Research Article

Formative Assessment of College English Autonomous Learning Based on Fuzzy Comprehensive Evaluation Algorithm

Yalei Li (ID)

Foreign Language Teaching Department, Henan Police College, Zhengzhou 450046, Henan, China

Correspondence should be addressed to Yalei Li; 20170984@hnp.edu.cn

With the rapid development of computer networks and multimedia technology, independent e-learning has become an integral part of modern education. However, the allocation of time and space for teaching and learning, the lack of instruction and guidance necessary for self-directed learning for students, and the development of e-learning are becoming increasingly problematic. Because of this, this thesis uses guided evaluation to determine the impact of improving the quality of Student learning. Firstly, under the background of college English web-based autonomous learning, this paper constructs a formative assessment index system and then combines the formative assessment with fuzzy comprehensive evaluation algorithm to form a formative assessment of college English web-based autonomous learning. Fuzzy comprehensive evaluation is an important application of analyzing complex fuzzy systems using the principle of fuzzy transformation. The simulation uses the online learning English behavior of college students to carry out an example evaluation. The results show that students can find their own shortcomings in network autonomous learning, which can be improved in later learning.

1. Introduction

Since the 1980s, the development of the Internet has been rapid, and the tentacles of the Internet have slowly extended to political, economic, cultural, and other fields, and affect the development of these areas. The largest user group in the network is the University students, using the network of autonomous learning has become an important part of today's education. It is not only a powerful complement to traditional teaching, but also an important guarantee for the realization of universal education, continuing education, and lifelong education [1].

With the rapid development of modern information technology, the application of multimedia and online technology in education is more comprehensive and detailed, and provides excellent resources for university studies in English. At the same time, independent online learning has become an indispensable part of modern education. Modern education is primarily focused on enhancing students' ability to learn independently, providing the benefits of modern educational technology, especially Internet and

multimedia technologies, and developing individualized university study methods for the global capabilities of Chinese people. The new teaching model focuses on students who not only provide general language skills and abilities but also emphasize the development of language skills and independent study skills. An important sign of the success of the teaching method reform is the development of teaching methods that focus on the individual characteristics of the students and the development of the students' independent learning skills. A change in study style inevitably requires a corresponding change in the assessment of education, which is an important link in the classroom. This paper studies and discusses the formative evaluation of college English autonomous learning based on the fuzzy comprehensive evaluation algorithm, in order to provide some references for the autonomous learning method of college English.

How to improve the quality of English learning is an important problem faced by college students in online autonomous learning. Teaching evaluation is one of the important measures to ensure the quality of online autonomous learning. The traditional teaching assessment

mainly focuses on summative assessment, neglecting the students' learning process and their daily learning behavior, and paying too much attention to the test results. This kind of teaching assessment, which emphasizes knowledge but neglects ability, has seriously hampered the students' enthusiasm and interest in language learning [2, 3]. In addition, the summative assessment is difficult to implement a comprehensive monitoring and effective evaluation of the network autonomous learning process due to its own defect limitations. Therefore, only adopting summative assessment is not suitable for online self-learning. We should focus on the formative assessment of students' comprehensive ability. That is to say, the students' emotion, attitude, ability and learning strategy, the level of mastering basic knowledge and learning content, and the potential of development are comprehensively evaluated. Formative assessment is student-centered and advocates self-assessment. Students are the main body of assessment. The main forms of learning are autonomous learning, cooperative learning, and personalized learning. It is advocated that teachers are the organizers and coordinators of learning, and are the helpers, promoters, and providers of information feedback for student meaning construction. The purpose of formative assessment is to motivate students, help students to effectively regulate the learning process, develop students' self-learning ability, and change students from passive evaluators to subject and active participants [4–6]. The introduction of formative assessment in college English network autonomous learning can not only stimulate students' language learning motivation and interest, monitor students' self-learning process, supervise the implementation of teaching links, but also create a good environment for independent learning and cultivate students' independent learning ability. Formative assessment is applicable to college English network autonomous learning, while college English network autonomous learning also requires formative assessment to guide, monitor and manage.

