



Reconstruction and Practice of Higher Vocational English Classroom Ecosystem Based on AHP Algorithm

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Abstract. The construction of English classroom ecosystem in higher vocational colleges is very important for students' learning and development. Therefore, in the face of various problems caused by the current imperfect classroom ecosystem, it is necessary to reconstruct the ecosystem. Therefore, this paper focuses on the AHP algorithm. The study mainly introduces the basic concept of AHP algorithm and the characteristics of the idealized ecosystem of English classroom, and then analyzes the classroom ecosystem by using the algorithm, and finds out the problems in the classroom ecosystem combined with the idealized ecosystem, and then carries on the reconstruction. Through the study, the AHP algorithm can help people understand the current situation of the English classroom ecosystem in higher vocational colleges. Combined with the idealized system standards, it can accurately analyze the problems and set strategies, and the goals of ecosystem reconstruction can be achieved by using strategies.

Keywords: AHP algorithm · Higher vocational English class · Classroom ecology

1 Introduction

Under the background of internationalization development, many industries in our country puts forward more diverse positions on the talent requirements, which involves the talent level of English, so in order to ensure the talent employment, promote industry development, higher vocational colleges from the perspective of its social responsibility, must do a good job in English teaching but, according to the present situation of higher vocational English classroom ecosystem exists many defects, the defects cause problems in teaching and are not conducive to the development of students' English learning, so higher vocational colleges cannot fulfill their social responsibilities. Under this condition, the modern higher vocational field advocates the reconstruction of the English classroom ecosystem, and proposes an idealized classroom ecosystem.

The rise of ecological civilization has changed the direction and focus of human social practice. Higher education, aimed at developing human life, survival, and life, realizing human values, and leading the progress of human civilization, is an important force and key way to promote the construction of ecological civilization. Higher education shoulders the functions of talent cultivation, scientific research, serving society, cultural inheritance and innovation, and its fundamental mission is to promote sustainable development and progress of society. Colleges and universities should play a leading and guiding role in education, integrate the ideas and concepts of educational ecology into English classroom teaching and English curriculum culture construction through various ways and means, and with a higher ideological realm and broader research perspective, make colleges and universities consciously become the main English classroom, main position, and main channel for promoting ecological culture, actively shaping and practicing the harmony, inclusiveness, responsibility Sustainable development and other core values, and strive to cultivate college students to become high-quality green talents who adhere to ecological civilization. The construction of ecological civilization calls for continuous reform in higher education, and the improvement of teaching efficiency in higher education cannot be separated from the continuous innovation of English classroom teaching paradigm, let alone the active creation of a good English classroom ecological environment. The ecological paradigm of co constructed college English classroom based on the concept of learning community will shoulder the responsibility and mission of building an ecological university, align the objectives, tasks, content, methods, and other aspects of college English classroom teaching with the essential attributes of ecological civilization construction, establish ecological concepts, strengthen ecological awareness, advocate ecological behavior, follow the path of ecological civilization development, and lead the trend of human ecological civilization development, Return higher education to an ecological track that focuses on the value and happiness of human life.

The English classroom is a place that emerged with the emergence of schools and specialized in transmitting human cultural knowledge. Its function is to continuously deepen and expand with the maturity of the class teaching system, an organizational form that emerged in modern times, and gradually develop in a diversified direction. With the importance attached to the function of English classroom teaching, the research on English classroom teaching theory has gradually attracted the interest and widespread attention of more researchers both at home and abroad. They have conducted systematic and in-depth research on English classroom teaching from different disciplines and professional perspectives, and have formed many rich research results on English classroom teaching theory. In order to carry out in-depth English curriculum reform and solve fundamental problems in teaching practice, Improving the effectiveness of English classroom teaching has laid a solid theoretical and intellectual foundation.

Therefore, the next problem to be solved is how to achieve the reconstruction goal. Focusing on this problem, AHP algorithm can provide powerful help, so it is necessary to carry out related research based on this algorithm.

