Construction of College English Teaching Model in the Era of Artificial Intelligence

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Abstract. The development of artificial intelligence (AI) technology provides new thoughts and ideas for the reform of English teaching (ET) mode. This article understands the related knowledge of AI technology and ecological pedagogy, and studies and analyses the current situation of college ET in my country, and discusses how to use AI technology to reform my country’s ET model. Relying on data mining technology and deep learning algorithms in AI, the ET model gradually develops in a better direction, making it a virtuous circle.

Keywords: Artificial Intelligence, College English Teaching, Ecological Education

1. Introduction
In the 1950s, a new concept of "AI" emerged in the world, and it has developed tremendously in recent years, becoming a major hot spot after the Internet and the Internet of Things. [1]AI technologies mainly include big data, speech recognition, cloud computing, etc. Driven by related information technologies, new technologies and algorithms are gradually appearing in the public's field of vision. In AI technology, speech and image recognition technology, language testing and translation technology and other language-related technologies have achieved rapid development. In the Boao Forum for Asia in 2018, the AI technology that presents real-time voice conversion and translation on a large screen has received widespread attention in society. This is the first time that AI technology has attracted worldwide attention since AlphaGo defeated the world champion.[2-4]

2. Current status of contemporary college ET
Since the 21st century, my country has achieved rapid development in all aspects, and the education industry has also undergone tremendous changes, and it has begun to develop in the direction of intelligent education. At present, researches on intelligent ET in our country have conducted research and analysis on the current status of college ET models, and divided them into two categories: One is the current status of college ET models and to be resolved Educationalist Wang Shouren (2016) pointed out that with the development of time, at this stage, we need to reflect on the problems that have arisen in the current reform of ET in my country. As far as the current situation of the ET model in my country is concerned, it pays too much attention to the language knowledge and skills of...
students, and then neglects the cultivation of their learning attitudes, methods, emotional views and values. Therefore, English education methods need to be changed to make them calm respond to the challenges brought by the times, China's ET is gradually moving towards a healthy, harmonious and sustainable development.[5-6]

The second is to study the methods and approaches to solve the above problems. College English is a very dynamic and diversified curriculum system that is rich in tools and humanities. Therefore, many scholars in the education field have put forward ideas for improving the college ET system. The POA (production-oriented approach) research group led by scholar Wen Qufang has played a very important role in solving the unfavorable development direction of "emphasis on learning" and "emphasis on learning and application" in foreign language education. Scholars Jin Yan and Hu Jiasheng (2015) Starting from the perspective of educational technology, it proposes a teaching method as the basis of action, linguistics and psychology as the theoretical guidance, and the basic realization condition is educational information technology, an interdisciplinary foreign language teaching technology.[7-8]

The improvement of my country's college ET model has been developed for more than half a century. However, with the continuous development and progress of the times, the traditional English education model can no longer meet the development needs of the society and the learning needs of students. Many scholars have also called for schools to improve ET methods. In 2017, the Ministry of Education issued the "The College ET Guide clearly points out the direction of college ET reform. From the perspective of teaching methods and methods, the "Guide" points out that "teaching should comprehensively consider the characteristics of ET content and the learning style of students, and establish a teaching method that implements the student as the main body and the teacher as the leading teaching concept, so that Transform from “teaching” to “learning” to establish a good teaching atmosphere. [9-10]When improving teaching methods, it is necessary to combine the latest research results in the field of linguistics at home and abroad, and constantly update teaching concepts to make teaching methods in line with college students' Characteristics." In this era of information rampant, learners often do not know how to start when faced with a large number of learning resources, and invest a lot of time and energy, but the effect is minimal. Therefore, how to deal with the relationship among students, learning strategies and learning environment is an urgent problem in college English education.[11]

3. Establish an ecological teaching model for college English
AI technology not only has cloud computing, but also contains the characteristics of big data. This technology provides new ideas and new ideas for the reform of ET mode. Scholars in education once put forward the viewpoint of "combining AI and college ET mode to establish an ecological teaching mode". He pointed out that this teaching mode can help students change the way, content and concept of English learning, thereby inspiring students' enthusiasm for English learning, which can improve students' English level.

