	1	2	3	4	5	6	7	8	9	10
-------	---	---	---	---	---	---	---	---	---	----

RI	0.00	0.00	0.59	0.92	1.13	1.15	1.63	1.42	1.46	1.49
----	------	------	------	------	------	------	------	------	------	------

By using the method of comprehensive scoring, the final weight table of College Students' information literacy evaluation standard is obtained from the average weight (the final weight values are rounded to two decimal places). The establishment of university students' information literacy evaluation index system is to accurately evaluate the information literacy ability of university students objectively and scientifically. At the same time, it should play the role of guidance, regulation and incentive. Therefore, the construction of evaluation index system should follow the following principles:

Scientificity is the basis to ensure the accuracy and rationality of the evaluation results. We should consider the formulation of various indicators with a scientific and realistic attitude, refer to the previous research results as much as possible, and combine with the actual situation of college students. Each index in the index system must be scientific and complete in order to objectively and truly reflect the comprehensive level of information literacy of college students in China. In the construction of the evaluation index system, these evaluation indexes can not only reflect the current requirements of College Students' information literacy ability, but also make the index system actively guide students to pay attention to information literacy, help to promote the improvement of students' information literacy, make students develop towards the correct direction and goal, and play a guiding function. The standards required by each item of the information literacy evaluation index system should be able to be realized in the current situation. In the design of the evaluation index system, we should proceed from the reality of students and be practical. The evaluation index should be concise, easy to understand and operate, and as few as possible to reflect the real situation of College Students' information literacy. The information society is in constant development and change. In the construction of the index system, we should not only meet the requirements of the current information society, but also see the dynamic of College Students' information literacy, which can meet the requirements of social and economic development for the quality of talents. As information literacy is a concept that is constantly improved with the development of the times, its connotation and denotation will continue to develop and change, so the designed evaluation index must have a certain era, effectiveness and development. This also means that the improvement of the evaluation

index system is a dynamic process. With the deepening of the research, the index system needs to be constantly adjusted and revised. Based on this, it can effectively guarantee the accuracy and effectiveness of the evaluation results of College Students' information literacy.

### 3. Analysis of Experimental Results

In order to test the evaluation standard, this paper makes an empirical analysis, randomly selects 10 sophomores from a software engineering major of an information engineering college to participate in the evaluation, and helps to complete the practical test of the evaluation standard. In order to ensure the reliability of the research, before the research, the author has promised that the relevant data only do scientific research, not use the real name. The single factor fuzzy evaluation matrix is constructed. The evaluation group consists of 15 authoritative experts including teachers, administrators and members of the academic committee. According to the index system of network information literacy constructed in this paper, the index system and each element are evaluated and graded according to the criteria of excellent, good, general and poor, Then, the assessment organizer will stack and summarize the assessment results. This paper takes a student as an example to evaluate the U11 item of the student's network information sensitivity. Assuming that 55% of the members of the evaluation group think it is excellent, 20% think it is good, 10% think it is average, and 15% think it is poor, then the membership degree of the item is 0.55, 0.20, 0.10, 0.15. By analogy with the statistical results, the evaluation matrix of single factor of network information awareness can be obtained as follows.

$$R_{U1} = \begin{pmatrix} 0 & 55 & 0 & 20 & 0 & 10 & 0 & 15 \\ 0 & 45 & 0 & 34 & 0 & 21 & 0 & \\ 0 & 40 & 0 & 40 & 0 & 10 & 0 & 10 \end{pmatrix} \quad (17)$$

According to  $ar = B$ , fuzzy synthesis is used. Combined with the above analysis, the single factor weight allocation set corresponding to  $R_{U1}$  is  $A_{U1} = \{10, 11, 64, 25\}$ , the 10 students are numbered as X1, X2, X3, X4, X5, X6. According to this evaluation standard, the head teacher, grade director and monitor of the class where the students are in are evaluated as excellent, good, medium and poor. The following results are obtained, as shown in the table 6:

Table 6. Results of information literacy evaluation of students

student	Information literacy evaluation	Weight index
X1	good	0.25±0.13
X2	good	0.26±0.10

X3	in	0.28±0.11
X4	in	0.27±0.08
X5	excellent	0.30±0.12
X6	good	0.46±0.10
X7	in	0.35±0.11
X8	good	0.37±0.12
X9	in	0.29±0.10
X10	difference	0.22±0.15

10 students in the tested group will evaluate themselves and other students respectively according to this evaluation standard and make the evaluation of excellent, good, medium and poor (if 10 of the 10 evaluators think this index is A, then the ratio is 0.5, and these data will be-

come important data for fuzzy judgment. Then according to the above established evaluation method for the next specific comprehensive quality assessment. Taking X3 as an example, the specific evaluation results are as shown in the table 7:

