EAI Endorsed Transactions
on Scalable Information Systems
Research Article EAI.EU

STEAM Education Concept in English Teaching Practice Process Based on Big Data Evolutionary Network Influence Analysis

Minmin Guo [1,*]

[1] Jiyuan Vocational and Technical College, Jiyuan 459000, Henan, China

Abstract

INTRODUCTION: English language teaching in China is primarily traditional test-based education. Few teachers customize teaching activities according to the content and students' characteristics, which results in students' low interest in learning English and reduces their understanding and application of knowledge to the point that their speaking skills are generally weak. English is different from Chinese in that it combines skills and practice and covers a wide range of knowledge. It is a subject category that combines general knowledge of life with theoretical knowledge. Although it is only a language subject, in the process of learning it, students can also learn the human background, customs, history and culture of foreign countries, enriching their understanding of world culture.
OBJECTIVES: Organic combination of the STEAM model and English teaching can promote academic innovation, on the one hand, to enhance learning hobbies from the aspect of learning needs and to cultivate students' comprehensive literacy, and on the other hand, the innovation of practice and concepts can enhance students' practical ability and innovation ability.
METHODS: This study is based on big data evolutionary network influence analysis of STEAM education concept in English teaching time process analysis of students in the classroom participation, interest in learning English and learning self-confidence and the phenomenon of mismatch between the students' learning foundation, to enhance the student's classroom participation, the interest in learning English and self-confidence, the students' comprehensive literacy, and the acquisition of English language skills.
RESULTS: STEAM + ELT practices + interdisciplinary teaching can be realized by organically combining STEAM education concepts across multiple subject areas.
CONCLUSION: Designing appropriate English teaching activities based on the STEAM education concept and applying the theory in actual teaching activities can achieve the expected results.

Keywords: STEAM education concept, English teaching, big data

Received on 12 March 2023, accepted on 5 August 2023, published on 29 August 2023

doi: 10.4108/eetsis.3828

*Corresponding Author. Email: amingxiaoxee@163.com

1. Introduction

English teaching in China is primarily traditional test-based education. Few teachers tailor relevant teaching activities to the content and students' idiosyncrasies, which leads to low interest in learning English and can reduce the understanding and application of knowledge to the extent that students' speaking is generally weak[1-2]. The current relevant textbooks are involved in multiple disciplines, and this trend of cross-disciplinary integration can make students' grasp of knowledge very confusing and require a high level of overall quality

ability, which requires them to have a deep understanding of the nature of knowledge

English differs from Chinese in that it is not only a close combination of skills and practice, but its knowledge covers a wide range of subject categories that combine common sense and theoretical knowledge of life[3-6]. As a language, its native ability is communication, and by mastering English, students master a new way of communicating with the outside world; it also expands students' knowledge, enabling them to keep up with the times and improve their cultural literacy. English teaching in China aims to teach English by developing students' language practice and application skills, cultivating their personality, improving their social adaptability, and promoting technological innovation and multidisciplinary talent development. The advanced concept of STEAM should be organically integrated into English teaching activities to help students connect and integrate knowledge from different disciplines and better master the theoretical concepts and core knowledge of each discipline[7-8].

Until now, most English teaching in China is still a traditional teaching method that favours the analysis of grammar and syntax and the mastery of the meaning of relevant vocabulary[9-11]. This fill-in-the-blank approach to education limits students' subjective initiative. It neglects the cultivation of their learning ability and practical application skills to improve the final teaching results[12]. Learning a language requires understanding its application areas, including astronomy, geography, science and technology, political economy, Etc., and an awareness of the similarities and differences between a learner's second language and his or her native language. There is a strong connection between the subject of English and other disciplines, and disciplinary integration is also a necessary path for teaching English, which makes it necessary to enhance the infiltration, transfer and application of knowledge in the teaching process in order to promote the improvement of students' overall abilities.

The organic combination of the STEAM model and English teaching can promote academic innovation, on the one hand, to enhance learning hobbies and cultivate students' comprehensive literacy in terms of learning needs. On the other hand, the innovation of practices and concepts can enhance students' practical and innovative abilities[13-15].

In the era of high-speed Internet development, social networks have become dominant social in the era of big data. Social influence analysis still dominates social network research[16]. It is widely used in network and graph mining, such as viral marketing, recommendation systems, source detection, finding leaders in communities, network topology optimization, and tumour suppression. Meanwhile, applying extensive data-based social networks brings opportunities and challenges for social influence analysis[17].

Most of the current research phase is based on static social networks but is dynamic. In actual social networks, there are additions and deletions of nodes, additions and deletions of edges, and modifications of edge weights, i.e., changes in the strength of the relationship between two points, Etc. In other words, the network structure is constantly changing rather than stationary. The difficulty in the study of evolutionary networks is how to obtain unknown information[18-22].