From the perspective of educational ecology, teaching activities can be regarded as an organic micro-ecological system. From the perspective of the constituent elements of the system, if the college ET model has ecological characteristics, not only need the main body and media of "teaching" and "learning", that is, teachers, students and learning resources, but also the conditions, environment and characters that can carry out teaching activities. In the development of the AI era, every part of the system may need to be reformed: in-depth analysis of learners can obtain sufficient technical support, and develop personalized learning plans based on the results; teachers rely on powerful technology to understand wisdom classrooms are designed and carried out to achieve blended teaching; the teaching method of human-computer combination can not only stimulate learning interest, but also improve learning efficiency; deep analysis of learning effects based on big data, accurate evaluation of students' learning effects. In other words, no matter from which perspective, AI technology can bring unique changes to the ET model.
3.1. Build a learner model

The learner is the main part of the entire teaching activity. Analysis of it is a prerequisite for effective teaching activity. Data mining technology in AI technology can achieve this and provide sufficient technical support. The realization of data mining technology is to record data for learners when they perform various learning activities, and use classification, clustering, text mining and other technologies to analyze the data, and discover learners' learning characteristics from them, and improve teaching methods for teachers for reference.

Before the emergence of AI technology, people only used theoretical knowledge, experience, and hypotheses to research and analyze sample data. With the emergence of AI technology, the use of data mining technology to conduct in-depth mining of the learning files left by learners on the Internet, and integrate the data to establish a learner model. After the teaching activity is over, AI technology can effectively interfere with the learner's learning behavior by analyzing the learner's learning data.

It is not difficult to see from the figure below that AI technology can record and mine learners' learning behavior data, and use deep learning integrated data to analyze and research them. To put it simply, AI technology can combine the basic information of students (gender, age, learning level, and cognitive ability) with various files (learning, social files, etc.), and refine the types of learners, so as to establish a personalized ET model to lay a solid technical foundation.

Learner's initial data; data mining; basic information; English learning files; social files; other files; test results; activity participation; teacher evaluation; personality types; hobbies; APP use; pictures; language; text; expressions; data integration; learning motivation; English level; learning style; learning goals; learner modeling

Figure 1. Schematic diagram of learner modeling

In the modern society where social software continues to develop, its influence has also expanded. Data mining technology can mine and evaluate learners' learning methods, styles, goals, and learning
capabilities from different social software. In 2018, the official website of the U.S. Department of Education released an interactive website that belongs to the study of English subjects. The data collected by the website, including changes in distribution and learning motivation, were collected, and the students studying English in the United States were modeling. The data shows that there are as many as 400 languages spoken by people living in the United States. Since 2010, the number of people learning English has increased by about 50%. Use big data technology to mine the learning traces left by learners on the Internet, so as to model learners’ learning styles, methods, abilities, and English proficiency, and ultimately personalize English education to improve the learning rate of the learner.

### 3.2. Teaching process and assessment

Through AI technology, ET can have the characteristics of environment virtualization, teaching personalization and management automation. For example, the in-depth integration of ET and virtual reality technology can integrate "teaching", "learning" and "sense". For another example, the widespread use of AI has enabled various types of learning management systems to be used in ET. Using the learning management system, learners, teachers, and various learning resources can be integrated to establish a new teaching model. The following figure is an example to build a teaching management and evaluation system based on AI.

![Figure 2. Teaching management system and evaluation system based on AI](image)

First, excavate learners’ English proficiency, learning goals, and hobbies. Using advanced algorithms, English knowledge has the characteristics of contextualization, visualization and fragmentation. It uses information push and personalized recommendations to provide learners with teaching methods and content as well as the form, etc., so as to enable students to conduct learning activities spontaneously. The research results show that providing personalized teaching methods around learners can encourage learners to engage in deep learning, thereby enhancing learning effects.

