Scholar Publishing Group
International Journal of Educational Innovation and Science
https://doi.org/10.38007/IJEIS.2020.010305
ISSN 2789-7184 Vol. 1, Issue 3: 56-73

The Current Situation and Countermeasures of English Teaching in the Era of Artificial Intelligence 2.0

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Keywords: Artificial Intelligence, Informatization 2.0 Era, Current Situation and Countermeasures of English Teaching, Informatization Teaching

Abstract: Apply artificial intelligence to the field of education, and use big data analysis technology to extract educational data to test the effectiveness of education and diagnose educational problems; improve education management by assisting education administrators to implement general supervision, and transform traditional experience-based management into intelligent and scientific management to improve management efficiency. Among other things, intelligent analysis of digital images, assessment of learner behavior, individual educational problem solving, and helping science teachers with educational decision-making are being developed for learners. Provide diagnostic feedback on education through artificial intelligence, improve educational efficiency, and then provide innovative solutions for educational organizations, learning activities, etc. This paper conducts a series of studies on how artificial intelligence can be better applied to English teaching, and summarizes the relevant technical background; this paper proposes a GNN-based personalized English learning knowledge graph and an expert system-based English-assisted teaching system. It also conducted a questionnaire survey of teachers in several high schools to understand the basic situation of teachers using artificial intelligence in teaching. The survey found that the correlation coefficient between teachers' utilization rate of artificial intelligence technology and constraints was -0.58, and the test value was $P<0.01$. Based on the results of the questionnaire survey, suggestions for improvement were put forward.

1. Introduction

As society enters a new era of intelligence and informatics, the update of science and technology has accelerated the process of moving from the information age to the intelligence age. The development of science and technology in the new era has changed the traditional concept of education, updated the educational model, and improved the teaching method. At present, AI

learning support has become a research frontier in the field of English language education informatics communication. It seeks to change the traditional teaching mode through artificial intelligence technology, improve the teaching quality of teachers, enable students to obtain a better learning experience, and thus improve the quality of English learning.

In English teaching and learning, artificial intelligence has been shown to be effective in writing with personal assistance, computer writing, machine writing, and group work. It can improve the efficiency of learning, teaching, assisting, testing, evaluation and other fields. Moreover, the application of artificial intelligence in education can motivate students to learn, enhance the leadership role of teachers, and thus improve the quality of education.

At the same time, with the continuous development of AI-supported English learning practice, students' learning also has a certain degree of incompatibility. These problems directly affect the effectiveness and quality of students learning English language. Therefore, it is necessary to have a deeper understanding of the current situation of English teaching supported by AI, and then propose corresponding solutions from the perspective of teacher teaching and student learning, or optimize the artificial intelligence English learning mode.

The AI-supported English language learning is developing continuously, initially realizing the diversification of AI-supported English teaching functions and the full coverage of application scenarios. The innovations of this paper are: First, the English knowledge map and expert system-assisted teaching mode based on artificial intelligence technology is proposed; the second is to investigate the current situation of artificial intelligence applied to English teaching, and has achieved certain results; the third is to put forward suggestions for improvement and establish an intelligent learning model.

2. Related Work

The convergence of education and AI technology is changing the paradigm of modern education. Li H introduced the application status of artificial intelligence in medical education, analyzed the existing problems, and proposed corresponding solutions to lay the foundation for promoting the integration of medical education and artificial intelligence [1]. However, his research did not further study the role of artificial intelligence in practical teaching, and only stayed at the theoretical stage. With the impact of information technology, the reform of English teaching mode in colleges and universities is hindered by various problems. Taking college English teaching as an example, Xiao H constructed a new model of college English teaching under the information technology environment through evaluative research. The study found that under the new model, teachers can make better use of information technology, interact with students, and improve the quality of college English teaching [2]. Its research has made some progress, helping teachers and students win-win. However, only using evaluative research as a method may not form a more scientific educational paradigm, and there is a lack of quantitative evaluation methods. In order to improve the teaching effect of American science fiction literature, Yi B built an intelligent American science fiction literature auxiliary teaching system based on artificial intelligence virtual reality technology. In addition, the time and space complexity of constructing point cloud spatial topological relationship and finding k nearest neighbors are also analyzed [3]. His research is the successful application of artificial intelligence technology to practical education, which has brought many inspirations to this article. Yingjie S summarizes the background conditions of students' learning environment changes in the information 2.0 era. He mentioned that with the continuous development of network technology, the continuous enrichment of network resources, and the advancement of artificial intelligence research, the human-computer interaction in the network virtual space has become humanized and personalized. In addition, the openness, sharing and