The theoretical basis of formative assessment can be summarized as follows.

(1) Theory of multiple intelligence [7, 8]: The theory of multiple intelligence believes that educational evaluation must emphasize the identification of students' strengths and weaknesses, propose recommendations for strengthening weaknesses and measurable expectations, and consider that individual assessment should be carried out under conditions closer to their "actual work situation." That is, as far as possible in the course of daily learning activities, it should be carried out "easy" in the learning context of individual participation, making assessments part of the natural learning environment, rather than forcing "additional" content. Educational assessments should be conducted in an "individually-centred" manner, and the assessment programme should take into account the large differences between individuals and the different stages of development.

(2) Humanism: Humanism attaches importance to the study of people's internal needs, motives, emotions, and interests, with special emphasis on the development of human potential and the cultivation of human personality. It advocates "student-centered" teaching content and teaching thinking should be in front of learners, should play the role of knowledge guide, recognize their important position in teaching, and constantly guide learners to the correct direction and goal of learning. In addition, the teaching activities are carried out around the needs and characteristics of the learners, so that the learners can clearly realize the importance of learning and how to achieve their own goals, so as to gradually cultivate the learners to consciously complete the learning tasks in the learning process. Consciously constantly improve existing learning methods and consciously innovate and expand existing theories and research results. At the same time, we must also pay attention to the important role of any learning activity teacher, so maintaining a good teacher and student emotion is conducive to creating a harmonious learning environment, so that learners can fully enjoy the joy and fun brought by learning.

Form assessments primarily evaluate students' performance in daily learning, practice, and development of emotions, behaviors, and strategies. The aim is to encourage students to help students manage the learning process effectively and increase their ability to learn on their own. Take students from passive assessors to topics and active participants.

At present, for the lack of research on the formative assessment of college students' English network autonomous learning, the content and form of formative assessment are still relatively simple, the evaluation methods and evaluation indicators are not scientific and comprehensive, the failure to give learners timely feedback based on the assessment results, and the fact that the online learning platform mainly stays at the digital level [9–11]. Therefore, in view of these problems, this paper combines the fuzzy comprehensive evaluation algorithm to form a formative assessment of network learning, and forms a formative assessment of college English online self-learning with fuzzy comprehensive evaluation algorithm. The main purpose is to improve the quality of learning by conducting a comprehensive and scientific evaluation and feedback on the self-learning process of college students' English network.

The innovations of this paper are as follows. (1) The use of formative assessment to solve network learning has shortcomings such as the separation of time and space between teaching and learning, and the lack of necessary monitoring and guidance for students' personalized self-learning. (2) Construct a formative evaluation index system for college English online self-learning. (3) In view of the shortcomings of the formative evaluation, which has a single content and form, and lacks scientific comprehensive evaluation methods and indicators, the fuzzy comprehensive evaluation algorithm is integrated into the network formative evaluation to form a formative evaluation of college English online self-learning.

2. Proposed Method

2.1. Introduction to Formative Assessment. Formative evaluation refers to the evaluation carried out in the teaching process in order to understand the students' learning situation and find out the problems in the teaching in time. The word evaluation guide was originally coined by G.F. Scriven, a leading American expert on educational evaluation in 1967. Profile assessment refers to the evaluation of the improvement of the quality of continuing education by identifying issues in the education program or program, processes and activities, and providing feedback for further education. The purpose is to monitor the acquisition of knowledge and skills of students in the process of educational work, i.e., the development of knowledge, skills, and attitudes of students [4, 5, 12]. It enables teachers to monitor and guide students' performance in a variety of learning environments. Bloom believes that before conducting formative evaluation, teachers should first determine the learning steps, break the teaching structure of a subject into a series of units of teaching series, and then further analyze the teaching objectives of each learning unit. The last step of formative assessment is correction, specifically, correcting, remedying and organizing students' second learning according to the feedback provided by formative tests. Feedback can not only focus students' attention on some important parts of the learning task but also improve students' interest in learning. Practice has proved that when a student can examine his own performance in order to see how he is making progress and decide what he should do next, it can better promote learning. Therefore, formative evaluation is a kind of evaluation which can directly affect the teaching process and improve the teaching process. The purpose of formative assessment is to motivate students to learn, to help students effectively regulate their own learning process, to enable students to gain a sense of achievement, to enhance self-confidence, and to cultivate a spirit of cooperation.