Next, use the existing deep learning and data mining functions in the learning management system to evaluate the effectiveness of the teaching content and process, and then create intelligent scenarios to improve the student experience. Therefore, the teaching mode of college English has been improved and integrated with the teaching evaluation system with the help of AI platform. As a result, students
have expanded their ways of conducting learning activities. They are not obsessed with teachers’ teaching and teaching materials, but can establish learning plans based on their own characteristics and conduct fragmented learning.

Secondly, teachers are no longer saints in classroom teaching, but become guides for students in learning activities. Teachers combine teaching knowledge with AI technology to make the teaching mode present diverse and mixed characteristics. Under the background of AI, teachers are not the instructors in the entire teaching process, but the instructors in the process of students learning English. Students are no longer passive, and become the main body in the entire teaching process and strengthen themselves learning initiative.

Then, AI technology can provide a large amount of data support for teaching evaluation, analyze the teaching ecology while evaluating the structure of teaching activities, and provide teaching reference opinions. The theory of diversification mentioned that there are certain differences in the cognitive level and learning starting point of different learning individuals, so the analysis and evaluation of the effects of students’ learning activities can effectively discover the problems that students have in the learning process. At the same time, it can help teachers think about teaching activities, and supplement the problems that students tend to ignore when learning.

Finally, the use of AI technology to supervise and manage the entire teaching process, and then evaluate the entire teaching process from the perspective of teaching structure, and timely feedback to the teachers and students' terminals to scientifically construct ecological education activities. AI plays a decisive role in the entire teaching activities. Teaching activities based on AI technology are no longer a closed loop, it makes the entire teaching link have a cyclical feature, and continue to develop in a good direction.

4. The main algorithm of AI’s ET mode

4.1. Neural Network Algorithm
Neural network algorithm is a way of simulating human thinking, and it is a nonlinear dynamic system. The neural network is mainly composed of three parts: output layer, hidden layer and input layer, as shown in the figure below:

\[ I_j = \sum w_{ij} O_i + \theta_j \]

In the above formula, \( O_i \) represents the input value, \( \theta_j \) represents the bias, \( W_{ij} \) represents the weight of the connection between this unit and the next unit, and \( I_i \) is nonlinearly transformed to obtain the value of the next unit:
\[ O_j = \frac{1}{1 + e^{-1}} \]

Next, perform reverse transmission based on the error to obtain:
\[ Err_j = O_j (1 - O_j) (T_j - O_j) \]

For the output layer, the formula is transformed into:
\[ Err_j = O_j (1 - O_j) \sum_k Err_k w_{jk} \]

From the perspective of the hidden layer, \( O_j \) represents the output value, \( T_j \) represents the tag value, and \( Err_j \) updates the bias.

After the weight is updated:
\[ \Delta \theta_j = (\bar{t})Err_j \]
\[ \theta_j = \theta_j + \Delta \theta_j \]

The neural network algorithm has three termination conditions: the weight update is less than a certain threshold; the predicted error rate is less than a certain threshold; the expected number of cycles has been reached.

The use of neural network algorithms in the college ET model can effectively integrate various teaching resources and make the data have the characteristics of sharing.

5. Conclusions
AI technology using neural network algorithms can integrate various network learning resources and learners' learning activities data into the back-end database, and use deep learning algorithms to mine the characteristics of the data to achieve human cognitive level phased improvement, it also provides technical support for constructing an ecological teaching environment for college English and enriching teaching methods, and promotes continuous updating of teaching methods with the changes of the times. In the era of AI, many new teaching modes have emerged, such as flipped classrooms and MOOCs. Therefore, it is necessary to update teaching facilities and equipment in a timely manner, and integrate and use teaching concepts to make teaching activities in a healthy development environment. The integration of AI and college ET is a new form of language teaching, which makes teaching gradually present the characteristics of individualization, modernization and autonomy.

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