2. Research background

2.1 Domestic and foreign English teaching research

2.1.1 Foreign Research on English Teaching and Learning

The trend of globalization and disciplinary integration has made English learning increasingly important. Neglecting foreign language education can significantly reduce international competitiveness. Other countries are also actively exploring the reform path of foreign language education, abandoning the fill-in-the-bag education, adding practical application tests in addition to theoretical knowledge assessment, shifting the focus from theoretical education to practical application education, from paper tests to oral strain communication, from results to competence, and from commonality to individuality. Integrating English into real life, cultivating students' international perspective and cross-cultural awareness, Etc[23].

Grammar-translation method: Originating in Latin and Greek, it emphasizes grammar and vocabulary, emphasizing written translation.

Audiovisual teaching method: It emphasizes hearing first, followed by reading and writing, and it uses the language quickly by repeating many sentence patterns.

Communicative teaching method: It emphasizes using the target language for communication in everyday life, and students can learn through group discussions, Etc. In addition to learning to use grammatically correct sentences, one must respond flexibly to determine the person's true intentions based on factors such as facial expressions, changes and the context of the conversation. Communication has a certain tolerance for partially incorrect or incomplete sentences, focusing more on the meaning of the speech. Students are at the center of the teaching activities, and the teacher provides an authentic communication environment to organize and guide their activities. The textbook is also not fixed and will flexibly change over time and with the target audience, including but not limited to newspapers and magazines, novels, radio and television, and television series. The meaning of communication includes both written and oral

communication, and we need to be able to read and write as well as to be able to hear.

Whole language theory: It focuses on the interpenetration of basic training in listening, speaking, reading, and writing as an organic whole. It advocates teaching language as a medium of interdisciplinary knowledge, arguing that knowledge and competence in language can be acquired naturally while using language to acquire knowledge and information from other disciplines.

2.1.2 Domestic research on English language teaching and learning

The main recognized domestic English teaching methods are grammar-translation and direct teaching methods.

Domestic English teaching is still in the primary stage. Generally, students memorize vocabulary and grammar by rote, and the primary training is reading ability, and the teaching process is: learning vocabulary, analyzing grammar, and translating sentences. The translation of sentences is generally more mechanical and direct, cultivating students' reading comprehension and word-by-word translation ability. It gives them a solid grasp of grammar structure but needs to pay attention to learning listening and reading skills. The main idea of direct instruction is that "the external structure of language reflects the structure of the internal experience it describes." Language learning should be an experiential process, and the most crucial feature of the experiential process is its sequence, i.e., any experience can be described in a series of smaller pieces.

Modern English teaching theories have been constantly developed and updated, and traditional English teaching models and theories have been gradually eliminated. Some scholars believe that the goals of modern ELT are gradually developing from commonality to individuality. The activities between teachers and students will change from a one-way model of the teacher to student to a two-way model of the teacher to student and student to teacher. The teacher's role will change from didactic to orientation, and the teaching activities will change from individual students to group cooperation. Teaching methods will shift from simple to multidimensional. Other scholars believe that traditional and novel teaching methods should be organically combined to make English teaching adapt to the needs of society and personal development.

2.2 STEAM education research at home and abroad

STEAM education originated from the talent crisis in foreign countries, where some countries needed well-rounded talents in science and technology, engineering, mathematics and other fields. In order to improve their comprehensive national power, they began to explore the path of STEM education adapted to their national conditions, which later developed into STEAM education. STEM stands for science, technology, engineering and mathematics, respectively, and this concept has attracted widespread attention from various countries since it was first reported. Subsequently, on this basis, some scholars proposed integrating Arts into it to strengthen the humanities and arts of talents, and the concept of STEAM education was formally introduced.

2.2.1 Foreign STEAM education research

In some foreign countries, from the top to the bottom, the importance of STEAM education holds a positive attitude. After the rapid development in the early stage, the STEAM education concept gradually develops smoothly; many education scholars put forward constructive suggestions for the existing problems, and the government and research institutions, universities, Etc. Promote the development of STEAM through legislation and projects. Some countries, thinking about the direction of education reform, have introduced the STEAM education concept and renamed it MINT education according to their situation to stimulate creative talent development.

By analyzing the development of STEAM education in various countries, the concept is vital and can be adapted to local conditions to cultivate and develop integrated talents. Countries are turning science education into integrated learning of science, mathematics, art, engineering and other disciplines.STEAM education is booming.

2.2.2 Domestic STEAM education research

It has been more than ten years since STEAM education was introduced in China, and we have been committed to developing a path that meets China's national conditions. Although specific achievements have been made, many things could still be improved.

Some scholars have compiled foreign STEAM education concepts and policies, emphasizing their importance, and published relevant literature illustrating its critical role in cultivating innovative talents. Other scholars have studied foreign STEAM-integrated teaching practices, analyzed the implementation in different types and levels of schools, and summarized some standard teaching methods and principles, providing a theoretical basis for the development in China.