The appeal's understanding of formative assessment is not the same but has the following commonalities [13, 14].

(1) Formative assessment occurs in the process of education and teaching activities, emphasizing the evaluation of process.

(2) Emphasize timely feedback and moderating effect.

(3) Weakened the screening and selection function of evaluation.

The formative assessment of online autonomous learning [15–17] should go through four stages: preparation, implementation, processing, and feedback.

2.2. Establishment of Formative Assessment Index System. The evaluation index system plays an important role in overall evaluation. Therefore, establishing a scientific and reasonable evaluation index system is the key to formative assessment. Formative evaluation does not simply start from the needs of the evaluators, but more emphasis on the needs of the evaluators, the learning process, and the students'

experience in learning. It emphasizes the interaction between people, the interaction of various factors in evaluation, and the communication between teachers and students.

2.2.1. Basic Concepts of Evaluation Index System

(1) Objectives, Indicators, and Weights of Evaluation. The goal of evaluation is to judge the value state of the evaluation object according to the purpose of evaluation. Generally speaking, the objective of evaluation always has a certain degree of principle, abstraction, and generality; it is difficult to achieve directly, which requires the evaluation of the objective to be specific. Indicators are determined by objectives, which decompose the general objective of evaluation with the characteristics of principle, generality, and abstraction step by step, so that it will eventually become concrete, behavioral, and measurable attributes. These attributes that can be measured after decomposition are called indicators.

Different evaluation indicators reflect the evaluation objectives and the degree of the essential characteristics of the evaluees are different. In order to show the importance of each index in the index system, each evaluation index is assigned a different value, which is called the index weight.

(2) Evaluation Index System. In the process of decomposing learning goals, we will get a series of specific and measurable goals. Generally speaking, a goal is always decomposed into several specific objectives, until the final indicators are directly measurable. Therefore, a goal generally needs a number of indicators to reflect it; these indicators naturally constitute a group of indicators, which is what we usually call the index system. Because of the complexity of network education, in many cases, it may not be possible to obtain measurable behavior indicators by decomposing the target only once; at this time, we need to decompose many times according to the actual situation. In this way, the indicators are naturally stratified and the decomposed indicators are not necessarily all at the same level. When setting the evaluation index system, the following principles should generally be followed: the regional principle, the dynamic principle, the quantifiable principle, and the current principle.

With the evaluation index system and weights, it is possible to draw students' achievement of the learning objectives according to the students' performance on the specific measurable goals, and finally make a meaningful and meaningful value judgment for the students' learning.

2.2.2. Principles for Constructing Evaluation Index System. In formative evaluation, the teacher's responsibility is to determine tasks, collect data, discuss with students, infiltrate the teacher's guiding role in the discussion, and evaluate together with students. Whether the teachers can choose the suitable teaching platform according to the teaching content and whether the learners can choose the suitable learning mode according to their own conditions requires a scientific and complete evaluation index system to give people the

most intuitive understanding. Designing a scientific, reasonable, and standardized rating index system should follow certain principles and reflect the interests of most people. From an objective point of view, the design principles of the index system refer to the rules and basis that must be followed when designing the evaluation index system. These principles are the common agreement with regularity summarized in the evaluation practice. Only in this way can the scientificity and validity of the evaluation index be improved, so as to avoid the deviation caused by ideological differentiation. In order to improve the accuracy, rationality, and scientificity of the evaluation index system of the Web-based self-learning mode, in the process of construction, it is necessary to have clear logic, clear gist, layered, and concrete evaluation objectives, so as to make the whole evaluation index system clear and comprehensive. Therefore, in the process of establishing the evaluation index system, this paper follows the principles of guidance, feasibility, objectivity, and quantification [18–20].