Table 7. X3 Student Information Literacy Evaluation Form

First level indicators		Secondary indicators		Third level indicators		Evaluation grade			
Name	Weight	Name	Weight	Accurate description	Weight	Excellent	Good	In	Difference
Information knowledge	0.22	Basic knowledge of information	0.60	Understand the connotation and transmission of information	0.54	0.4	0.2	0.2	0
				Understand the basic knowledge of network	0.26	0.8	0.4	0.4	0
		Basic knowledge of information	0.42	Master English and understand English information	0.49	0.2	0.5	0.2	0.1
				Master search tools and use search engines	0.56	0.1	0.5	0.1	0.1
Information awareness	0.24	The importance of information	0.64	Students who recognize information and the importance of life	0.29	0.5	0.4	0.3	0
				An important way to solve problems when using information	0.73	0.4	0.4	0.5	0
		Information sensitivity	0.38	Be able to actively pay attention to all kinds of information	0.52	0.6	0.4	0.2	0
				Can actively use information for learning	0.50	0.5	0.3	0.2	0.2
				Can discover valuable information in time	0.68	0.3	0.2	0.5	0.3
Information ethics	0.28	Law abiding information	0.45	Be able to comply with relevant laws and regulations	0.68	0.7	0.5	0	0
		Information normalization	0.57	Can distinguish information, health use information	0.64	0.3	0.3	0.4	0.2
		Information normalization							

The information literacy of X3 students is evaluated. Information literacy includes information awareness, information knowledge, information ability and information ethics. From the fuzzy evaluation results of X3 students, the evaluation of information knowledge awareness is good, information knowledge is good, information skills is excellent, and information ethics is good. If there is no such evaluation model, teachers often judge students' ability based on the examination results of relevant courses, while ignoring the influence of students' psychology, consciousness and other internal factors on people's ability. According to the evaluation in previous years, the student's information knowledge and information skills are excellent, but his information ethics is not

qualified. In the current Internet era, the frequent occurrence of college students through network crime has sounded an alarm for our higher education administrators, paying attention to college students' information literacy and comprehensive evaluation of College Students' information literacy. In order to promote the cultivation and improvement of students' information literacy, we must timely feedback the evaluation results of students' information literacy, and provide personalized suggestions for students to improve their information literacy. Based on the results of students' information literacy situational task evaluation, the whole process of students' information literacy evaluation is presented with intuitive graphic and image information by using



data visualization tools, including the overall evaluation results of students' information literacy level, the observable behavior performance of students when completing each situational task, and the quantitative scores of students on each observation variable To provide students with a comprehensive evaluation report of personal information literacy; based on the evaluation results of students' information literacy, scientific diagnosis of the overall level of students' information literacy, in-depth study of students' lack of information literacy when completing situational tasks, research on targeted and feasible strategies for cultivating and improving students' Information Literacy

#### 4. Conclusions

With the development of information dissemination, especially the Internet technology, information dissemination is faster. With the development of the Internet, especially the emergence of Web2.0 technology, information identification, information acquisition, information expression, information sharing and collaborative work in the network environment have become the information literacy that people must have, and also a kind of digital viability that everyone in the network society should have. Therefore, information literacy in the network environment has become a topic worthy of study. On the basis of clarifying the connotation of network information literacy, this paper attempts to initially build an evaluation system of network information literacy. Combined with the information literacy standards, it uses effective methods to evaluate the information literacy under the network environment, so as to provide theoretical support for the research of network information literacy evaluation.

#### 5. Acknowledgments

Construction of key Technology of Intelligent Learning Environment under the background of big data of Natural Science Project of Sichuan Education Department (Project No.: P018039).

#### References

- [1] Bhat S., Raju R., Bhat S., et al. Redefining quality in engineering education through the flipped classroom model. *Procedia Computer Science*. 2020, 172(9), 906-914.
- [2] Sahney S. A response to "A research note on the article of 'Quality framework in education through application of interpretive structural modeling'". *Tqm Journal*. 2019, 31(1), 11-11.
- [3] Wang J., Tigelaar D., Admiraal W. Connecting rural schools to quality education: Rural teachers' use of digital educational resources. *Computers in Human Behavior*. 2019, 101(9), 68-76.
- [4] Kang W., Xiao J., Xiao M., et al. Research on remaining useful life prognostics based on fuzzy evaluation-gaussian process regression method. *IEEE Access*. 2020, PP (99),1-1.
- [5] Zhou L., Liu B., Zhao Y., et al. Application research of grey fuzzy evaluation method in enterprise product reputation evaluation - ScienceDirect. *Procedia CIRP*. 2019, 83(9), 759-766.
- [6] Yang H., Fan W., Qin G., et al. A fuzzy-anp approach for comprehensive benefit evaluation of grid-side commercial storage project. *Energies*. 2021, 14(4), 1129.
- [7] Zhang X., Shi W. Research about the university teaching performance evaluation under the data envelopment method. *Cognitive Systems Research*. 2019, 56(8), 108-115.
- [8] Jian Q. Multimedia teaching quality evaluation system in colleges based on genetic algorithm and social computing approach. *IEEE Access*. 2019, 7(6), 1-1.
- [9] Lee T., Lee B.K., Lee-Geiller S., The effects of information literacy on trust in government websites: Evidence from an on-line experiment. *International Journal of Information Management*. 2020, 52(1), 102098.
- [10] Majid S., Foo S., Chang Y.K. Appraising information literacy skills of students in Singapore. *Aslib Journal of Information Management*. 2020, 72(3), 379-394.