2.3 Researching English teaching with STEAM concept

2.3.1 Research on English teaching under the STEAM concept in foreign countries

Foreign countries generally teach English, geography, and other integrated subjects, but only a few combine the STEAM education concept with English teaching.

2.3.2 Research on English teaching based on the STEAM concept

Some scholars believe that it is necessary to organically combine the STEAM education concept with students' learning process, flexibly combine theoretical knowledge with real life, improve students' interest and ability in learning English, promote the development of students' comprehensive ability, and cultivate the ability of independent learning.

Other scholars believe that the STEAM education concept should be put in a guiding position, apply it in teaching practice, promote the integration of knowledge from various disciplines, provide students with comprehensive quality, promote students' independent learning through group discussions, use of Internet technology for tutoring, and cultivate students' classroom innovation.

Other scholars believe STEAM education concepts contain interdisciplinary, practical, dynamic, and experiential characteristics. With the starting point of cultivating comprehensive literacy and promoting interdisciplinary education, the STEAM+English model helps develop students' listening, speaking, reading, and writing skills and creatively integrates English acquisition and quality improvement.

In summary, the educational concept and teaching activities of STEAM have been combined to some extent, but further integration and exploration are needed, especially in English teaching.

3. Materials and methods

3.1 Analysis of social influence in evolutionary networks

With the development of the times, the scope of social networks is constantly developing and expanding, and the analysis of their influence has become a hot spot for research, with a wide range of real-life application scenarios. When analyzing the influence of model nodes, the factors with the most decisive influence are generally identified and saved. They are input into the network for analysis, and finally, the final analysis results are output. The process is shown in Figure 1. The biggest problem faced from theory to application is minimizing the cost of influence. Some scholars analyze the behaviour of the sample, but this has a problem that other influential people will influence the sample behaviour, and the sample is only selected to cover some highly influential users. Recent foreign research uses a novel reverse influence maximization method to estimate costs. The principle is to determine the minimum number of neighbours required for a given set of target nodes in the network and work in the opposite direction of the influence maximization problem, as shown in Figure 1.

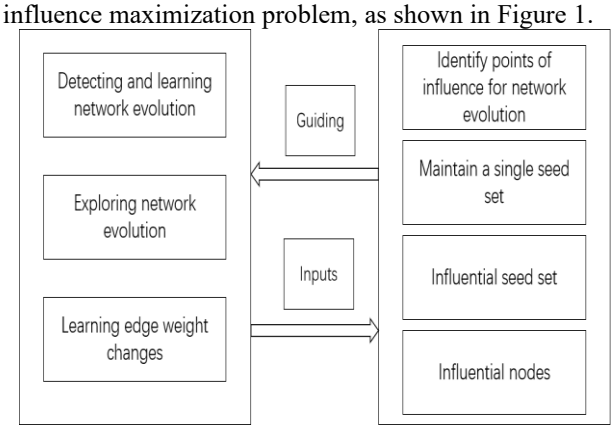

Figure 1 Influence analysis in evolutionary networks

With the increase of network nodes and their evolution, the complexity of the network is also changing. The static node influence analysis of social networks is no longer applicable to evolutionary networks, and analyzing the high-influence nodes in the network is the current difficulty. As shown in Figure 2, the first thing to do in extracting influential nodes is to pre-process the data and then evaluate the nodes' influence. The current relevant evaluation algorithm is closely related to the network topology parameters, which have the feature of low computational complexity. However, the accuracy of its results could be higher due to ignoring the influence of the topology of the adjacent nodes. To address this problem, some scholars propose the algorithm of structural holes, which focuses on the location of nodes and expresses the influence of nodes through the structure of their neighbours. The more nodes are restricted, the less its influence is. Its advantage is that it can accurately identify the critical nodes, and its disadvantage is that the algorithm's ability to identify the clustering centre could be more vital, as shown in Figure 2.

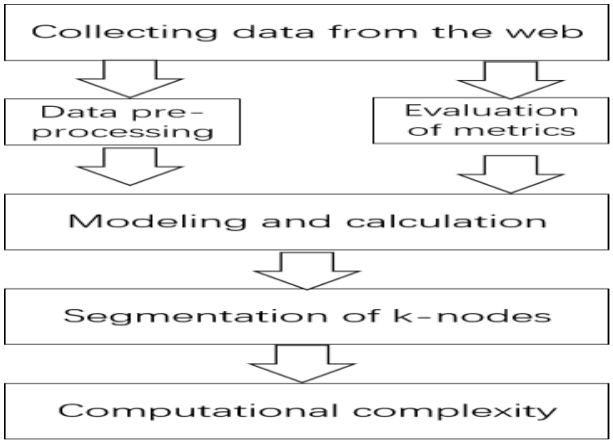

Figure 2 Influential node extraction process

3.2 Attentional mechanisms

The signal processing mechanism of the brain brings about the exploration of the attention mechanism, where humans invest their attention to the visual focus and ignore some useless information around them to focus better.