(1) Guiding Principle. Guidance means that the evaluation index system of network-based self-learning should have direction, and the content should cover a wide range, not deviate from the goal of web-based autonomous learning. It conforms to the problems that learners can use, think of, and encounter in the process of learning and provides a basis for instructors to guide learners to choose learning content.

(2) Feasibility Principle. Feasibility is that the evaluation index system should conform to the current situation of the existing network independent learning mode, the target is comprehensive and specific, operable, and the evaluation method is accurate and effective.

(3) Objectivity Principle. The evaluation index system should be objective and true, and it does not follow the subjective will of the person. It can not only accurately describe the objective laws of the network autonomous learning mode but also reflect the important factors and their intrinsic relevance of various network autonomous learning models. Typical indicators ensure that the evaluation is true and accurate, and cannot be subjectively judged or mixed with personal feelings. In the actual evaluation, all from the network self-access learning can bring learners the vital learning benefits, truly and accurately evaluate the effectiveness of network self-access learning, for future learners in network self-access learning, can take the previous evaluation results as a reference, thus improving learners' learning efficiency and learning quality.

(4) Quantification Principle. Quantitative principle, also known as scientific principle, is to quantify the formative assessment advantages of college English web-based autonomous learning, to assess the individual autonomous learning of different learners, to get the relevant data, to reflect the characteristics of learners' web-based autonomous learning, so that it can be targeted for guidance.

This paper intends to use the most core, the most effective, the most direct indicators to reflect more accurate information, which is the most important content of the evaluation results of online autonomous learning. If the selection of indicators is not strong pertinence, lack of value and repeatability, no matter what method is used to evaluate the index system, it will not get a scientific and reasonable evaluation results.

2.2.3. Constructing a Formative Evaluation Index System. To construct a formative evaluation index system for college, English online autonomous learning is mainly to construct some elements of the learner's basic learning process through learner's behavior in learning activities, which can reflect the learner's learning situation. Among them, the evaluation methods of English classroom teaching are as follows: First, the combination of inside and outside the classroom—the extension of language outside the classroom, to stimulate students' interest in learning English. The second is to evaluate learning attitudes and study habits—a combination of self-evaluation, other evaluation, and teacher evaluation. The third is to hear and start, and settle down comprehensively. In order to determine the evaluation index system, this paper refers to the existing network learning platform, and through literature research, consulting network English education experts and teachers, interviewing network college students, according to the actual situation, set up three first-level indicators of enthusiasm, participation, and interaction, and set up the relevant second-level indicators under the first-level indicators. In this paper, the formative evaluation index system of network-based autonomous learning in college English is constructed as shown in Table 1.

The index system mainly reflects learners' learning attitude and learning process. Three primary indicators and corresponding secondary indicators are used to guide and improve learners' learning enthusiasm, participation, and interaction. The specific performance is as follows: while guiding learners through secondary indicators, they should pay attention to the time, frequency, completion of ordinary homework, and the number of topics of online learning. The selection of indicators refers to the existing network learning platform, which basically reflects the learners' learning situation and is feasible to win. Each first-level indicator contains several second-level indicator and reflects the first-level indicator as a whole through multiple second-level indicators, so as to minimize the evaluation error and achieve scientific and reasonable.

2.3. Fuzzy Comprehensive Evaluation Algorithm. Fuzzy comprehensive evaluation [21–23] is an important application to analyze complex fuzzy systems by using fuzzy transformation principle. Fuzzy comprehensive evaluation is a comprehensive evaluation of something using fuzzy mathematics tools under the influence of various factors. This comprehensive evaluation method transforms qualitative evaluation into quantitative evaluation according to the membership degree theory of fuzzy mathematics, that is, using fuzzy mathematics to make a general evaluation of things or objects restricted by many factors. The formative

TABLE 1: Formative evaluation index system of college English autonomous learning.

