English Hybrid Cooperative Learning Model Based on Genetic Algorithm

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Abstract. With the further development of basic education curriculum reform and the rapid development of network technology, hybrid learning has been introduced into various disciplines of basic education, which has become a new development trend. Hybrid learning refers to the organic combination of traditional face-to-face classroom learning and online learning based on network to give full play to their unique advantages in order to promote emotional communication and close interaction between students and teachers. At the same time to meet the different requirements of independent learning and collaborative learning. In this paper, 52.4% of the high groups are procedural knowledge, 20.9% are declarative knowledge, 13.7% are strategic knowledge, only 13% are useless knowledge. 29.3% of the speeches belong to shallow interaction, 46.6% belong to moderate interaction and 24.1% are deep interaction.

Keywords: Internet Technology, Forms of Education, Hybrid Collaborative Learning, Genetic Algorithms

1. Introduction
In the 21st century, some remarkable features of this era can be seen, such as the speed of information replacement and the phenomenon of knowledge explosion. In this era of big data, if we want to master information technology further, we need to have the consciousness of flexible use of information technology and sufficient information technology ability. It can be seen that the present society pays attention to the application of information technology, so school education should strengthen the cultivation of students' information literacy in order to help students win greater development advantages in the increasingly fierce market competition. In order to have greater capital to base on society [1].

With the social informatization step by step into our life, study, work, the field of education has also made corresponding rectification measures, trying to gradually jump out of the shackles of textbooks. Although the knowledge in the textbook gathers the research essence of the major experts and scholars and the wisdom of the saints of various generations, the knowledge is not actually obtained by the students through practice. At the same time, it is necessary to develop students' ability to cooperate with others and to carry out learning activities more quickly under mutual cooperation and mutual discussion. In the College English Curriculum Standard, the latest achievements of
biological science and technology should be displayed in the study of biology curriculum, and the knowledge reserve of students should be understood [2]. Through the study of curriculum reform instructions and curriculum standards, two points can be made clear: first, to change the situation that the curriculum pays too much attention to book knowledge, to emphasize the relationship between modern life and English subjects, and to train students to use Internet and other tools to understand the development of the latest English learning methods. With the development of the times, computer network technology is also developing. A learning method called "digital learning" or "network learning" has gradually become popular in the field of education. This learning method has many advantages, such as quick-impact, cross-regional, wide range of communication and so on. It can not only realize students' autonomous learning, but also increase the opportunities for interaction between teachers and students, and provide students with more colorful learning resources. Therefore, network learning not only changes the traditional teacher-student relationship, but also promotes the change of teaching structure and educational essence. Of course, while promoting reform, there are many different old educational ideas [3].

In a word, both networked learning and traditional teaching methods have their own advantages and disadvantages. It is often difficult to achieve the desired goal by using one of them alone, so only by combining the two and complementing each other's advantages can we better improve the teaching efficiency and quality. Based on the above reasons, after summing up the experience of online education in recent years, the field of international educational technology gradually combines online learning with traditional classroom learning, and then realizes a new learning mode, that is, hybrid learning.

2. Related Concepts

2.1. Genetic Algorithms
Genetic algorithm simulates the selection, crossover and crossover and variation in biological evolution, retains a set of feasible solutions in each evolution process, selects better individuals according to a certain standard, and then recombines the feasible solutions. Genetic algorithm mainly includes initial population, fitness function, chromosome coding, genetic operator and so on [4].

A simple genetic algorithm (SGA) can be defined using an octet as shown in the formula:

\[
SGA = \{C, E, P_0, M, \phi, \gamma, \psi, T\}
\]  

(1)

Through the analysis of the principle of genetic algorithm, the basic flow of the algorithm is obtained.

(1) Initial population: Set the iteration counter and generate the initial population randomly.
(2) Calculated fitness values: calculated fitness values for individuals in the population.
(3) Selection operation: selection is the selection of individuals from the group to adapt to the environment according to the survival principle of the fittest.
(4) Variation: Variation is the random selection of an individual as a parent by roulette according to the selection probability according to the principle of genetic variation in biological heredity, and random selection of gene position to perform heterodyne transformation to certain gene positions of some individuals Pm the probability of variation [5].

Define the objective function of feasibility reasoning:

\[
f_i = A(x) + B(x) + C(x) + D(x)
\]  

(2)

\[
T(x) = \sum_{i=1}^{N} T_{ij}
\]  

(3)

2.2. Basis of Hybrid Learning Theory
(1) Humanism Theory
The educational thought of this theory mainly includes: emphasizing respect for human thought, paying attention to human potential and development, and having a unique vision for human value personality. What can best reflect this idea is that teachers must pay attention to cultivating students' comprehensive quality during teaching, so that students should not only acquire knowledge, but also make themselves more valuable in their study; In the process of learning, we should not only learn the known conclusions, but also discover knowledge, explore and experience [6].

Under the application of mixed learning mode, humanism can play a corresponding role. In the process of mixed learning, students can not only acquire knowledge through teachers' teaching, but also learn independently in a certain way, thus improving their learning ability. In addition, teachers can also guide students to correct their attitude and behavior [7].

(2) Behavioral Theory
Conditioned reflex is the basis of learning. After stimulation, there will be a reaction, and learning will be completed at the same time. In other words, learning is to link the stimulus with the response. Appropriate external stimuli can stimulate human learning desire and better deepen memory. Educators are to transfer knowledge, and learning is to achieve the goal of educators in the process of communication, and ultimately to achieve unity with the understanding of educators. This theory emphasizes the importance of mastering knowledge and skills and for behavioral research, which can be well explained by learning between emotion, motor skills and behavior habits. In the process of using mixed learning to make use of behaviorist learning theory, we should pay attention to summing up the learners' deficiency and strengthening in time, and let the learners know their learning progress anytime and anywhere [8].