Given the query vector q and the input information x, the attention distribution I of the ith input vector is calculated as (1)Eq.

$$\begin{aligned}\alpha_i &= p(z=i|X,q) \\ &= soft\max(s(x_i,q)) \\ &= \frac{\exp(s(x_i,q))}{\sum_{j=1}^{N}\exp(s(x_i,q))}\end{aligned} \tag{1}$$

where s(xi,q) is the attention scoring function, the scoring function is not uniquely computed, and the additive model is used here as (2)Eq.

$$s(x_i,q) = v^T \tanh(W_{x_i} + Uq) \tag{2}$$

W,v and U are the trainable network parameters. After the attention distribution is obtained, the input information is weighted and summarized as (3)Eq.

$$att(X,q) = \sum_{i=1}^{N}\alpha_i x_i = E_{z\sim p(z|X,q)}[X] \tag{3}$$

4. results and discussion

4.1 Research hypothesis

In order to verify the effectiveness of the STEAM education concept, three hypotheses are proposed in this paper.

(1) English teaching activities based on the STEAM education concept can help stimulate students' interest in learning English and reflect students' dominant position.

(2) English teaching activities based on the STEAM education concept are conducive to cultivating and improving students' practical English application skills.

(3) English activities based on the STEAM education concept can improve students' comprehensive quality of subjects and enhance their cooperative communication skills in practice.

4.2 Research Process

4.2.1 Pretest

Before conducting the experimental study, Class A and B students were tested. The Pretest was divided into CC and EC at the same time. Due to the authenticity guarantee, both classes were tested simultaneously and with the same test content. Before testing, students were told they had 60 minutes to complete the written and oral exams independently. The oral and written exams began simultaneously, with two teachers for both classes. Each student was asked to take a one-minute oral exam in seating order. Students were expected to use the Pretest as a general exercise in learning; the Pretest had nothing to do with their subsequent performance.

4.2.2 Pre-questionnaire

This questionnaire was distributed to EC students only. The pre-questionnaire was released before the study began to get a general idea of the student's English learning and attitudes. Before distributing the questionnaire, the authors explained to the students the primary function: to find out about their current theoretical and practical English language skills and their attitudes toward English language learning. The questionnaire was administered anonymously. Students were asked to answer each question carefully within 10 minutes according to their situation to ensure they provided an authentic and referable answer.

4.2.3 Teaching and learning process

Teachers should focus on developing students' thinking skills and the relationship between other subjects and English.

4.2.3.1 Teaching English in CC

The experiment requires the use of traditional English teaching methods in communicating. In each new unit, the teacher directly presents the words from the vocabulary list. The teacher explains the vocabulary or grammar points word by word. Then students follow

word by word. Afterward, the teacher shows the meaning, usage and fixed collocations on the board or tutorial. In order to remember the vocabulary and grammar points, students should listen carefully to what the teacher says and take notes. Then the teacher will explain the reading part and translate it word by word. In the subsequent vocabulary and grammar consolidation exercises, vocabulary and grammar are practised through questions, explanations, and after-class transcriptions rather than practice activities.

4.2.3.2 STEAM + English Language Teaching

In EC, the STEAM teaching method organizes classroom learning and practice. The process of applying STEAM pedagogy refers to the process of experimental learning, which aims to find some positive impacts and effects for students. In order to present a specific experimental process, this paper combines some English classroom teaching cases. At the beginning of the experiment, teachers explained to students the STEAM education concept's definition, characteristics, and application and explored the STEAM education concept's impact.

The focus and difficulty of the STEAM teaching model are how to skillfully and efficiently integrate interdisciplinary tasks into the English classroom, i.e., how and when to apply STEAM instruction to English teaching and the percentage of classroom instruction. Students are grouped before class based on the collaborative nature of STEAM. Group collaboration is not a random stacking of numbers. In order to ensure the regular and effective operation of groups and good learning results, groups here have the following characteristics: intergroup homogeneity and intra-group heterogeneity; group size should be 4-6, each group has a leader, and group members have a clear division of labour; group members are actively dependent and mutually supportive of each other; and the results of the group are the results of individuals. Before the start of the class, according to the student's English level, the class teacher and English teacher consider the students' personalities and divide the students into groups of 5. Five people in the group have different English performances and practical abilities. After the grouping is completed, a group leader will be set to consider the English level and personality traits.

(1) STEAM Introduction

Teachers should create interdisciplinary contexts to introduce new lessons of STEAM contextual activities in conjunction with textbook content and chapter content and then have students engage in interdisciplinary knowledge groups to work with to complete STEAM models and activities. Time should be limited to 25 minutes or less. During this phase, teachers can use different methods to deliver interdisciplinary knowledge to students. Teachers can provide students with relevant library resources for students to access and discuss on their own. Teachers can also visualize interdisciplinary information related to the content by showing picture slides or video materials to stimulate students' enthusiasm and interest in learning and participating in class. Teachers can also engage students in brainstorming through question-and-answer sessions, allowing students to independently complete the process of extracting and applying interdisciplinary knowledge content.