Description	First-level indicators	Second-level indicators
Reflecting learning attitude	Enthusiasm	Number of login learning platforms
		Total online time
		Average number of login per day
		Normal homework completion ratio
Reflecting the learning process	Participatory	Total duration of course content learning
		Total frequency of course content learning
		Number of questions
		Question click rate
		Number of quizzes marked quintessence
		Total number of learning notes
		Average performance of ordinary homework
	Interactivity	Number of replies to posts
		Number of learning text messages sent

assessment of college students' English web-based autonomous learning has a large number of factors and indicators. Therefore, the formative assessment indicators set of college students' English web-based autonomous learning can be regarded as a multi-index evaluation problem. Fuzzy evaluation is a kind of analysis and evaluation method which combines qualitative and quantitative methods and combines precision and inaccuracy. Fuzzy comprehensive evaluation can effectively deal with people's subjective and objective fuzzy phenomena in the evaluation process, and finally come to the conclusion of the overall event. Therefore, fuzzy comprehensive evaluation method can be used to deal with various complex system problems with its unique advantages of fuzzy transformation. The characteristics of the fuzzy comprehensive evaluation method are: taking the optimal evaluation factor as the benchmark, its evaluation value is 1; the remaining inferior evaluation factors get the corresponding evaluation value according to the degree of inferiority.

The main steps of applying fuzzy comprehensive evaluation are as follows.

2.3.1. Set Up Index Set. To analyze things, determine the factors affecting the domain, and set up the index set U: $U = \{U_1, U_2, \cdots, U_n\}$, that is to set up an index system that affects the characteristics of objects, so as to determine objective evaluation objects.

2.3.2. Determining the Weights of Indicators. Weight is a measure of the importance of an indicator in a thing. The indicator factor fuzzy weight vector can be expressed as A: $A = \{a_1, a_2, \cdots, a_n\}$, where a_i indicates that each indicator in U belongs to the degree of membership of the evaluation set, which is called the index importance coefficient or the contribution coefficient [24] and n represents the number of
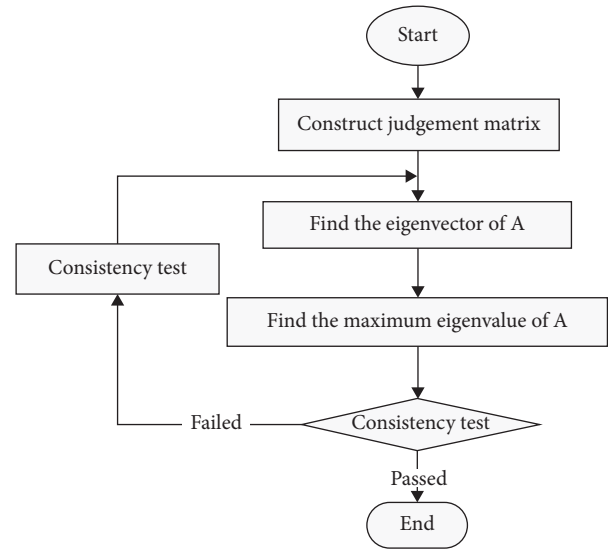

FIGURE 1: Analytic hierarchy process flowchart.

indicators. The difference of importance represents the different influences of each index in the evaluation of things. When the fuzzy comprehensive evaluation is carried out, the establishment of the index weight is related to the accuracy of the evaluation, which is a very important part of the fuzzy evaluation method. The methods used to determine the weights are commonly used in expert evaluation, frequency statistical analysis [25], analytic hierarchy process (AHP) [26], attribute hierarchy model [27], and so on. This paper uses AHP to determine the weight of indicators. The analytic hierarchy process is shown in Figure 1.

