

Optimal Processing of English Education Model Based on Artificial Intelligence Technology

Linfeng Zhang¹

¹*Zhejiang University of Water Resources and Electric Power, 310018, Zhejiang, People R China
Zhanglf@zjweu.edu.cn*

Abstract

With the rapid development of science and technology, the society has entered a new era of knowledge and information. Modern information teaching has changed the traditional curriculum concept, improved the curriculum model and improved the teaching method in the curriculum field. This paper studies the optimization of English education mode based on artificial intelligence technology, mainly using SAIES system, so that middle school students are placed in an intelligent environment. The practice of SAIES system in middle school English teaching can be divided into six steps. The teaching process of SAIES system consists of ten steps. Finally, the reliability and validity of the system are tested. The results show that the overall reliability of the learning adaptability level questionnaire is 0.913, and the reliability of the system is very good.

Keywords: *Artificial Intelligence, English Education, Optimizing Education, Learning Adaptability*

1. INTRODUCTION

At present, the integrated development of artificial intelligence and curriculum is the key, and the importance of artificial intelligence to curriculum reform is self-evident. For a long time, the research on artificial intelligence supporting English learning at home and abroad has not stopped at "technical exploration". In recent years, research has paid more attention to "teaching practice", and this kind of attention has also increased. Teachers and students use artificial intelligence effectively and efficiently in English education. Artificial intelligence-supported learning has become the research frontier of current English education informatization, trying to change the traditional teaching mode through artificial intelligence technology and improve the quality of teachers' teaching [2][6].

There are many researches on the application of artificial intelligence in English, including, Khairy D developed an "Intelligent Teaching System for Academic English" for non-native English learners, which uses artificial intelligence technology to help non-native learners correct language learning errors [5], and Vinichenko M V verified the effectiveness of the system in practical teaching [12]. It can be seen that important results have been achieved in artificial

intelligence supporting college students' English learning practice.

This paper firstly analyzes the structure of educational adaptability in the study of educational adaptability scale, combining the autonomy and interactivity of artificial intelligence-assisted English learning, and the theory of constructivism, and concludes that English education needs to meet adaptability requirements. Supported by artificial intelligence is mainly determined by the adaptation of writing behavior, which has five elements: adaptation to autonomous learning ability, adaptation to learning interaction, transition to learning environment, and transition to physical and mental health.

2. RESEARCH ON THE OPTIMIZATION PROCESSING DESIGN OF ENGLISH EDUCATION MODEL BASED ON ARTIFICIAL INTELLIGENCE TECHNOLOGY

2.1. The shortage of artificial intelligence in English teaching

The application of AI in middle school English teaching may gradually blur the research and penetration of related disciplines such as pedagogy and

linguistics, ignore the principles and methods of the teaching process, and ignore the irreplaceable nature of teachers. However, the role of English teachers is not only to teach language and grammar knowledge, or to let students master language communication tools, but also to use language tools to teach different cultural essences, spread life philosophy, stimulate the desire for knowledge and exploration of the world, and achieve its own value, rather than just making a living with language tools [1][8].

The value of AI applied to English teaching in middle school lies in "individualized" teaching, but in practical applications, it may lead to the phenomenon of "individualized teaching" and "cooperative learning". The application of the system has always emphasized the advantages of the individualized teaching model, because in traditional teaching, and each student's problems have their own uniqueness. Under these circumstances, the application of AI in computer-aided teaching can stimulate students to be proactive, guide each classmate on their own problems, and play an incomparable role in traditional classrooms and human teachers.

The application of AI in middle school English teaching may result in excessive reliance on the assessment provided by the system, which may easily result in an inaccurate assessment. No matter how perfect the system is, it only represents the success of a technical team, and it is not guaranteed to be foolproof. If teachers and students rely too much on the AI-based middle school English teaching system in middle school English teaching, it will inevitably cause harm [7][9].

2.2. Countermeasures to Face The Problem

(1) The application of AI in middle school English teaching needs to pay attention to both "teaching" and "learning". In terms of technology, it should improve the simulation of English Learning environment, improve human-computer interaction and the intelligence of human-computer interface, provide adaptive learning according to the differences of each student, and at the same time be good at playing the guiding role of teachers, focusing on cultivating students' autonomous learning ability [4][11].