Suppose models or works need to be made in STEAM tutorials. In that case, they should be discussed and collaborated in small groups, and each team member should actively participate in the discussion and practice.

(2) Teaching English subject knowledge

In this section, teachers teach English subject knowledge, including pronunciation, meaning and usage of unit vocabulary, and the presentation of grammar and explanation of sentences to achieve clear goals and focus. Based on the interdisciplinary introduction to STEAM, students can actively engage and deepen their understanding of English knowledge. Significantly when reading unit texts, students' logical reasoning and thinking skills can be improved with the support of interdisciplinary knowledge, and their sense of language can be improved.

(3) STEAM-English Teaching

After learning the main content of the unit, teachers should combine the critical knowledge of the unit with STEAM instructional content, issue specific tasks, and practice English in groups. The practice activities include group discussions, division of labour, and understanding and applying English knowledge. Each team member must actively participate in the work and demonstrate the language on stage with the team. For example, students can present group work in an English STEAM tutorial, do interactive activities in English in a STEAM context, Etc. This part involves expertise in the English language subject. The cooperative group learning approach can effectively reduce the anxiety of learners with low English proficiency, giving them confidence and success. Cooperative learning allows learners with different levels of English to help each other, so their English skills can be practised and developed through conversation and interaction. Teachers should pay close attention to students' independent learning and group communication and give inspiration when necessary to enable students to understand better and apply their knowledge. At the same time, we should also pay close attention to each student's different comprehension skills. Teachers should help students with poor comprehension skills to keep up with the pace of group learning.

(4) STEAM Education

At the end of the communication and practice process, teachers should listen patiently to students' reports of their results, including their work and language outcomes, and allow each group member to choose a representative to present their results. Students can develop and practice their expression skills by presenting the group's work on stage and enhancing their sense of collective honour.

Evaluation methods should be diversified, with three primary forms: (1) group evaluation; (2) summative and process evaluation; and (3) teacher evaluation and mutual group evaluation. In small groups, the team's overall performance is included in the individual evaluation as individual records. The purpose is to make team members more actively involved in small group cooperation activities and to raise students' awareness of their responsibility for themselves and other team members to ensure the proper and effective operation of the team. Summative evaluation is the evaluation of the final results of each group. However, student learning outcomes should cover many aspects and areas. Therefore, performance evaluation includes students' cooperative skills, communication skills, problem identification and problem-solving skills, learning methods and attitude improvement, and other external and implicit performance behaviours. Teachers should also evaluate student performance and encourage students to progress by correcting their pronunciation, vocabulary and grammar errors in the learning process. Scientific analysis of students' learning habits and thinking methods is essential to develop a scientific approach to teaching English.

4.2.4 Post-testing

After 12 weeks of experimentation, post-tests were administered at CC and EC. To ensure the reliability of the test results, the test time, type of questions, and difficulty were the same. All students in both classes had to complete the papers simultaneously and turn them in within 60 minutes.

4.2.5 Questionnaire survey

After the experiment, the questionnaire was again distributed to EC students. The content of the questionnaire was the same before and after the experiment. In order to make the students' responses more reliable, an anonymous method was used to conduct the questionnaire. Students were required to answer each question carefully and factually within 8 minutes according to their actual feelings to ensure the reliability of their answers.

4.2.6 Interviews

Interviews are a standard tool for analyzing research results in experimental studies. The results of the interviews are used to analyze the effectiveness of the teaching methods. Each student will be interviewed for 10 minutes.

4.3 Experimental and Analytical Data

4.3.1 Prediction data and analysis

Prior to the experimental study, the authors conducted a pretest. The measured data conformed to a normal distribution and were described by the mean and standard deviation. These two types of data are shown in the table. The pretest statistics for CC and EC are given in Table 1.

Table 1 Pretest grouping statistics

Class		N	Mean	Standard deviation	Variance
Pretesting at CC and EC	CC	50	49.39	15.760	2.228
	EC	50	49.77	7.719	1.091

The above table shows the predicted results for both classes. The table shows that the mean scores of CC and EC are 49.39 and 49.77, respectively, which are not significantly different. The students in both classes maintained almost the same level of general English knowledge, oral practice skills and general subject knowledge.

4.3.2 Comparative analysis of the Pretest and post-test of CC

At the end of the experiment, students in both classes took a post-test, mainly an essay and a speaking test. The following table shows the results and data from the post-test.

(1) Students' understanding of the usefulness of English and their understanding of the STEAM education concept went further, as shown in Figure 3.