interaction of information resources, as well as the infinite expansion and penetration of information resources in education have greatly changed the learning environment of students [4]. His overview of the changes in students' learning environment has laid a very good research foundation for this study, and he has made a comprehensive summary of the characteristics and attributes of students' learning environment in the information 2.0 era. Li X has developed an online intelligent English learning system with Java and artificial intelligence language Prolog as software system. The system is built on the Struts Spring Hibernate lightweight JavaEE framework, and the system develops appropriate learning strategies to help students improve their English learning efficiency according to their knowledge and personality [5]. The English learning strategy it developed is also an effective attempt, but the online intelligent English learning system may not be suitable for students of all learning levels. Liang X conducted research and analysis on the classic teaching model, and optimized the construction of the teaching model of artificial intelligence courses to make it more perfect through a questionnaire survey on the current teaching status of artificial intelligence courses. Based on cloud computing technology, the system architecture and functional module division of the online open course platform are designed based on the overall requirements, and are developed and implemented on this basis [6]. The system developed by Liang X, relatively speaking, the operation method is too complicated and the practicability is not strong.

3. Artificial Intelligence Technology and Informatization 2.0 Era

3.1. Educational Informatization and Teaching

The essence of informatization in education is to use information technology focusing on multimedia computer and network communication to achieve the optimal level of education and teaching process, so as to achieve the purpose of improving the effectiveness, efficiency and effect of education. Computer-aided education began in the United States of America, and computer-aided language education is mainly used for classroom teaching in the fields of grammar and audio translation [7]. With the development of cognitive theory and the popularization of computers, computer assistance is no longer one-way in and out, but includes the interaction between people. It uses computers to improve students' listening, speech, reading and writing skills. The development process of teaching informatization is shown in Figure 1.

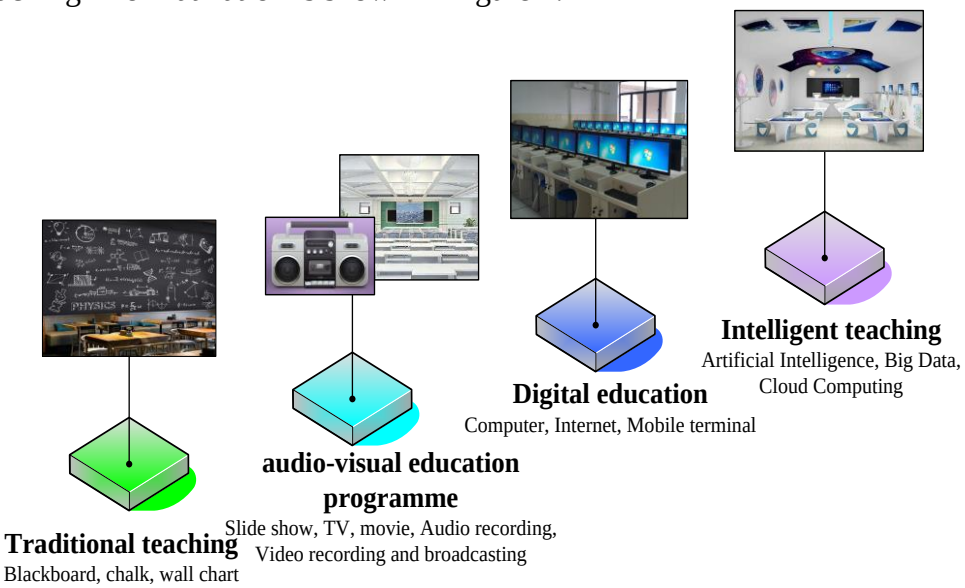

Figure 1. Teaching development process

With the popularization and application of network, the organic integration of network multimedia and classroom has become the trend of future teaching. Many scholars and teachers are aware of the rapid development of informatization, and the research on informatization and English teaching is also increasing. In order to understand the current situation of English teaching in the environment of educational informationization, this paper uses "English teaching" and "informationization" as the keywords to search based on "China National Knowledge Infrastructure", and a total of 3955 documents are retrieved. The annual number of publications of this type of literature is shown in Figure 2. It can be seen that the research on the informatization of English teaching shows an overall increasing trend. Especially since 2014, the number of related literature publications has increased rapidly year by year, reaching a maximum in 2019, which is also consistent with the trend of informatization development.