(2) The application of AI in English teaching in middle schools should focus on cultivating English teachers' information technology capabilities. Information technology needs to be truly "integrated" with English subject teaching. In addition to relevant language skills, education and teaching, middle school English teachers must have In addition to knowledge, we must also be good at using the transformative power of new technologies to improve our teaching methods. Therefore, in the management of middle schools, it is

imperative to improve the information literacy and operational ability of English teachers [3][10].

2.3. Algorithm Research

2.3.1. Fitness

The fitness function formula of GEP algorithm based on absolute error is shown in (1):

$$Pi = \sum_{j=1}^N |F_{ij} - H_j| \quad (1)$$

Among them, N represents the number of samples of the virtual machine, F_{ij} represents the return value of the i-th model sample for the j-th fitness sample virtual machine, and H_j represents the target value of the j-th sample virtual machine. $|F_{ij} - H_j|$ represents the precision.

2.3.2. Energy consumption

CPU usage can be defined as a function of time, denoted by $u(t)$, because CPU usage varies with workload, and workload varies with time. Then the total energy consumption of a host can be defined as the integral of energy consumption with respect to time, as shown in formula (2):

$$E = \int_{T_0}^{T_1} P(u(t)) dt \quad (2)$$

Wherein, T_0 represents the start time of the migration of the virtual machine in the host, and T_1 represents the end time of the migration.

3. EXPERIMENTAL RESEARCH ON OPTIMAL PROCESSING OF ENGLISH EDUCATION MODEL BASED ON ARTIFICIAL INTELLIGENCE TECHNOLOGY

3.1. SAIES Implementation Steps

The SAIES system is an exploratory idea of applying AI to English teaching in middle schools. The purpose is to optimize the English method and teaching effect in middle schools. The following exploratory implementation steps are aimed at using this system in teaching practice, so that middle school students can be placed in an intelligent environment. In a contextualized and humanized language learning environment, the practice of SAIES system in middle school English teaching mainly as follows:

The first step is to determine the student's learning ability.

The second step is to implement student group teaching. After the learning ability is determined, students with a considerable degree of learning ability are grouped and classified, which is convenient for teaching students according to their aptitude, and individualized teaching is carried out according to different levels of learning ability.

The third step is to choose a teaching strategy.

The fourth step is to implement classroom teaching.

The fifth step is to conduct secondary teaching according to the evaluation data analysis report.

The sixth step is to implement a paperless examination.

3.2. Teaching Process Design

(1) Let students log in to the "SAIES System", enter their own courses, enter the vocabulary module, and conduct listening, pronunciation correction, and spelling tests on the new words they have learned.

(2) Teachers use the SAIES system to create a real geographical situation, introduce new lessons, attract students' attention, and stimulate students' interest.

(3) Teachers guide students to enter the environment simulation module, conduct simulated dialogues, and choose the animated virtual characters they are willing to play and dialogue with.

(4) Teachers explain the words, key knowledge points and grammar through the auxiliary teaching module of the system.

(5) Teachers use the environment module to arrange tasks, and each student puts on a headset and enters their own SAIES system to cultivate autonomous learning ability.

(6) The SAIES system uses the data analysis function to track the learning status of students, dynamically form the corresponding teaching content, dynamically change the corresponding teaching strategies, and send the progress of the tasks completed by the students and the problems encountered to the teacher module.

(7) In the process of completing the task, if the learner encounters a problem, he can post the problem to the knowledge explanation module of the system to seek answers and problem-solving strategies.

(8) Let the students take off the earphones to discuss in groups of men and women.

(9) The teacher invites the group to demonstrate the dialogue and express the experience, so as to summarize the class, arrange the post-class consolidation and preview the content for the next section.

(10) Learners work together on assigned tasks according to the teacher and the system

4. EXPERIMENT ANALYSIS OF OPTIMAL PROCESSING OF ENGLISH EDUCATION MODEL BASED ON ARTIFICIAL INTELLIGENCE TECHNOLOGY

4.1. Reliability Test

It is generally measured by the Cronbach coefficient. The value range of α is (0, 1). The larger the α coefficient, the higher the reliability and the higher the reliability of the measurement result. Using SPSS25.0 to carry out "reliability analysis" of the questionnaire, the analysis results are as follows:

Table 1. Cronbach's alpha reliability analysis of the level of learning adaptability questionnaire

