Statistical Characteristics of the Application of English Human-Computer Interaction Mathematical Algorithm in Online Courses

Yang Luo
Liaoning Special Education Teachers College, Shenyang 110000, China
254848207@lnjtsz.edu.cn

Abstract. In recent years, with the rapid advancement of multi-mode teaching theory, this paper adopts an interactive large classroom method and derives from the interaction of mathematics. In combination with online course optimization, the performance is improved through the use of a multi-mode system and the use of interactivity. The principle and empirical formula, and finally through the comparative analysis of mathematical statistics, proved that the human-computer interaction mathematical algorithm has a significant effect, "problem English human-computer interaction mathematical algorithm plays an active role in online courses.

Keywords: English teaching, human-computer interaction, mathematical algorithms, online courses, multi-modal systems.

1. Introduction
With the increasing renewal and popularization of computer and network information technology, the Internet has intervened in my country's college English teaching. How to integrate computers and modern information technology into college English teaching, and to explore a college English teaching model that adapts to the new situation has become an important direction of college English teaching reform in my country. Multimodal human-computer interaction analysis is one of the main methods of multimodal research, which goes hand in hand with the two methods of social semiotics analysis and system functional linguistics. The essence of the teaching process is the interaction process between teachers and students [1]. This article attempts to verify the effectiveness of the multimodal interactive teaching model in the teaching of non-English majors in two colleges from the perspective of multimodal interaction analysis, in order to enrich the research content of multimodal foreign language teaching.

2. Overview of related theories

2.1. The function of interactive teaching
In terms of online teaching, the main functions of interaction are reflected in: 1) Interaction greatly affects the cognitive process of learners' meaning construction, and their learning interest and attention, as well as defensive learning are all derived from continuous interaction; 2) Interaction is an important...
foundation and main way for effective development of online teaching. Two-way interaction based on modern information technology (i.e., synchronous and asynchronous communication/communication) can promote online teaching not only open and flexible, but also diversified and personalized. Therefore, realizing effective interaction is a necessary condition and an important way to promote college English online teaching and learning, so as to use the rich and diverse digital resources to stimulate students' interest in learning, increase the classroom capacity of teaching, and improve the efficiency of English learning.

2.2. Interactive classification
Generally speaking, domestic and foreign researchers will classify the interaction according to the function and purpose of the interaction, the participants of the interaction, and the logical sequence in which the interaction occurs [2]. The more recognized categories are students and content, students and teachers, students and learners and the interface, an interactive classification framework.

3. The theoretical basis of English teaching mode in the multimedia environment-interactive teaching concept and practice

3.1. Human-human interaction
The concept of interaction used to refer to the interaction between a teacher and many students. We can now develop into the interaction between many students and many students, person-person interaction, it can be the interaction between one person and many people, or the interaction between many people and many people.

3.2. Human-machine interaction
In terms of human-computer interaction, network course exercises can not only provide feedback on the results of the students' exercises after every exercise done by the students at that time, but also the exercises they have done can be recorded in the online database. Students can click at any time to find their own practice results or records. At the same time, the network teacher can also enter the teaching management area to find that the student did this exercise? Did it right? Or did it wrong? In addition, we can also find other situations in the teaching management area. For example, the teacher can find the situation of a certain student doing exercises, and can also find the situation of students doing exercises on a certain road exercise [3]. The teacher can summarize the situation of the students doing exercises, and explain them in detail when they are taught face-to-face in a large class. Human-computer interaction takes "New Vision University English" as an example, which is mainly realized through www, E-mail, BBS and other systems. This kind of exercise can span space and time. Geographically, our students can communicate with teachers or students who have never seen each other far away. It can also be non-simultaneous communication in time. Because the E-mail or BBS sent today may not be answered in a few hours. The interactive teaching concept embodied in "New Vision College English" is something that traditional teaching cannot do. In this respect, it truly brings students into the world and the world into the classroom.

3.3. Interaction between learners and learning content
The interaction between the learner and the learning content means that when the student encounters a word or has some other problems in comprehension while reading the text, he can immediately click on a word or phrase to find the correct explanation. If he has difficulty in the Chinese translation of a sentence, he can click on the corresponding Chinese translation. This kind of click is interactive. If a new word such as frustration appears in the reading, he can click frustration to find out where the word appears in the textbook.
4. Design of English online course teaching system based on human-computer interaction

4.1. Main framework
The university English autonomous learning platform of our school is composed of three modules: student module, teacher module, and background management. The structure is shown in Figure 1. "Basic Exercises" consists of 5 sub-modules: vocabulary exercises, grammar exercises, error correction exercises, translation exercises, and writing training [4]. The platform can record students' exercises and corresponding answers in electronic learning files.

"Online Reading" is composed of three modules: theme reading (new edition), theme reading (21st century), and extracurricular reading. After reading the article, students can post comments and write down their feelings through the "reading notes" function provided by the platform. The platform provides a collection function, so that students can collect their favourite articles so that they can read them at any time. "Audiobooks" are composed of classic speeches and today's golden songs. This module allows students to appreciate the charm of English from different angles. Audio books provide audio files and corresponding English manuscripts and Chinese translation manuscripts. In order to make full use of audiobooks to improve students' English proficiency, the audiobook module provides three modes for students to learn. Just listen but not watch. When students choose this mode, they are not eager to read the comparative English. Through repeated listening, students can find out the difficult points in the sentence and gradually improve their listening. Read first and listen later. Students read by themselves first, and the system will record their voices. Students can compare their own voice with the original sound to gradually improve their sense of language. Listen and watch. The ultimate goal of learning English is to communicate [5]. Therefore, mutual translation ability is the key goal of learning English. By repeatedly reading Chinese, listening to English, or reading English to Chinese, the brain can simultaneously receive the same information expressed in different ways, and at the same time store and subtly favourite, it will benefit the students infinitely and improve their translation ability. "English Knowledge" provides articles on customs, national geography, religious beliefs, and political systems
in English-speaking countries. So as to stimulate students' interest in learning English, so that students can expand their knowledge while improving their reading ability.