2 Basic Concepts of AHP Algorithm and Characteristics of Idealized Ecosystem in English Classroom

2.1 Algorithm Concept

At present, AHP algorithm is widely defined as subjective weighting algorithm in theory, which can evaluate different decision schemes of multi-objective problems and distinguish good from bad. The principle is as follows: AHP algorithm is able to put all the elements related to the decision-making plan into principles, scheme and so on several levels, quantitative and qualitative analysis, and then combined with each other, according to the user's subjective experience judgment decision scheme in the correlation between the layers of element size, according to the judgment result give each level corresponding weight, so you can according to the weight to determine the decision scheme is good or bad [1–3].

Figure 1 is the hierarchical structure of AHP algorithm. This structure is one of the advantages of AHP algorithm, that is, it can greatly simplify the judgment process, and make many indicators that cannot be quantified into quantifiable indicators, with operability, people can directly compare the importance of indicators to get the answer. At the same time, AHP algorithm not only has the characteristics of human thinking, but also can effectively avoid the subjective influence of decision makers to a certain extent, and ensure the quality of results. The AHP algorithm also has disadvantages, that is, its judgment matrix depends on people, if the subjective and objective of people are not unified, and there is a certain deviation between the subjective and correct answer, the result will be inaccurate, which shows that the algorithm is easy to be affected by human factors.

AHP algorithm mainly solves the problem of cross level ranking. It obtains the relative weight of the lowest level to the highest level by establishing a comparison matrix layer by layer, and arranges each scheme according to the relative weight to select the optimal solution. AHP algorithm is widely used in agriculture, education, medical treatment, behavioral science, economic planning and management, energy policy and distribution, and other fields. The published literature is also far superior to other decision-making methods. The characteristics of AHP algorithm are as follows.

1. Systematicity

The idea of system analysis is not to ignore the impact of any factors on the results. The AHP algorithm hierarchically analyzes the research objectives, compares the relationships of various elements, and synthesizes all results to make decisions. This makes each element in each layer have a quantitative impact on the results, becoming another important system analysis tool after statistical analysis. Therefore, AHP algorithm is particularly suitable for system evaluation with unstructured characteristics and multiple criteria.

2. Combination of quantitative and qualitative analysis

AHP algorithm solves complex problems hierarchically through a combination of quantitative and qualitative methods, including both subjectively analyzing the relationship between criteria and using rigorous mathematical formulas to obtain the weight of the

criteria. Therefore, the AHP algorithm is not only suitable for situations where there are subjective factors and uncertainties, but also suitable for logical experiences.

3. Simple and effective

AHP algorithm does not pursue complex mathematical processes, but rather pays more attention to qualitative analysis and judgment than general quantitative calculation methods. It obtains the quantitative relationship between sub elements and their parent elements through pairwise comparison, and finally uses simple mathematical calculations. The final result is simple and clear. As the final result is obtained through careful analysis and accurate calculation layer by layer, the reliability of the result is high.

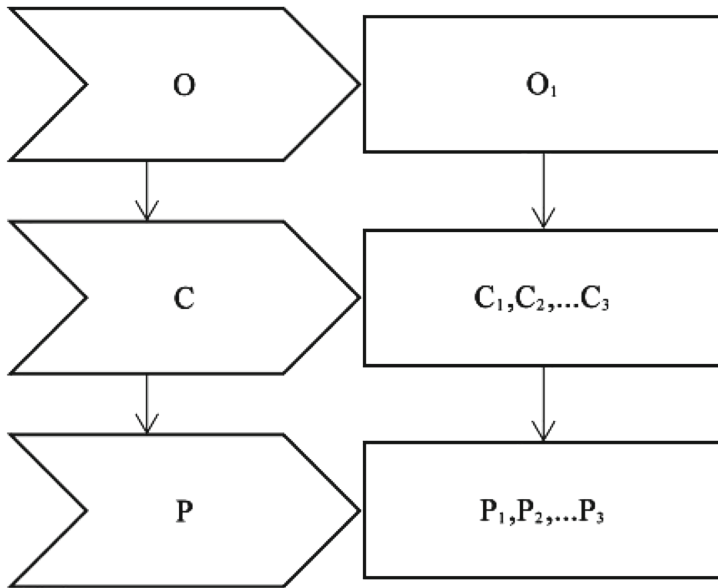


Fig. 1. Hierarchical structure diagram

(O is the goal layer, which contains only a unique final goal, or optimal solution; C is the criterion layer, which contains several criteria of the scheme, and each criterion is an evaluation index. P is the solution layer, which contains several solutions).