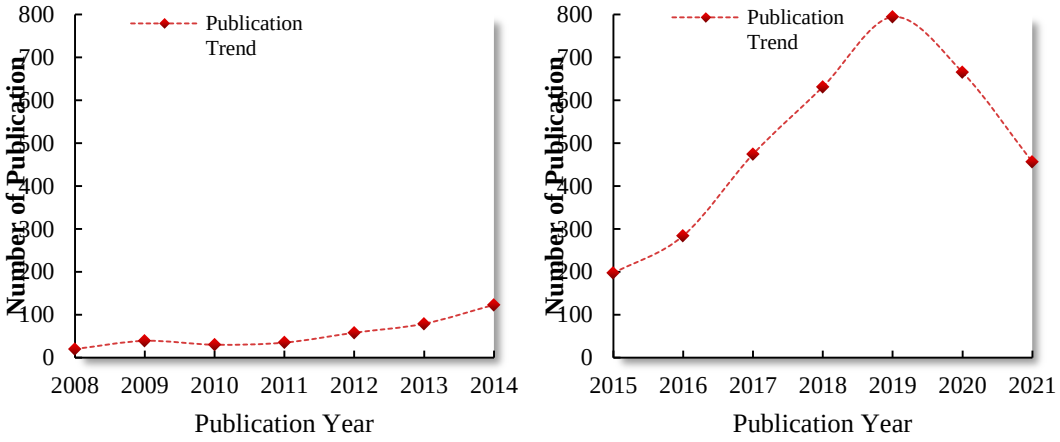

Figure 2. Changes in the number of researches on information-based English teaching

Informatization has played a subversive change in all curriculum education, and changes in teaching resources and teaching environment are the core of informatization teaching. This paper divides the curriculum changes brought about by informatization according to the main body and analyzes it according to the process, as shown in Figure 3. For both teachers and students, AI can be of great help. It helps teachers to teach better and supports students to better explore themselves [8-9].

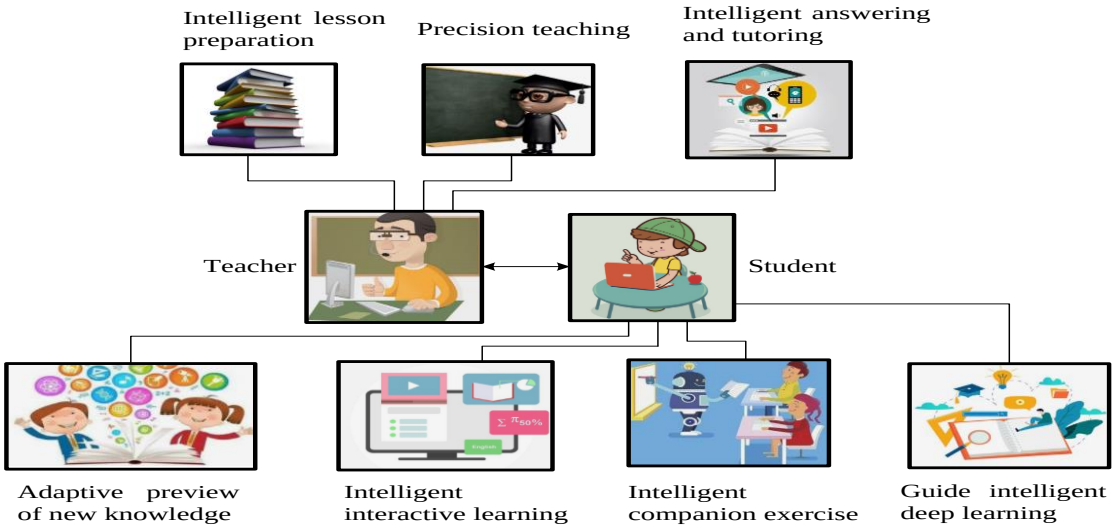

Figure 3. Informatization teaching process

Under the conditions of intelligence and informatization, it is the current top priority to explore new teaching models based on artificial intelligence and reconstruct the teaching process. Many scholars and institutions have made useful attempts. First of all, for schools to build a fully information-based teaching environment, various information technologies provide strong support for students' precise teaching and personalized teaching [10]. Secondly, when artificial intelligence enters teaching, the main body of teaching is no longer simply centered on teachers and students, but centered on machines, teachers and students. Machines will play an important role, as shown in Figure 4.