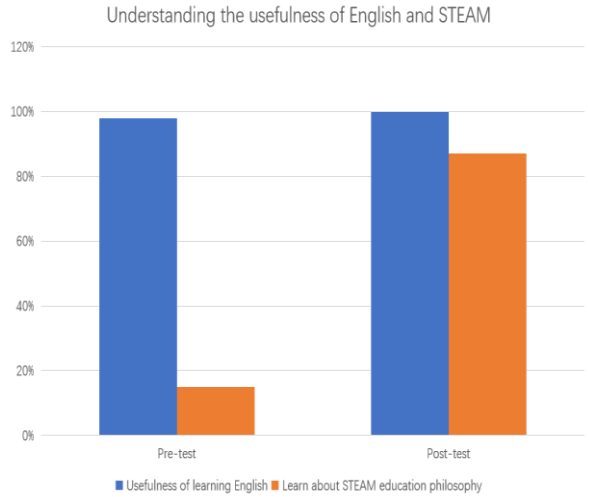

Figure 3 Understanding of the usefulness of English and STEAM

After the activities based on the STEAM education concept combined with English teaching activities, students thought learning English was helpful in their opinions. The Pretest was that the students thought learning English was mainly for each stage's exams and possible future job needs. The post-test results showed that learning English has the functions mentioned above in addition to the students' discovery of the appeal of English as a language in its own right, its use in communicating and communicating with people from different countries, its ability to establish and maintain relationships between people, to say the right words in the proper context, to learn about vocabulary and grammar, and to use it in actual communication situations.

(2) The STEAM-based educational concept combined with English teaching activities is liked by students, as shown in Figure 4.

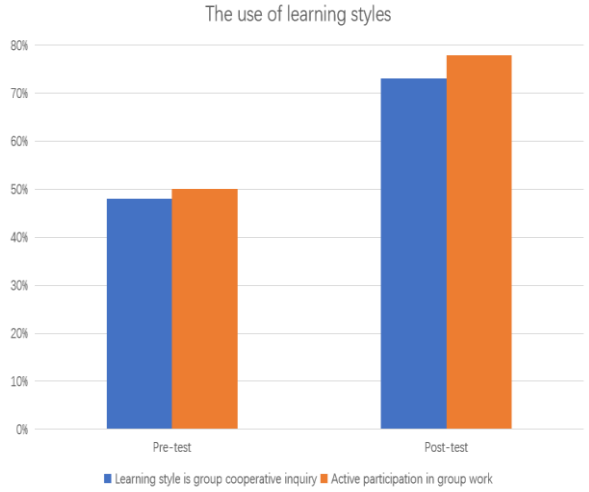

Figure 4: Use of Learning Styles

When STEAM-based activities are carried out, the teacher is a guide. It directs students to carry out independent learning experiences and investigations, usually in cooperative investigations in small groups. In the cooperative inquiry process, students' initiative is greatly enhanced, and their participation in the classroom is significantly increased. Discovering new knowledge, exploring it, finding solutions and summarizing it in cooperative inquiry can increase students' satisfaction more than the formal form of cooperative group exercises.

(3) Students' self-confidence in learning English showed an upward trend, as shown in Figure 5.

Figure 5 Comparison of self-confidence in learning

Many students perceive their self-confidence in learning English as externalized by pre-studying new knowledge before English classes. From a measurable point of view, the pretest results show that about half of the students will pre-study English lessons, i.e., about half are confident in learning English. Based on the STEAM education concept combined with English teaching activities, more than half of the students would preview English lessons. As shown in Figure 5, it can be seen that nearly 60% of the students in the Pretest were confident that they could learn English well, and after the post-test, the number rose to 70%, and these students were also confident that they could learn it well, with an increase of nearly 10% before and after the test. Self-confidence is a stable value that does not decrease or increase quickly in a short period, so the nearly 10% increase after the post-test indicates the effectiveness of integrating STEAM education concepts into English teaching. It is essential to apply it to the practical activities of English teaching in order to produce better teaching results.

By comparing the results of the pre-and post-tests, we can see that student's understanding of the usefulness of English, the form of cooperative group learning in the English classroom, their participation in the English classroom, their interest in learning English and English classroom teaching, and their self-confidence in learning English have all been improved and strengthened to different degrees, which shows that the teaching practice of English thematic activities based on the STEAM education concept It is evident that the STEAM-based English thematic activities have achieved the expected

results in terms of increasing students' participation in the English classroom and enhancing their interest in learning and self-confidence in learning English.

(4) After the STEAM education concept was organically combined with English teaching, students' motivation to learn English was significantly increased, as shown in Figure 6.