In addition, through the above discussion we know that the core idea of AHP algorithm is to calculate the weight of the relevant elements in a certain criterion, so according to the sum of the weight to judge the scheme is good or bad, so to use the method, must first master the weight calculation method. At present, there are three kinds of this method, as shown in Table 1.

Table 1. Three methods of calculating the weight of element criteria in AHP algorithm

Name	Characteristics
Arithmetic mean method	The results of typical normalization algorithms are generally higher than those of other algorithms, but the accuracy is not low
Method of geometric mean	Vector solution method, the results of the numerical value is small, under certain circumstances will appear the problem of insufficient accuracy
Eigenvalue method	The results of consistency matrix algorithm are small and not accurate enough

In contrast, this paper only considers the arithmetic average method, which is expressed in Eq. (1).

$$\omega_i = \frac{1}{n} \sum_{j=1}^n \frac{a_{ij}}{\sum_{k=1}^n a_{kj}} \tag{1}$$

Type i and j represents the i layer respectively in the first j, n is the normalized quasi value, a is the related factor, and k is the relative degree.

The basic steps of the AHP algorithm are as follows:

1. Establish a hierarchical structure model;
2. Construct a comparison matrix;
3. Sort the hierarchy list and perform consistency check;
4. Overall ranking of levels and consistency testing;
5. Analyze the relationship between the criterion layer and the scheme layer, and obtain the final scheme.

AHP algorithm follows the principle of “priority weight”, indicating the relative measure of superiority of one scheme over other schemes under various criteria. The AHP algorithm uses the eigenvectors of the comparison matrix and the maximum features and values. After normalization, the relative importance of the child element relative to the parent element can be obtained. Because the comparison matrix is obtained based on the subjective comparison of two elements, when there are many elements, it is likely to reach inconsistent conclusions, so consistency verification is required.

2.2 Characteristics of Idealized Classroom Ecosystem

Ideally, the English classroom ecosystem in higher vocational colleges has three characteristics, as shown in Table 2.

According to Table 1, in the idealized ecosystem, if students’ learning attitude is positive enough, it means that students can learn faster and better, understand and master knowledge, and have good autonomy in learning. If the teacher’s teaching method

Table 2. Characteristics of idealized ecosystem of English classroom in higher vocational colleges

Indicators	Idealized index characteristics
Attitude towards learning	Positive
Teacher's teaching style	Mainly students
Teaching promotion mechanism	Circulation to promote

is student-oriented, it means that students have sufficient space of initiative to fully divergent thinking, and it is easier for teachers to understand students' problems and implement targeted teaching [5, 6]. If the teaching promotion mechanism has the feature of circular promotion, it means that the interaction between teachers and students is good, and it can constantly expand through the circular process of "the student asks the question and the teacher helps solve the problem", which can provide a good help to the development of students' English proficiency.

The ecological construction of English classroom is a complex systematic project. Guided by the ecological thinking of overall relevance, interactive openness, dynamic generation, and multiple symbiosis, this study systematically analyzes various environmental factors that affect the ecological development of college English classroom from both vertical and horizontal dimensions. We have not only seen the interaction between the internal and external environment of the college English classroom and the ecological subjects of the English classroom, but also realized the mutual connection between the ecological environment of the English classroom at different levels of education. For a long time, there has been a lack of effective communication and communication between basic education and higher education in China. The two stages of education are largely independent and disconnected from each other, causing the originally systematic education chain to be artificially fragmented, seriously affecting the improvement of education quality and the overall and personalized development of students. Through this study, it is hoped that education administrators, teachers, and college students can establish a sustainable development ecological view of the English classroom, coordinate various environmental factors that affect the ecology of the English classroom, carry out teaching and learning activities from a holistic, connected, developmental, harmonious, and symbiotic perspective, promote the full development of students' personalities, and promote the healthy development of the ecological environment of the English classroom in universities. To promote the quality and effectiveness of English classroom teaching in China's universities.