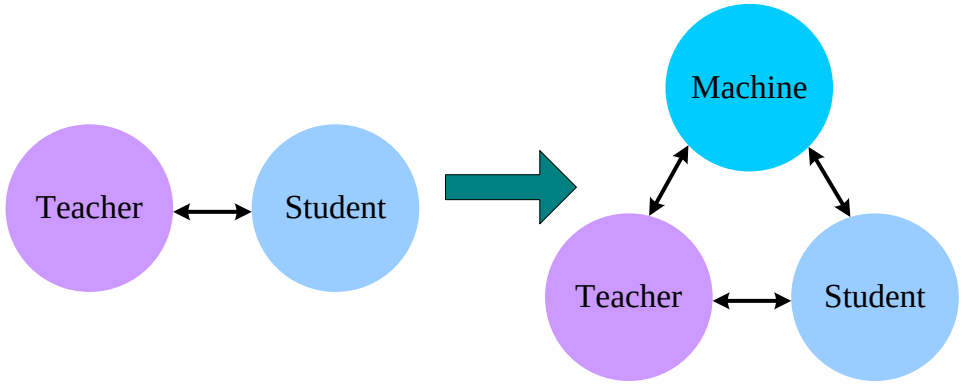

Figure 4. Changes in teaching subjects

3.2. The Application of Artificial Intelligence in Education and Teaching

The development stage of artificial intelligence is divided into three stages, namely the development stage of computational intelligence, the development stage of perceptual intelligence and the development stage of cognitive intelligence, as shown in Figure 5. Computational intelligence refers to the fast computing and mass storage capabilities of computers. Perceptual intelligence has benefited from the rapid development of deep learning models of CNN and RNN, and has further developed in the fields of speech recognition, gesture recognition, and natural language processing. Cognitive intelligence is the most advanced form of artificial intelligence development, which can realize the process of individual acquisition, processing and application of knowledge, that is, the advanced information processing method of the human brain [11].

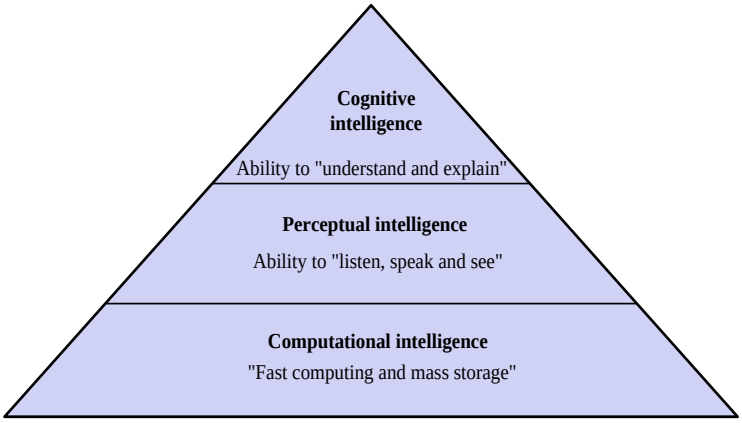

Figure 5. Development of artificial intelligence

In recent years, with the development of big data and deep learning algorithms, artificial intelligence has developed rapidly in all walks of life, actively exploring and applying intelligent artificial intelligence to solve industry problems, and education is no exception. Artificial

Intelligence (AI) is a technology that empowers, enables and empowers. Its application in education can be divided into two categories: subjective and auxiliary. Subjectivity refers to the education system with artificial intelligence technology as the main body, such as intelligent education robot, intelligent tutor system, etc. Assistiveness means that a part of the functional modules or structures of artificial intelligence can be integrated into teaching, resources, environment, assessment and management, and transformed into media or tools to play the role of education and teaching, such as intelligent assessment, adaptive learning, teaching management, etc.

4. Application of Artificial Intelligence Technology in Education and Teaching

4.1. Personalized English Knowledge Graph Based on Graph Convolutional Neural Network

GNN is a neural network model that can process graph data. It obtains the mutual relationship between the nodes in the graph through the information transfer between the nodes in the graph, and GNN only needs to label a small number of node categories when training the model [12-13]. Taking the high school English knowledge graph as an example, there are many exercise nodes and interconnected edges. When representing one of the exercise nodes, the model will use its surrounding nodes to represent this node, which is the process of graph convolution. The process of mining the relationship between the surrounding nodes and the current node is the process of feature extraction. GNN has multiple hidden layers, and the propagation between layers is:

$$A^{t+1} = \sigma(\widehat{B}^{-\frac{1}{2}}(E + M_N)\widehat{B}^{-\frac{1}{2}}A^tW^t) \quad (1)$$

Among them, A^{t+1} represents the state matrix of the t+1th hidden layer, σ represents the activation function, E represents the knowledge graph adjacency matrix, MN represents the diagonal matrix, and Wt represents the weight matrix that needs to be learned in the t-th layer.