Dimension	Number of terms	Sample size	Cronbach's alpha coefficient
Learning attitude	3	552	0.858
Self-directed learning ability	3	552	0.826
Learn to interact	3	552	0.893
Learning Environment	3	552	0.867
Physical and mental health	3	552	0.749
Over all reliability value	15	552	0.913

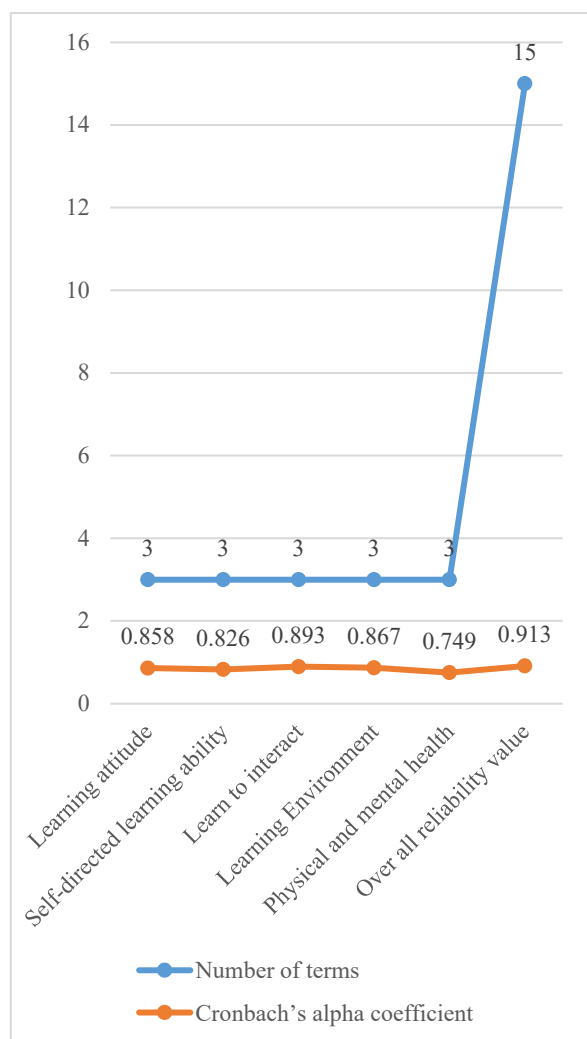


Figure 1. Cronbach's alpha reliability analysis of the level of learning adaptability questionnaire

As shown in Figure 1, the overall reliability of the learning adaptability level questionnaire is 0.913, and the reliability of a single dimension is tested. Except for the “physical and mental health” dimension, the reliability of the learning adaptability level questionnaire in this study is acceptable, and the internal consistency of the data is good.

4.2. Validity Test

Using SPSS 25.0 to perform "factor analysis" on the sample data, the results are shown in Table 2 below:

Table 2. Learning Adaptability Level Questionnaire Test

KMO value		0.903
Bartlett's sphericity test	Approximate chi-square	3271.630
	df	105
	p-value	0.000

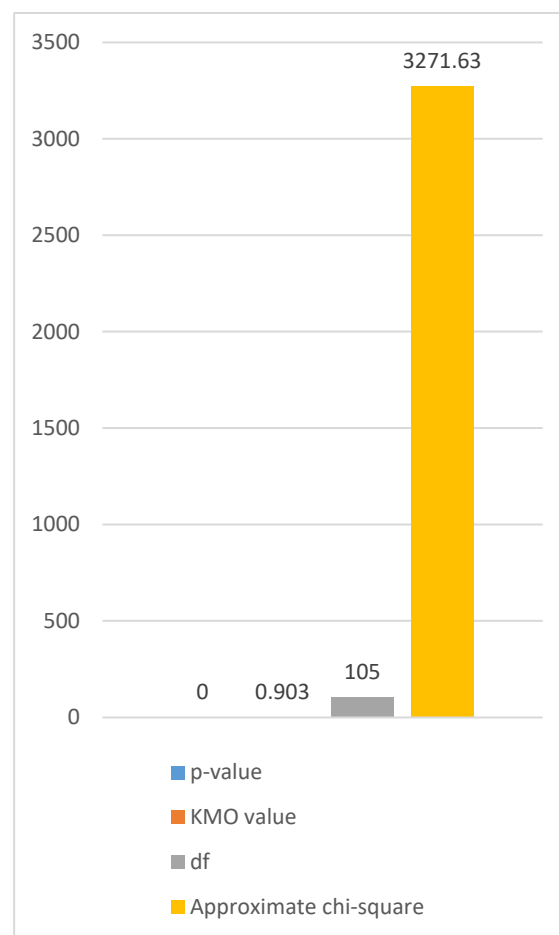


Figure 2. Learning Adaptability Level Questionnaire Test

Specifically, as shown in Figure 2, KMO=0.903 and P=0.000; The validity of the questionnaire on the level of learning adaptability in this study is passed, can be carried out.