2.3.3. Create a Collection of Reviews V. In the fuzzy comprehensive evaluation, the establishment of the comment set is very important. The general domain $V = \{V_1, V_2, \cdots, V_n\}$ represents the possibility of several levels or evaluation results. Through the overall consideration of the things being evaluated, the purpose of the fuzzy comprehensive evaluation method is to obtain the best evaluation results from the evaluation set V. The fuzzy comprehensive evaluation index system is the basis for the comprehensive evaluation. Whether the selection of the evaluation index is appropriate will directly affect the accuracy of the comprehensive evaluation.

2.3.4. Establish Membership and Conduct Single Factor Evaluation. According to the established index sets and review sets, experts are invited to quantitatively evaluate the evaluation objects. After statistical analysis and synthesis, the single factor is determined as the criterion, and the membership degree of each level of fuzzy subsets of the evaluation object is established, that is, the fuzzy relation matrix $R = (r_{ij})_{n \times m}$.

2.3.5. Selecting Operator to Calculate Fuzzy Comprehensive Evaluation Set B. The fuzzy comprehensive evaluation set B

is a sort of the calculation of the weight of the indicator set and the evaluation membership degree of each index, as shown in the following formula:

$$B = A \circ R = (a_1, a_2, \cdots, a_n) \circ \begin{bmatrix} r_{11} & r_{12} & \cdots & r_{1m} \\ r_{21} & r_{22} & \cdots & r_{2m} \\ \vdots & \vdots & \vdots & \vdots \\ r_{n1} & r_{n2} & \cdots & r_{nm} \end{bmatrix} = (b_1, b_2, \cdots, b_n)$$

This paper will use the weighted average model $M(\cdot, +)$ to carry out the late fusion calculation of the fuzzy comprehensive evaluation method. The advantage of this model is that the single index evaluation information is retained, and the influence of all indexes is considered comprehensively. The comprehensive evaluation of the indexes is effectively fused, which is more suitable for this kind of comprehensive evaluation. Among them, the fuzzy comprehensive evaluation method based on fuzzy sets makes a comprehensive evaluation of the affiliation status of the evaluated objects from multiple indicators. The ambiguity of standards and influencing factors is reflected.

3. Experiments

In the experimental simulation work, the computer hardware configuration is as follows:

(1) Processor: Inter i5 2.50 GHz

(2) Memory: 4 GB

(3) Operating system: Windows 764 ultimate

Development platform: Visual Studio 2005.
Development language: VB.NET.

This paper chooses college English course and makes a formative assessment of one of the students' online autonomous learning behavior through this system. According to the evaluation index system established in this paper, the data are collected, and then the student is taken as an example for fuzzy comprehensive evaluation. According to the 3 major indicators of evaluation, data are collected from enthusiasm, participatory, and interactivity. Specific data are listed in Table 2.

4. Discussion

According to the index system designed in this paper, the weight is calculated by analytic hierarchy process, and the weight table is shown in Table 3.

First of all, the first-level indicators are: enthusiasm, participation, interaction of fuzzy comprehensive evaluation, and then the results of a higher level of comprehensive evaluation, that is, the second-level indicators of fuzzy comprehensive evaluation and analysis of the overall performance of learners.

4.1. Enthusiasm. First analyze the enthusiasm. According to the weight table of Table 3, the weight of the secondary indicator under enthusiasm is $A_1 = \{0.235, 0.229, 0.125, 0.411\}$. Figure 2 shows the histogram of positive weights. It can be seen from the figure that the "average

TABLE 2: Autonomous learning of English in a college student.

First-level indicators	Second-level indicators	Specific situation
Enthusiasm A_1	Number of login learning platforms	41 times
	Total online time	55 minutes
	Average number of logins per day	0.7 times
	Normal homework completion ratio	0.35
Participatory A_2	Total duration of course content learning	55 minutes
	Total frequency of course content learning	26 times
	Number of questions	3 times
	Question click rate	30 times
	Number of quizzes marked quintessence	2 times
	Total number of learning notes	2 times
	Average homework results	30
Interactivity A_3	Number of reply posts	5 times
	Number of learning text messages sent	2 times

TABLE 3: Weight table.