Faced with the current situation in Chinese universities that overemphasize teachers' scientific research capabilities and academic achievements while ignoring English classroom teaching, this study not only focuses on the relationship between English classroom ecological subjects and the English classroom ecological environment, but also focuses on the interaction and influence between English classroom ecological subjects [7-9]. Through the exploration of the ecological relationship between teachers and students and the transformation of teaching processes and methods, the English classroom is revitalized, creating a dynamic growth environment and development space for the ecological subjects of the English classroom, promoting teachers' professional

growth, and providing theoretical guidance and practical support for teachers to achieve educational ideals, complete educational missions, and improve professional well-being in the English classroom. To make teachers consciously become advocates of ecological concepts and practitioners of ecological behavior in English classrooms.

The ultimate goal of studying English classroom teaching is to solve the non ecological phenomenon in English classroom, improve the effectiveness of English classroom teaching, stimulate students' enthusiasm, consciousness, initiative, and creativity in learning, and improve the quality and specification of talent cultivation. This research is based on the perspective of coordinated development of the ecological environment inside and outside the college English classroom from the perspective of ecology, always taking the physical and mental health and lifelong development of learners as the research basis, and taking holistic, harmonious, symbiotic, and sustainable development as the basic value concepts [10]. The ultimate goal of its research is to promote the comprehensive development and full development of students' personality through theoretical and practical exploration of ecological issues in the English classroom, This is also the most genuine expectation of this study.

3 AHP Algorithm Analysis and Reconstruction Scheme of Higher Vocational English Classroom Ecosystem

3.1 Algorithm Analysis

On the basis of AHP algorithm, the analysis scheme of English classroom ecosystem in higher vocational colleges is shown in Fig. 2.

According to Fig. 2, the final goal is firstly established, which is the idealized ecosystem of higher vocational English classroom, and the evaluation standard is compared with the current situation of classroom ecosystem, so as to find out the problems therein. Secondly, the final goal is decomposed into several criteria and the criterion layer is constructed. In this paper, three indicators in Table 2 are selected as the criteria to clarify the direction of comparison. Finally, the scheme comparison is used to compare the quality of the reconstruction scheme, so as to make the optimal choice.

On this basis, the following will analyze the current situation of the English classroom ecosystem in higher vocational colleges, aiming to find out the problems and clarify the direction of reconstruction [11].

3.1.1 Current Situation Analysis

Taking the English classroom ecosystem of a higher vocational college as an example, focusing on the three indicators in Table 2, a scoring mechanism is adopted for evaluation, and the evaluators are teachers, students and head teachers as needed: First, it focuses on students' learning attitude and is scored by teachers. According to the full score of 10 (the same as below), the overall score of students' learning attitude in the classroom is five points, seven points, seven points respectively, and the comprehensive score is six. Second, in terms of teachers' teaching methods, students are responsible for scoring [10–13]. After being scored by ten students, the scores of teachers' teaching methods are seven points, five points, eight points respectively, and the comprehensive score is

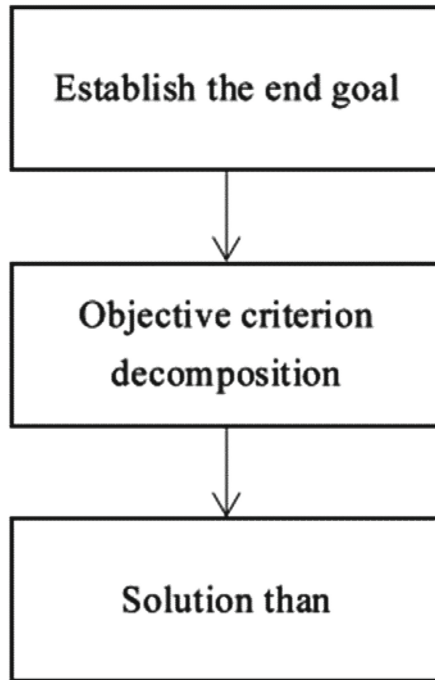


Fig. 2. Analysis scheme of English classroom ecosystem in Higher vocational colleges

six. Third, in terms of teaching promotion mechanism, the head teacher is responsible for scoring. After scoring by the three head teachers, the score of teaching promotion mechanism is eight points, eight points, eight points respectively, and the comprehensive score is eight [14].

By evaluating scores, the higher vocational English classroom ecosystem students learning attitude positive, teacher's teaching style is given priority to with students, but the degree is not high, just barely, so there is plenty of room for improvement, also suggests that students' learning attitude is not positive, the teacher's teaching way yet to implement the student primarily idea is a key problem to the English classroom ecological system, is the main refactoring direction. However, the comprehensive score of teaching promotion mechanism is high, indicating that the teaching promotion cycle is good. Although there is some room for improvement, it does not need to be reconstructed, or the priority of teaching promotion mechanism in the reconstruction of the ecosystem is relatively low, and the urgent task is to solve other problems.