2.3. The Theory of "Dominant-subject" in Hybrid Learning
In the 1980s, Professor Ho Kekang advocated a "dominant-subject" theory according to the current educational model of our country: in the process of learning, students occupy the leading position, students dominate their own learning, and in the process of teaching, the teacher is the main force, the teacher plays the role of guide, assistant. In fact, teachers and students as a whole, in different processes play different roles. Teachers decide and are responsible for the overall direction of teaching, learning content, strategies, order, results and quality, etc., which is a bridge for learners to acquire knowledge information and connect learners with teaching materials [9].

2.4. Education Communication Theory
The media is actually an important extension of the human body, such as the radio extending our ears to hear further sounds; the camera extending our eyes to fix the scene we see; and the application of the Internet. As if our brains were extended. Through the extension of various equipment, not only to achieve the effect of our human body, but also to a large extent to achieve our human body can not do, to give us a lot of convenience [10].

3. Design of English Hybrid Cooperative Learning Pattern Based on Genetic Algorithm
3.1. Research Programmes
In this study, according to the standard of "making micro-class" in the final course of online cooperative learning in "Teaching system Design ", the highest score group and the lowest score group in normal students' class were selected as the research objects. Through observing and analyzing the formation of the team, the discussion content, the interaction situation, the influence of the learning community on the learners, the two groups of learning community activities, behavior and its influence on the learners' inner activities are understood. Through the comparison of all aspects of the two representative groups of students, we find out the influence of learning community factors in the actual learning process and the existing problems, and then from the perspective of learning community, combined with practical learning, put forward the relevant suggestions to improve the
efficiency of network collaborative learning.

3.2. Research Analysis

Through the observation, analysis and in-depth interviews with the group members of the two groups of students' online cooperative student chat records, the study found that there are different degrees of differences between the two groups of learning communities in terms of learning content, participation, frequency of interaction, depth of interaction and the influence of community on learners.

4. Analysis of Hybrid English Cooperative Learning Model Based on Genetic Algorithm

4.1. Learning Community Network Collaborative Learning Content Analysis

Select a task cycle chat record, 595 in high group and 486 in low group, According to the analysis of the two groups of learning community collaborative learning process chat records found, In the lower group, 43.3 per cent of the learning is procedural, Including how to design micro-class, how to produce more novel works, 27.6% of the students are declarative. It is mainly about the discussion of knowledge points in class and the explanatory reply to the use of software, 5.2% strategic knowledge. Including how learners learn to design micro-lessons in the process of collaboration so as to attract students' attention, reflect on your shortcomings. There are also 23.9% of the expression, daily chat and other content unrelated to the topic of collaborative learning. In the high group, of these, 52.4%
were procedural, share and discuss the design of each part of the microcourse, There are 20.9% declarative knowledge, most are learners who discuss their understanding of a concept or point of view in a learning group, 13.7% strategic knowledge. In the early stage of collaborative learning, the collaboration efficiency of this learning community is low due to improper collaboration methods. A few days later, rapid reflection and discussion, reorienting the collaboration strategy, BIG6 mode. To make learning more successful, about 13% are irrelevant. Less chatter, most of them are "likes"," smiling face "," goodbye" and other expressions or "agree "," good" and other expressions of attitude. The two groups of learning community collaborative learning content are represented in pie chart as shown in figure 1 and figure 2.

4.2. Learning Community Interaction Analysis

Table 1. The Depth of Network Collaborative Learning Interaction

| Interaction     | Deep interaction | Moderate interaction | Shallow interaction |
|-----------------|------------------|----------------------|--------------------|
| High Group      | 24.1%            | 46.6%                | 29.3%              |
| Low Group       | 18.8%            | 32.5%                | 48.7%              |

Figure 3. The depth of network collaborative learning interaction

This study analyzed the chat records of two learning communities during one task cycle. These included 595 high-group records, 486 low-group records, manual classification and calculation. It was found that in low grouping, 48.7 per cent of the statements were shallowly interactive. There is only a simple response, a simple echo, or a simple answer to a declarative question. Less words, does not reflect the learner's personal views and ideas, 32.5 per cent were of moderate interaction. The main performance is the discussion of the content design of each part of the micro-class, as a community of learning. But it's a simple analysis and evaluation, and then makes a decision. There's no deep research, 18.8% of them are deep interactions, two days before the deadline, deep interaction. Over and over again, group members can express their views and give detailed explanations. In the high group, 29.3 per cent of the statements were shallowly interactive, 46.6 per cent were of moderate interaction. The main performance is the discussion of the content and form design of each part of the micro-class, 24.1% were deep interactions. In the later integration and modification phase of the task, the panellists were able to speak actively during discussions on collaborative learning on the Internet, put forward your own unique views or valuable suggestions. The depth of interaction between the two groups of learning communities is shown in Table 1 and figure 3.
5. Conclusions
This study first focuses on the quantitative study of the influence of the internal and external factors of the learner's individual and learning environment on the effect of network cooperative learning, and determines the research tools of learning effect and influencing factors. Through data collection, collation and analysis to determine the degree of influence and influence relationship. Then, the most influential factors are selected for case study, and the performance of learning community and its influence on learners are observed, interviewed, recorded and analyzed. Through the case study, it is found that there are different degrees of four aspects of interaction content, interaction frequency, interaction depth and team formation between the low group and the high group learning community. The problems highlighted by the low group include shallow interaction content, low interaction frequency, insufficient interaction depth, and serious team homogenization.

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