First-level indicators	Weight	Second-level indicators	A_1	A_2	A_3	Weight
A_1	0.395	1	0.235			0.093
		2	0.229			0.090
		3	0.125			0.049
		4	0.411			0.163
A_2	0.459	5		0.259		0.118
		6		0.224		0.103
		7		0.089		0.041
		8		0.035		0.016
		9		0.121		0.056
		10		0.182		0.084
		11		0.09		0.041
A_3	0.146	12			0.415	0.061
		13			0.585	0.085

number of daily logins" is small, and students should pay attention to it.

The comment set is divided into four levels: excellent, good, medium, and poor: $V = \{$excellent, good, medium, poor$\}$. According to the fuzzy distribution of each index level, the comprehensive evaluation matrix R:

$$R = \begin{pmatrix} 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 \end{pmatrix}$$ of index enthusiasm is obtained. Then the

fuzzy comprehensive evaluation result is: $B = A \circ R = \{0, 0.464, 0.411, 0.125\}$.

4.2. Participation. Secondly, the participation is analyzed. According to the weight table of Table 3, the weight of the
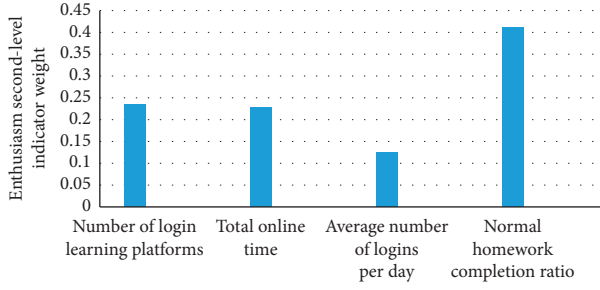
Figure 2: Enthusiasm second-level indicator weight chart.

second-level indicator under enthusiasm is $A_2 = \{0.259,$ $0.224, 0.089, 0.035, 0.121, 0.182, 0.09\}$. Figure 3 shows the histogram of the participation weights. It can be seen from the figure that the "number of questions," "click rate of questions" and "average grades of average homework" account for a small proportion, and students should pay attention to them.

$V = \{\text{excellent}, \text{good}, \text{medium}, \text{poor}\}$. According to the fuzzy distribution settings of each indicator level, the comprehensive evaluation matrix R of the index enthusiasm is obtained:

$$R = \begin{pmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

Then the fuzzy comprehensive evaluation result is: $B = A \circ R = \{0, 0.294, 0.434, 0.272\}$.

4.3. Interactivity.

Then, analyze the interactivity. According to Table 3, we can see that the weight of the second-level indicator is $A_3 = \{0.415, 0.585\}$. Figure 4 shows the histogram of interactive weights. It can be seen from the figure that the proportion of "number of reply posts" is smaller and students should pay attention to it.

$V = \{\text{excellent}, \text{good}, \text{medium}, \text{poor}\}$. According to the fuzzy distribution settings of each indicator level, the comprehensive evaluation matrix R of the index interactivity is obtained: $R = \begin{pmatrix} 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}$. Then the fuzzy comprehensive evaluation result is: $B = A \circ R = \{0, 0, 0.415, 0.585\}$.

4.4. Overall Performance.

Finally, the overall performance analysis is given. From Table 3, it can be seen that the weight of the first-level index is $A = \{0.395, 0.459, 0.146\}$. Figure 5 shows the histogram of the overall performance weight. It can be seen from the figure that the importance of "participation" is higher than that of "enthusiasm," and then higher than "interactivity."