3.1.2 Problem Analysis

In order to complete the reconstruction scheme design, it is necessary to analyze the problems of students' learning attitude and teachers' teaching methods in the English classroom ecosystem of higher vocational colleges, so as to understand the causes and provide directions for the reconstruction scheme design.

The first is students' learning attitude. After a long time of observation and the opinions given by teachers, we know that the causes of students' not positive learning attitude are as follows: First, most of the teaching content provided by teachers comes from textbooks, so the content is characterized by theorization, which makes the content boring and boring. Students prefer to learn from interesting content, so the boring and boring teaching content has a negative impact on students' learning attitude [15]. It is in conflict with the positive influence of teachers to mobilize students' learning enthusiasm, students' learning consciousness and other factors, which is higher than the positive influence, but not much higher than the positive influence, so students' learning attitude is worthy of the standard; Secondly, students have a single learning style and have adopted independent learning methods for a long time, which inevitably leads to the lack of communication in the learning process, and they are easy to be restricted by personal thinking, and have certain misunderstandings about their learning level. For example, they mistakenly believe that they have mastered knowledge, so their learning attitude is not positive enough.

The second is the teaching method of teachers. Combined with students' description and research observation results, the teaching method adopted by English teachers in higher vocational colleges is relatively traditional, that is, teachers are responsible for teaching, asking questions, arranging exercises in class, and requiring students to carry out learning activities according to their own opinions, indicating that students are often in a passive learning state. Only in some extracurricular practical English activities can fully diverge their own thinking, so the degree of teachers' teaching method is up to the standard [16]. The causes of the traditional teaching methods of teachers are as follows: first, teachers themselves hold the traditional education ideas, and believe that teaching should let students follow the teachers, so they will adopt the traditional teaching methods; Second, higher vocational colleges do not actively lead teachers to carry out teaching reform work, resulting in many higher vocational English teachers lack of reform consciousness, still follow the traditional teaching methods.

3.2 Reconstruction Scheme

In the face of the two major problems and causes of the English classroom ecosystem in higher vocational colleges, this paper proposes two reconstruction schemes based on the idealized characteristics of the ecological classroom, and uses AHP algorithm to analyze, and then chooses the best.

Scheme 1: Colleges and universities ask a third party organization to train teachers, and use case training method to change teachers' ideas and promote them to get rid of traditional teaching methods [17]. Then, teachers are required to reform the teaching content to make it interesting. The elements that students are interested in can be integrated into the teaching content, so as to mobilize students' concentration in learning, create a good classroom atmosphere, and promote students' learning attitude to be more positive. At the same time, encouraging students to communicate outside the classroom, enriching students' communication methods, combined with classroom learning, can help students break through thinking limitations, correctly understand their own shortcomings, and further improve students' positive learning attitude.

Scheme 2: Encourage teachers to strengthen self-learning and deepen self-reflection, so as to find problems and get rid of traditional teaching methods. On this basis, since it is higher vocational education, every student has his or her own choice of major, which represents the interest of students. Therefore, teachers can combine English teaching with professional subjects, and teach with the goal of students' personal career ideal, so as to improve students' learning attitude and enthusiasm [18]. At the same time, with the help of the network to expand class hours, use the extra class hours to partially organize students to carry out group cooperation discussion, practice exchange and other learning activities in class, during which teachers should propose discussion and exchange topics according to students' interest orientation, so as to improve students' learning attitude and enthusiasm [19].

AHP algorithm is used to compare and analyze scheme 1 with scheme 1. First according to the teaching content, universal experience can be confirmed by teachers, students interested in teaching content, teaching content related to students' vocational ideal can make students to maintain a positive learning attitude, but the effect extent have certain difference, such as interested in learning content can only improve the students' interest in the moment, and the low degree of role, and related to the students' vocational ideal teaching content, it has the value of helping students realize their ideals, so students will be more active in order to realize their personal ideals, which indicates that the role of the latter is higher, so the weight of the latter in the idealization standard is higher in the AHP algorithm analysis [20]. Second in view of the teaching way, one way to advocate training, and training can't be this long, and the traditional teaching notion, may find it difficult to shake, in order to solve the impact of factors on the colleges and universities at the same time, the second scheme promote autonomous learning motivation of teachers, that solved the factors influence on the level of colleges and universities, and this method can be carried out for a long time, can promote the teachers to reflect continuously, so it's higher under action. In contrast, option 2 is recommended.