5.CONCLUSIONS

AI-supported learning is an inevitable trend of future education development, and students' learning adaptability is the key to students' academic development and the effectiveness of AI. This research on the English learning adaptability of college students under the support of artificial intelligence is a preliminary exploration of the learning adaptability of students in education and teaching supported by artificial intelligence. The method of structural equations was used to verify the hypothetical model of influencing factors proposed in the study. The results show that learning motivation, intelligence literacy, learning self-efficacy, and resource platform all have a significant direct and positive impact on learning adaptability, and the research hypothesis has been verified.

ACKNOWLEDGMENTS

Business Etiquette Virtual Simulation Experiment Teaching Project (Virtual Simulation Experiment Teaching Project in Colleges and Universities of Zhejiang Province During the 13th Five Year Plan)

REFERENCES

- [1] Aliashrafi A, Zhang Y, Groenewegen H, et al. A review of data-driven modelling in drinking water treatment[J]. *Reviews in Environmental Science and Bio/Technology*, 2021, 20(4):985-1009.
- [2] Al-Refaie A, Al-Alaween W, Diabat A, et al. Solving dynamic systems with multi-responses by integrating desirability function and data envelopment analysis[J]. *Journal of Intelligent Manufacturing*, 2017, 28(2):387-403.
- [3] Douven I. Optimizing Group Learning: An Evolutionary Computing Approach[J]. *Artificial Intelligence*, 2019, 275(OCT.):235-251.
- [4] Hoseini S M, Parastesh H, Hajirasouliha I, et al. Structural Design Optimization of All-Steel Buckling-Restrained Braces Using Intelligent Optimizers[J]. *International Journal of Steel Structures*, 2021, 21(6):2055-2070.
- [5] Khairy D, Abougalala R A, Areed M F, et al. EDUCATIONAL ROBOTICS BASED ON ARTIFICIAL INTELLIGENCE AND CONTEXT-AWARENESS TECHNOLOGY: A FRAMEWORK[J]. *Journal of Theoretical and Applied Information Technology*, 2020, 98(1817-3195):2227-2239.
- [6] Kottler M N. Artificial Intelligence: A Private Practice Perspective - ScienceDirect[J]. *Journal of the American College of Radiology*, 2020, 17(11):1398-1404.
- [7] Lestari L, Djastuti I. IMPLEMENTATION OF SMART TECHNOLOGY, ARTIFICIAL INTELLIGENCE, ROBOTICS, AND ALGORITHMS (STARA): A THREAT OR OPPORTUNITY FOR WORKERS 'FUTURE[J]. *Review of Management and Entrepreneurship*, 2020, 4(2):149-166.
- [8] Mohe bb an aa z, Kumari L V R, Sai Y P. Classification of ECG beats using optimized decision tree and adaptive boosted optimized decision tree[J]. *Signal, Image and Video Processing*, 2021, 16(3):695-703.
- [9] Patidar M, Gupta V B, Patidar S. Optimizing Analytics of Artificial Intelligence and Data Science[J]. *INTERNATIONAL JOURNAL OF COMPUTER SCIENCES AND ENGINEERING*, 2019, 7(3):736-740.
- [10] Tao H B, Diaz V R, Guerra Y M. 2019 72(12) 30 ARTIFICIAL INTELLIGENCE AND EDUCATION Challenges and disadvantages for the teacher 1[J]. *Arctic Medical Research*, 2019, 72(12):30-51.
- [11] Unal Z. Smart farming becomes even smarter with deep learning – a bibliographical analysis[J]. *IEEE Access*, 2020, PP(99):1-1.
- [12] Vinichenko M V, Makushkin S A, Lyapunova N V. Changing the Quality of Education in a University Using Digital Technologies and Artificial Intelligence in the Context of the COVID-19 Pandemic[J]. *Uchenye Zapiski RGSU*, 2020, 19(4):137-144.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