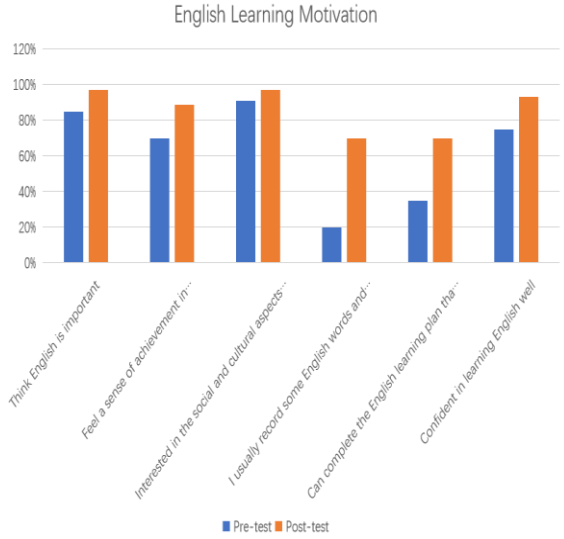

Figure 6 English learning motivation

After integrating the STEAM education concept with English teaching, a significant change in students' motivation to learn English was found. From Figure 6, it can be seen that students in the experimental class showed an increased level of agreement than before the experiment in terms of whether they thought learning English was necessary, the achievement and experience of being able to communicate in English unhindered, the level of interest in the humanities background, and the fact that students were independent in English learning, taking the initiative to accumulate English vocabulary and self-confidence in English learning. This indicates that the organic combination of STEAM education concepts and English teaching can significantly increase the motivation and incentive to learn.

(5) After combining the STEAM education concept with English teaching, students' participation in the English classrooms significantly increased, as shown in Figure 7.

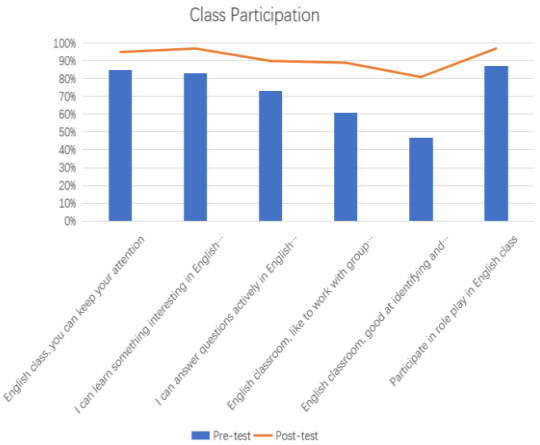

Figure 7 Classroom Participation

After applying the STEAM education concept to English teaching, students' participation in the English classroom showed significant changes. The students in the experimental class had a higher level of agreement than those in the non-experimental class, indicating that the organic combination of the two significantly increased the student's participation in English class.

(6) Students' interest in English learning and classroom teaching showed a more significant increase in the post-test compared to the Pretest, as shown in Figure 8, for both the teaching of the English classroom and the longer time of independent English learning, as shown in Figure 8.

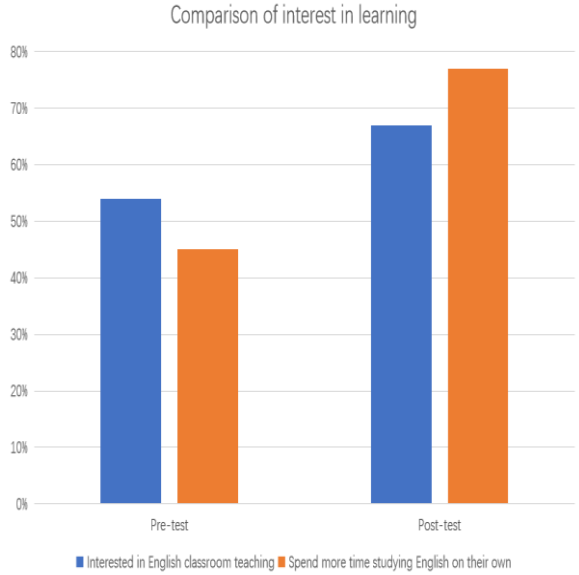

Figure 8 Comparison of learning interest

5. Conclusion

This study is based on big data evolutionary network influence analysis of STEAM education concept in English teaching time process analysis of students' participation in the classroom, interest in learning

English and self-confidence in learning and students' learning base mismatch, the ultimate purpose of which is to enhance students' participation in the classroom, enhance interest in learning English and self-confidence, improve students' comprehensive literacy and improve English acquisition skills. By organically combining the STEAM education concept with multiple subject areas and realizing STEAM + English teaching practice + interdisciplinary teaching, we can achieve the desired goals, enhance students' participation in learning, stimulate their interest in learning English, and improve their independent learning ability. Suitable English teaching activities are designed based on the STEAM education concept, and the theory is applied in actual teaching activities to achieve the desired results.

Teaching practice shows that relevant teaching activities using the STEAM education concept as a starting point can enhance participation in the English classroom.

Teaching practice shows that teaching activities related to the STEAM education concept as a starting point can enhance students' interest and confidence in learning English and can motivate students to learn English.