4.2. Functional modules of the teacher-student interaction platform

As students use the network teaching system for more and more independent learning, the interaction between students and teachers is particularly important. The process of teacher-student interaction solves the problems of students in the learning process through the exchange of learning content, learning methods and learning attitudes, so as to more effectively guide students to learn independently. In this module, the system should support teachers to play a leading role and better support students' various learning activities. as shown in picture 2. The original system set up four functions of appointment, forum, homework and short message to promote teacher-student interaction. These four functions are asynchronous communication tools and lack the function of synchronous communication between students and teachers. Therefore, this research has two suggestions for the teacher-student interaction platform, namely, the creation of a real-time communication system and an automatic answering system. As shown in figure 2

![Diagram](image)

**Figure 2.** The function of the teacher-student interaction platform in the college English network teaching system

5. System function test

Many students can make learning plans according to their own situation (M=3.56), complete the content of self-learning (M=3.32), and choose their own learning strategies (M=3.06), but many students think that it is necessary to improve their self-learning ability Teacher's guidance and monitoring (M=4.43). In general, more than half of the students believe that the multi-modal English interaction among students, teachers, students, and humans and computers helps to improve their learning ability (M=3.39).
This shows that the self-learning method based on network multi-modality allows students to control their own learning. Students can choose learning content according to their own interests and abilities, and regulate their learning progress [6]. This flexibility enhances their motivation for learning. Therefore, learning becomes a student's autonomous behaviour. As shown in Table 1.

Table 1. The influence of multi-modal interactive teaching mode on teachers' teaching effect

| Problem                                                                 | M  | SD  |
|------------------------------------------------------------------------|----|-----|
| Language modalities occupy the main position of language learning.     | 4.16| 1.23|
| Other modalities such as sound and pictures help language learning.     | 4.28| 1.14|
| The teacher's appropriate expressions and body language help me deepen my understanding of the content of the text. | 3.06| 1.32|
| Multi-modal English interactive activities help me deepen my understanding of the text content. | 4.16| 1.01|
| Too many modalities will distract me.                                  | 3.87| 1.45|
| Frequent modal changes can distract me.                                | 3.95| 0.99|

Although most students agree that language modalities occupy the dominant position of language learning (M=4.16), other modalities such as sound and pictures contribute to language learning (M=4.28). Teachers’ appropriate expressions and body language help deepen their understanding. Understanding the content of the text (M=3.06), multimodal interaction activities such as teacher-student interaction, group interaction, etc. help deepen the understanding of the content, but many students think that there are too many modalities (M=3.87) and the frequency of modal changes is high (M=3.95) will distract oneself. Therefore, in the multi-modal interactive teaching mode, teachers should pay attention to modal selection and modal structure configuration. As shown in table 2.

Table 2. The influence of multi-modal interactive teaching mode on student learning effect

| Problem                                                                 | M   | SD  |
|------------------------------------------------------------------------|-----|-----|
| Teachers often ask questions to help improve my learning effect.       | 3.67| 1.05|
| Teachers’ questions will increase my anxiety.                         | 4.26| 1.48|
| Multi-modal interactive teaching mode helps to improve one's comprehensive English application ability. | 3.97| 1.34|
| Multi-modal interactive teaching mode helps me improve my listening skills. | 3.92| 1.26|
| The multi-modal interactive teaching mode helps me improve my reading level. | 3.87| 1.12|
| The multi-modal interactive teaching mode helps me improve my translation level. | 3.26| 0.86|
| Multi-modal interactive teaching mode helps me improve my writing skills. | 3.27| 0.91|
| The multi-modal interactive teaching mode helps me improve my English cultural literacy. | 3.46| 1.32|

Many students agree that the teacher’s questions help improve the learning effect (M=3.67), but the teacher’s questions will increase their anxiety (M=4.26). At the same time, more than half of the students believe that this model helps to improve their comprehensive English application ability (M=3.97). Among them, this model helps to improve listening skills (M=3.92) and reading skills (M=3.87), the improvement of translation level (M=3.26), the improvement of writing level (M=3.27) and the improvement of English cultural literacy (M=3.46), and the students’ test scores confirmed the students’ guesses in the questionnaire survey. Regarding which interactive teaching mode is the most helpful for English learning, 48% of students think teacher-student interaction, 22% of students think it is group interaction, and 30% of students think it is human-computer interaction, which shows that multimodal interactive teaching can satisfy the characteristics of personalized learning for students' different needs.
6. Conclusion
The network teaching mode has become the development direction with excellent functions such as integration, timeliness, interactivity, resource sharing, and personalized teaching. Computer courseware also has instant response, automatic adjustment of information, automatic feedback, selectivity, two-way communication, and self-paced, Adaptability and other functions. Interaction is the lifeline of online teaching and the key and main way for effective development of online teaching. Although the various real-time and non-real-time interactive functions provided by the existing network technology and platforms can meet the basic interaction needs between humans and humans in the network teaching environment, the most advanced technology cannot directly generate the English teaching process the various interactive behaviours in, let alone the learning behaviour of students' autonomous exploration and construction of cognition. The author's research found that the "task-driven + teacher's guidance + student self-study" college English interactive teaching mode can better solve the above problems, and can take into account the advantages of network technology and traditional teaching in content, form and effective teaching methods.

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