The activation function can be any activation function. Common activation functions include RELU function and SIgmoid function, whose formulas are shown in formula (2) and formula (3) respectively. Formula (4) is the derivative function of the sigmoid function, and the RELU function is selected here.

$$g(x) = \begin{cases} 0, x \le 0; \\ x, x > 0 \end{cases} \quad (2)$$

$$f(z) = \frac{1}{1+e^{-z}} \quad (3)$$

$$f(z) = f(z)][1 - f(z)] \quad (4)$$

In the spectral convolution process, the feature matrix can be converted into a Laplacian matrix, and the transformation method is:

$$D = M^{-\frac{1}{2}}(M - E)M^{-\frac{1}{2}} \quad (5)$$

M is a diagonal matrix and D is a positive semi-definite symmetric matrix with n linearly independent eigenvectors [14].

The spectral convolution method of the graph is essentially the product of the graph signal and the filter, Q^Tx is the graph Fourier transform of x, $g(\tau)$ is the graph Laplace matrix eigenvalue function, K is a matrix consisting of normalized eigenvectors, τ a diagonal matrix consisting of D's eigenvalues. Parameterize the filter in the Fourier domain:

$$G(\vartheta) * x = Qg(\tau)Q^Tx \quad (6)$$

$$G(\vartheta) = diag(\vartheta) \quad (7)$$

The graph Laplacian matrix is calculated as:

$$D = Q\tau Q^T \tag{8}$$

When the graph size in the knowledge graph is large, the computation time may become long. Therefore, approximating $g(\tau)$ with the kth order of the Chebyshev polynomial yields formula (9). Tk(x) is a Chebyshev polynomial.

$$G^{\sim}(\tau) \approx \sum_0^k \vartheta_k^{\sim} T_k(\tau^{\sim}) \tag{9}$$

$$\tau^{\sim} = 2\tau/\lambda_{max} - M_N \tag{10}$$

$$T_k(x) = 2xT_{k-1}(x) - T_{k-2}(x) \tag{11}$$

$$T_0(x) = 1 \tag{12}$$

$$T_1(x) = x \tag{13}$$

Therefore, formula (6) can be written as:

$$G(\vartheta) * x \approx \sum_{k=0}^k \vartheta_k^{\sim} T_k(\frac{2}{\lambda_{max}} D - M_N)x \tag{14}$$

Both Chebyshev polynomials and Laplace polynomials of order k are of order k, which means that the representation of a node in the English knowledge graph only depends on the nodes whose path length is within k. Then, multiple convolutional layers can be stacked in the graph convolutional neural network, which will lead to an increase in parameters and overfitting may occur. Therefore, the number of convolutional layers is reduced as much as possible, and the forward propagation of the model can be written as:

$$Z = F(X, H) = \text{softmax}(\hat{H}\text{RELU}(\hat{H}XW^0)W^1) \tag{15}$$

$$\hat{H} = \hat{B}^{-\frac{1}{2}}(E + M_N)\hat{B}^{-\frac{1}{2}} \tag{16}$$

The knowledge map of high school English exercises is forwarded to obtain the class probability of each node, as shown in Figure 6.

[0.896422146934788921	**0.103577853065211079]**
[0.195734007863747826	**0.804265992136252174]**
[0.785395726499276194	**0.214604273500723806]**
[0.706943847374938647	**0.293056152625061353]**
[0.984048372917401546	**0.015951627082598454]**
[0.802398948676738109	**0.197601051323261891]**
[0.482948715755298897	**0.517051284244701103]**
[0.712940389604836505	**0.287059610395163495]**
[0.629058747662681919	**0.370941252337318081]**

Figure 6. Probability of the category a node belongs to

After the model is transformed by the softmax layer, it will output two values for each English knowledge node. These two values are probability values, and the sum is 1, and the output value can represent the category the node belongs to. If the first value of the output value of the knowledge node is larger, a range is generally set. For example, if it is greater than 0.75, it means that the knowledge of the node has been mastered, and the label "mastered" is given, otherwise not

mastered [15-16]. According to this, the probability value output by the model is converted into the label corresponding to the knowledge for output, and then the mapping file between the knowledge point number and the knowledge label is established. By linking the labels with the knowledge numbers to represent them in the English knowledge graph, a personalized English knowledge graph can be generated, as shown in Figure 7. In the figure, if the tag is 0, it indicates unmastered knowledge, and if the tag is 1, it indicates the knowledge that has been mastered. The generated map can help learners consolidate unskilled and poorly mastered knowledge points, improve learning efficiency, and fill in gaps.