This study provides a reference basis for the reform of English teaching practice. This study integrates the STEAM concept in actual teaching activities, allows students to participate in English classroom activities actively, enlivens the English classroom learning atmosphere, enhances students' interest in learning English, and stimulates students' ability to learn English, which is a small-scale attempt to reform the teaching practice and provides a reference basis for the reform of English teaching practice.

This study provides a basis for the organic integration of STEAM education into English teaching practice. STEAM education concept is generally combined with subjects such as geography, art, mathematics, chemistry and language, and there needs to be more research involving STEAM + English form. This study analyzes the STEAM education concept in the English teaching practice process based on big data evolutionary network influence analysis.

References

[1] Green Christopher. Consequences of neoliberal traits in curriculum design; English influences and the implementation of moral education in schools in the United Arab Emirates. Globalization, Societies and Education,2022,20(5).

[2] Abdar Sayeh, Shafaei Ali. The relationship between EFL teachers' reflective thinking and teaching style in the Iranian EFL context. Reflective Practice,2022,23(5).

[3] Wenjun Zhong, Yuxuan Zhang, Yajing Jin. Military English Teaching in Chinese Military Academies: A Review. Journal of Language Teaching and Research,2022,13(5).

[4] Dan Panigahi. Analysis on the Cultivation Methods of Students' Innovative Thinking Ability in High School English Teaching. Journal of Research in Vocational Education,2022,4(8).

[5] Ke Wang. A Study on College English Teaching under OBE Education Concept. Journal of Research in Vocational Education,2022,4(8).

[6] Haiyan Wang. Grasp the Distance Education Trend and Push Rural English Learning Development—Journal of Humanities and Social Sciences Studies,2022,4(3).

[7] Hiroki Yoshida. Effects of Managerial Facilitation Strategies on Flipped Learning for Developmental English Education. International Journal of Languages, Literature and Linguistics,2022,8(3).

[8] Adya Juniar Shaleha,Rusdiana Junaid,Musliadi. Students' Perception Towards the Strategies Used by the Teacher in Teaching English Using Virtual Learning Platforms. International Journal of English Language Studies,2022,4(3).

[9] Karpovich Irina, Borschenko Galina, Koroleva Yuliana, Krepkaia Tatiana. Teaching English to First-year Students in Russia: Addressing the Challenges of Distance Learning. Education Sciences,2022,12(8).

[10] Guohui Rao. The Design and Implementation of EFL Teaching Resource Database Based on AI Technology. Studies in English Language Teaching,2022,10(3).

[11] Yin Jiming, Cui Jie. Secure authentication scheme in 6G-enabled mobile Internet of things for online English education. IET Networks,2022,11(5).

[12] Jing Yan, Mingfang Zhou, Yafang Chen. Evaluation Model of College English Education Effect Based on Big Data Analysis—Journal of Information amp; Knowledge Management,2022,21(03).

[13] Fatimah H. Alshehri. Ultrasound Overlay Video Effectiveness in Teaching Pronunciation to Young EFL Learners. Theory and Practice in Language Studies,2022,12(8).

[14] Bingbing Jin. Thoughts on College English Teaching on Computer Science and Technology Majors in Private Colleges. Journal of Educational Research and Policies,2022,4(7).

[15] Fengting Li,Jixian Wang. Application of Education Humour Art in English Classroom Teaching of Middle Schools in China ---Laughter in Class. Curriculum and Teaching Methodology,2022,5(5).

[16] Ling Zhou. On the Teaching Strategies of Ideological and Political Education in College English under the Hybrid Teaching Mode. Curriculum and Teaching Methodology,2022,5(6).

[17] Enderson Mary C., Selover David D. The US should have adopted the metric system: the high cost of teaching the English system. International Journal of Mathematical Education in Science and Technology,2022,53(9).

[18] Huang Fang, Qi Jiafu, Xie Ailin. Sustaining Teaching with Technology after the Quarantine: Evidence from Chinese EFL Teachers' Technological, Pedagogical and Content Knowledge. Sustainability,2022,14(14).

[19] Mingjue Peng. English Curriculum Strategies for Higher Vocational Education Guided by Carrying Forward Huxiang Spirit. Curriculum and Teaching Methodology,2022,5(4).

[20] Milligan Lizzi O.. Towards a social and epistemic justice approach for exploring the injustices of English as a Medium of Instruction in primary education. Educational Review,2022,74(5).

[21] Li Y. From STEM Education to STEAM Education-the New Role of Art Education. Frontiers in Art Research,2023,5(5).
[22] C. A H,Tomás R,Piedad T, et al. From the Steam Engine to STEAM Education: An Experience with Pre-Service Mathematics Teachers. Mathematics,2023,11(2).
[23] Adam D, Maria K, Rachel B, et al. STEAM education: An opportunity to transcend gender and disciplinary norms in early childhood? Contemporary Issues in Early Childhood,2022,23(4).