4 Conclusion

The AHP algorithm can help people understand the existing problems of the English classroom ecosystem in higher vocational colleges, provide the direction of system reconstruction, and evaluate the quality of the reconstruction scheme, so that people can make the best choice. It can be seen that the AHP algorithm has good application value in the reconstruction of the English classroom ecosystem in early vocational colleges, and is worth promoting.

References

1. Yunfang, Z., Yuexi, W.: Interactive teaching path analysis of higher vocational ideological and political courses based on artificial intelligence algorithms. In: 2019 11th International Conference on Measuring Technology and Mechatronics Automation (ICMTMA) (2019)
2. Wen, Z.: Research on characteristics and countermeasures of English teaching in higher vocational colleges in China based on discrete differential algorithm. *Dyn. Syst. Appl.* **29**(4) (2020)

3. Cui, X.: The study on C# teaching based on trinity method in higher vocational college. In: International Symposium on Educational Research and Educational Technology
4. Feng, L.: Research on employment data mining for higher vocational graduates. In: 2014 5th International Conference on Information Technology for Manufacturing Systems (ITMS 2014)
5. Bao, W.: Construction of Higher Vocational Teaching Quality Evaluation System Based on the Combination of Work and Study (2016)
6. Xilin, Z., Shiming, L.: Optimization model of higher education resources allocation based on genetic algorithm. *Chin. J. Schistosomiasis Control* **25**(4), 337–42, 356 (2013)
7. Yu-Jiong, Z., Yan, L., Jiang, Q., et al.: Research on higher vocational college laboratory safety management evaluation based on DHGF algorithm. *Res. Explor. Lab.* (2016)
8. Xi, Z.: Fuzzy comprehensive evaluation of higher vocational professional performance based on AHP method. *J. Ningbo Inst. Educ.* (2017)
9. Liu, H.: Research on practice evaluation system of higher vocational preschool education based on artificial intelligence. In: 2021 13th International Conference on Measuring Technology and Mechatronics Automation (ICMTMA) (2021)
10. Wan-Xiao, S.: Research on evaluation model of “flipped classroom” in English teaching of vocational college based on AHP. *J. Liuzhou Vocat. Tech. Coll.* (2017)
11. Rong, Y., Wen-Qi, Z.: A brief talk on the application of AHP to optimization distribution of higher vocational education resources. *J. Qingdao Vocat. Tech. Coll.* (2006)
12. A brief study on the design of higher vocational English classroom based on blended teaching model. *海外英语* (16), 2 (2020)
13. Li, H., Jiao, L.: Research on the innovation of higher vocational English teaching mode based on OBE concept under the background of big data. *J. Phys.: Conf. Ser.* **1757**(1), 012037 (7 pp) (2021)
14. Ya-Ni, C., Xuan, L.: A study on practice of the second classroom teaching of higher vocational English based on the first classroom—a case study of Ji’an College. *J. Hubei Corresp. Univ.* (2018)
15. Shaoxian, H.: Research and practice of teaching model of higher vocational English project based on project framework. *The guide of science and education* (2018)
16. Zhao-Xia, Z.: The practice of teaching reform of higher vocational English course based on the demand of professional competence. *J. Liaoning High. Vocat.* (2017)
17. Lin, Y.U.: Research on professional English and practice of the higher vocational English courses based on the workplace environment. *J. Xinjiang Vocat. Univ.* (2016)
18. Bo, L.: Research on the practice of higher vocational oral English teaching based on information teaching mode. *J. Jiamusi Vocat. Inst.* (2018)
19. Jin, B.: New theory and practice of higher vocational English listening and speaking teaching. *J. Tianjin Vocat. Inst.* (2016)
20. Wang, J.F.: Research and practice of theme based teaching mode of public English project in higher vocational colleges. *J. Jiamusi Educ. Inst.* (2013)