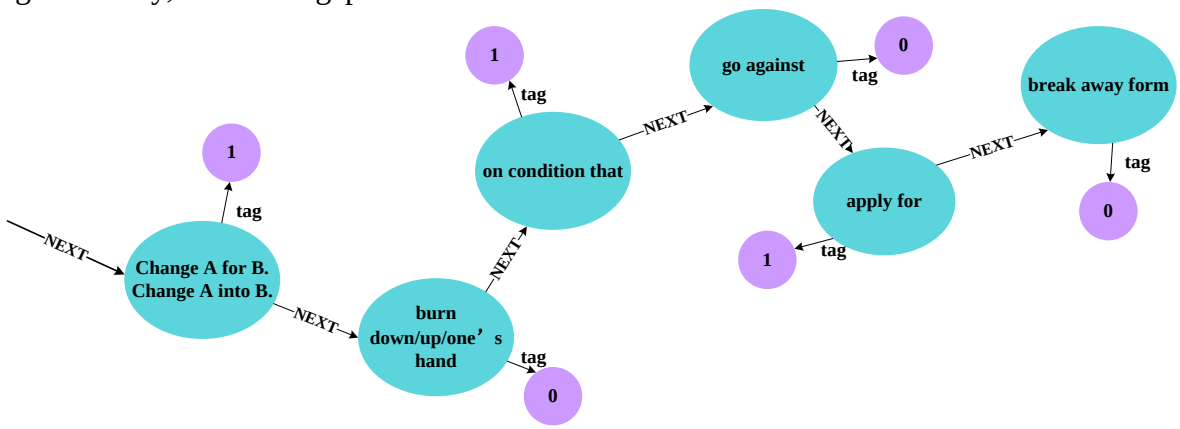

Figure 7. Personalized high school English knowledge map

The model is trained and each iteration computes the value of the loss function on the labeled dataset. The loss function uses the cross entropy calculation method to evaluate the performance of the model by the size of the loss function value. The cross entropy calculation method is:

$$LOSS = -\sum_{l \in y_L} \sum_{f=1}^{F} P_{lf} \ln Q_{lf} \quad (17)$$

y_L is the label node index value, P_{lf} is the real label, and Q_{lf} is the prediction result. When generating a high school English knowledge graph, the cosine similarity of the knowledge vector is used to determine whether there is a connection between the two nodes. When the threshold is different, the number of edges in the generated knowledge graph is different, and the results of the model are also different [17]. The training set and test set experiment were carried out on the model, and the experimental data sample set came from a high school English knowledge point database in a certain province in China. To prevent overfitting problems, it is not suitable to set too many iterations. The number of iterations of the model is set to 295, the learning rate is set to 0.01, the number of layers of the graph convolutional neural network is set to 2, the number of hidden layer neurons is 16, and the dropout parameter of the drop function is set to 0.5.

In this paper, five different thresholds of 0.5, 0.6, 0.7, 0.8 and 0.9 are selected to observe the experimental results. The results are shown in Figure 8. From the experimental results, it can be concluded that from the perspective of the accuracy of the model, the accuracy of the model initially increases with the threshold, and the prediction accuracy of the model also increases. When the threshold was increased to 0.7, the model showed the best performance. When the threshold continues to increase, the model effect begins to decline; from the change of the loss value of the model, the test set is the most important. The loss value also reaches the minimum when the threshold is 0.7, indicating that the model shows better performance under this threshold. The reason for this result is analyzed, it is mainly that when the threshold is low, there are more relational coefficients in the knowledge graph. There is a lot of noise data in the knowledge graph, and many unnecessary features may be learned during the convolution operation. When the

threshold is high, there are fewer relation coefficients in the knowledge graph, and the learned features during convolution operation are not comprehensive, and the model effect also decreases [18].