$V = \{\text{excellent}, \text{good}, \text{medium}, \text{poor}\}$. According to the fuzzy distribution settings of each indicator level, the comprehensive evaluation matrix R of the index enthusiasm
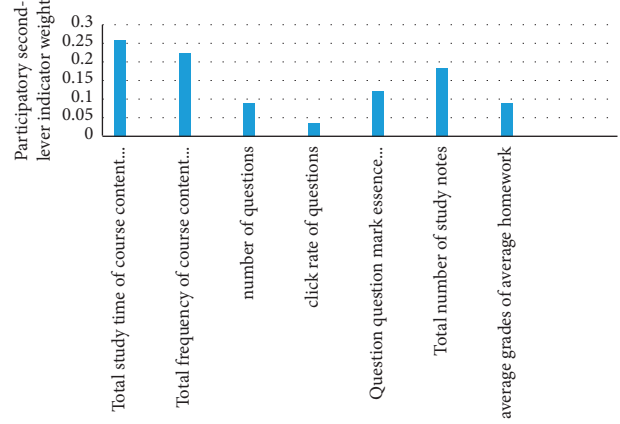

Figure 3: Participatory second-level indicator weight chart.
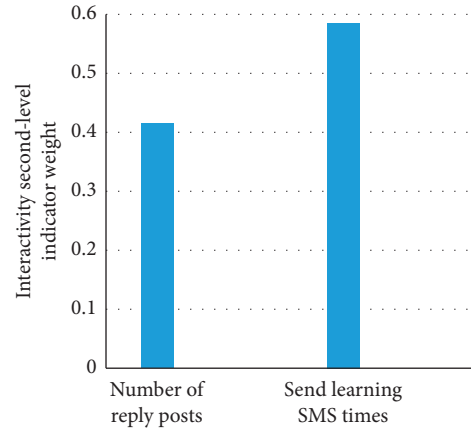

Figure 4: Interactivity second-level indicator weight chart.
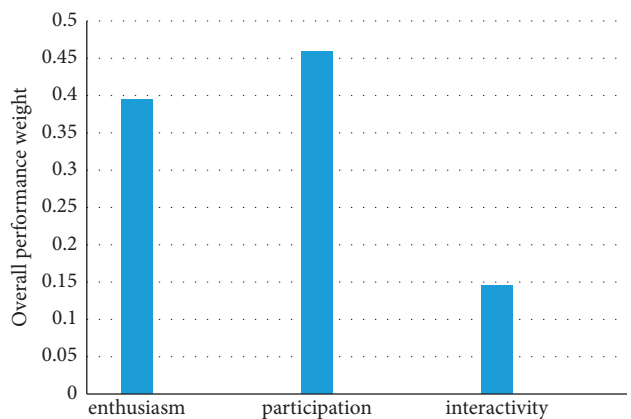

Figure 5: Overall performance weight chart.

is obtained: $R = \begin{pmatrix} 0 & 0.464 & 0.411 & 0.125 \\ 0 & 0.294 & 0.434 & 0.272 \\ 0 & 0 & 0.415 & 0.585 \end{pmatrix}$. Then the fuzzy comprehensive evaluation result is: $B = A \circ R = \{0, 0.318, 0.422, 0.26\}$.

Finally, set the grade score demarcation point to: 90, 80, 70, 50, that is $R' = \begin{pmatrix} 90 \\ 80 \\ 70 \\ 50 \end{pmatrix}$, then the overall reference score

$D = B \circ R' = 67.98$.

5. Conclusion

In today's world of automated learning, shortcomings, such as the separation of time and space in teaching and learning and the lack of control and guidance necessary for self-directed learning, have become a bit of a problem.. To address this issue, this article discusses assessment as a form that focuses on the evaluation process and clearly integrates the overall assessment algorithm to form a kind of independent evaluation of university-based study design.. First for online university studies in English, this article sets out a formal assessment index system and then addresses the lack of profile assessment, such as the single content and form, and the lack of scientific and comprehensive evaluation methods and indicators. The formative evaluation is combined with fuzzy comprehensive evaluation algorithm, in which the index weight is calculated by analytic hierarchy process. However, due to the limitations of time and technology, we have not conducted in-depth research on the research of formative evaluation in other disciplines, and we will conduct further analysis and research in the follow-up.

Data Availability

No data were used to support this study.

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this article.

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