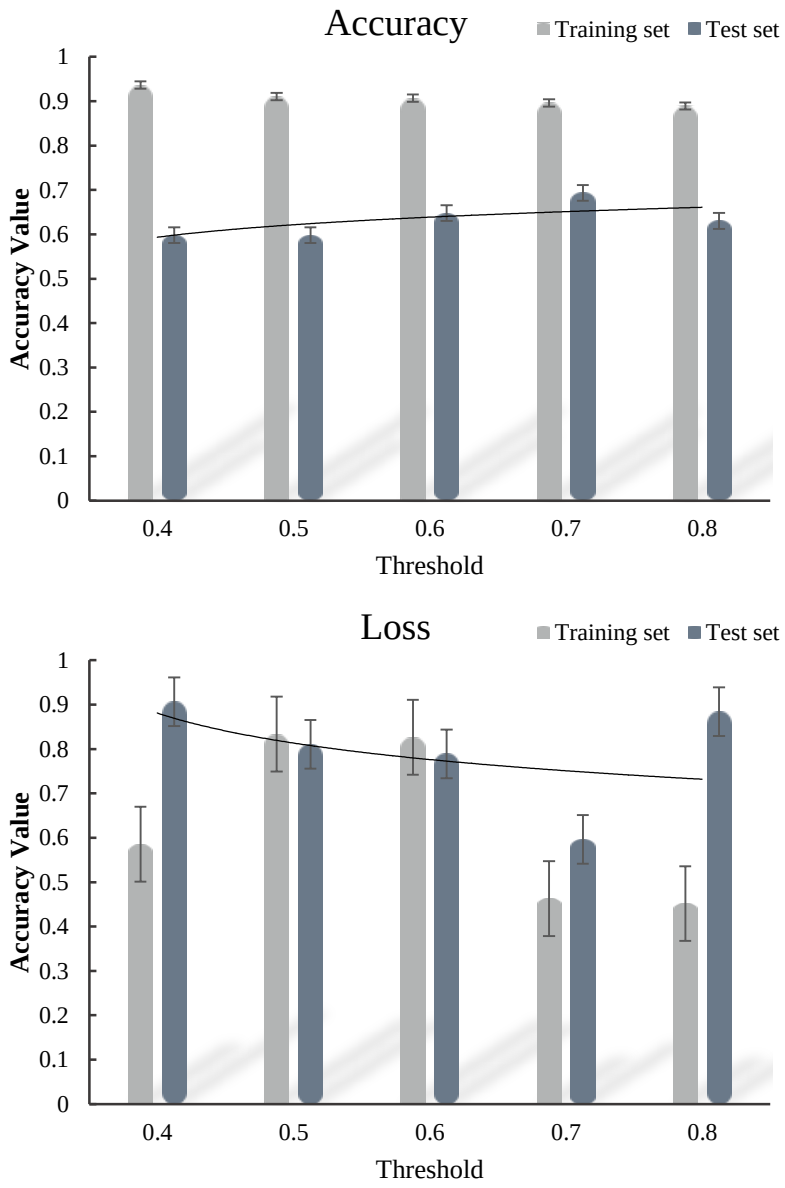

Figure 8. Model performance experiments

The knowledge point data of the GNN-based English knowledge graph can be updated, and the difficulty level of the knowledge point can be marked. According to the students' problem-solving situation and the similarity between knowledge points, the exercise sets that constitute the personalized learning path are selected in the personalized knowledge map, which can also make the personalized learning path based on artificial intelligence more scientific and reasonable.

4.2. Intelligent Teaching System Based on Expert System

Expert system is an artificial intelligence computer program that can solve complex problems in some specific fields with a large amount of expert knowledge and reasoning. The purpose of an

expert system is to simulate the thought process of an expert. Generally, the knowledge and experience of field experts are stored in the computer in the form of knowledge representation [19].

This section proposes an English-assisted teaching system based on expert system theory and data mining technology. One part is an English-assisted teaching module for teachers and users, which classifies and summarizes high school English knowledge points, and analyzes the correlation of knowledge points; the other part is for students' learning, using the existing data of the system to establish students' self-learning modules to realize self-diagnosis and evaluation of students.

In the English expert system mentioned in this paper, it is not a single reverse reasoning or forward reasoning, but a combination of the two, that is, a hybrid reasoning model. This enables the system to come up with useful results even in the face of complex problems.

At the same time, it should be noted that in the implementation of the inference model, the factors of the rules are not single, and different factors have different degrees of influence on the rules. Therefore, the proportion of each factor is inconsistent. The expert system in this paper is also a weighted reasoning model. The reasoning model introduces the concept of weighting factor into the English expert system, so that the fuzzy reasoning conditions can be described visually. It can clearly express the different degrees of independence and importance of each sub-condition, which greatly helps the accuracy of knowledge representation and uncertain reasoning [20].

After the weighting factor is introduced, let B be the impact factor, D be the conclusion, W be the sub-condition coefficient, the sum of the ownership values is 1, and the English knowledge is expressed as:

$$\begin{cases} \text{if } B_1(W_1) \wedge B_2(W_2) \wedge \ldots \wedge B_n(W_n) \text{ Then D Con}(D, B) \\ B_1(W_1) \wedge B_2(W_2) \wedge \ldots \wedge B_n(W_n) = B \end{cases} \tag{18}$$

Assuming the credibility of each sub-condition Bi is Con(Bi), the credibility of the combination is:

$$\text{Con}(B) = \sum_{i=1}^{n} W_i * \text{Con}(B_i) \tag{19}$$

Con (D, B) is the reliability of the rule, and the value is in the range of 0 to 1, then the reliability of the conclusion D is:

$$\text{Con}(D) = \text{Con}(D, B) \otimes \text{Con}(B) \tag{20}$$

5. Questionnaire Survey on the Application Status of Artificial Intelligence in English Teaching

This section investigates the current situation of teachers' informatization teaching and the adaptability of teachers' informatization learning. This survey adopts the questionnaire method, and the main target is English teachers in high schools. The survey expanded the sampling range as much as possible, and the sample came from 36 high schools in eight provinces in China. The main form of questionnaire distribution is edited and distributed by Questionnaire Star, and the questionnaires are collected by relying on platforms such as QQ and WeChat. After excluding unreliable data, the specific sample data is given below.

There are 20 questions in the questionnaire, which are mainly divided into four parts: personal information, current situation of cognition of artificial intelligence and informatization teaching, application of artificial intelligence in English teaching, and suggestions for improving English teaching informatization. There are 85 valid questionnaires collected in the experiment, and the sample of teachers is shown in Table 1. It can be seen that among the interviewed groups, English teachers account for a relatively large proportion of 67.06%; the age distribution is relatively

uniform, and the largest number of people are 31-40 years old, accounting for 44.71%; in terms of teaching experience, more than half of the respondents have taught for 5-10 years; in terms of academic qualifications, the majority are undergraduates.

Table 1. Teacher sample situation

Type	Category	Number of people	Proportion
Gender	female	57	67.06%
	male	28	32.94%
Age	25-30	26	30.59%
	31-40	38	44.71%
	41-50	21	24.71%
Education	Undergraduate	62	72.94%
	Master's degree (above)	23	27.06%
Teaching age	⩽5	25	29.41%
	5-10	43	50.59%
	>10	17	20%

5.1. Teachers' Cognition and Acceptance of Artificial Intelligence and Teaching Informatization

Figure 9 shows the overall cognition of the respondents to this survey on artificial intelligence and the statistics of the channels for obtaining artificial intelligence information. It can be seen from the results that the overall awareness of AI among these teachers interviewed is generally not high. Among them, only 4.71% of the teachers said that they "know very well", and those who said that they "do not know much" or "generally know" accounted for 75.3% of the total number of teachers. Through data analysis of teachers of different age groups, it can be found that teachers aged 31-40 have the best understanding of artificial intelligence, followed by teachers in the age group of 25-30. In the analysis of educational background, it is found that the p value of the chi-square test is less than 0.05, indicating that there is a significant difference in cognition among samples with different educational backgrounds. In terms of gender samples, there was no significant difference in cognition between male and female samples. From the analysis of the channels for obtaining "artificial intelligence" related information, it is found that most English teachers mainly obtain related content through the Internet, accounting for 78.02%. TV programs accounted for 36.7%. The third is books and newspapers, accounting for 25.6%.

A survey of teachers' perceptions of "Artificial intelligence applied to English teaching". This paper mainly analyzes the three levels of teacher acceptance, namely cognitive, emotional and behavioral tendencies. The main statistical results are shown in Table 2. From a cognitive point of view, more than half of the teachers agreed that "it is necessary to apply artificial intelligence to teaching", and 41.08% said that it doesn't matter and their attitude is unclear. More than half of the teachers did not give a clear attitude to whether the application of artificial intelligence in teaching can improve the quality of English teaching. Among them, 32.67% of the teachers thought it could be improved. This may be because there are not many well-known examples and projects of using artificial intelligence to improve the quality of English learning, and only 29.94% of teachers

believe that he can be competent in English teaching under artificial intelligence. Analyzed from the emotional level, fewer teachers are interested in artificial intelligence, and most teachers think that it does not matter or is not interested at all. However, teachers are still optimistic or wait-and-see attitude towards "artificial intelligence makes teaching easier". The most noteworthy point may lie in the "learning pressure brought by artificial intelligence". Most teachers believe that "learning artificial intelligence-related technologies" will bring a certain pressure to education and teaching, which may be because a relatively complete and comprehensive training system has not been formed. From the perspective of behavioral tendencies, it is still relatively optimistic, and most teachers are willing to apply artificial intelligence technology to English teaching.

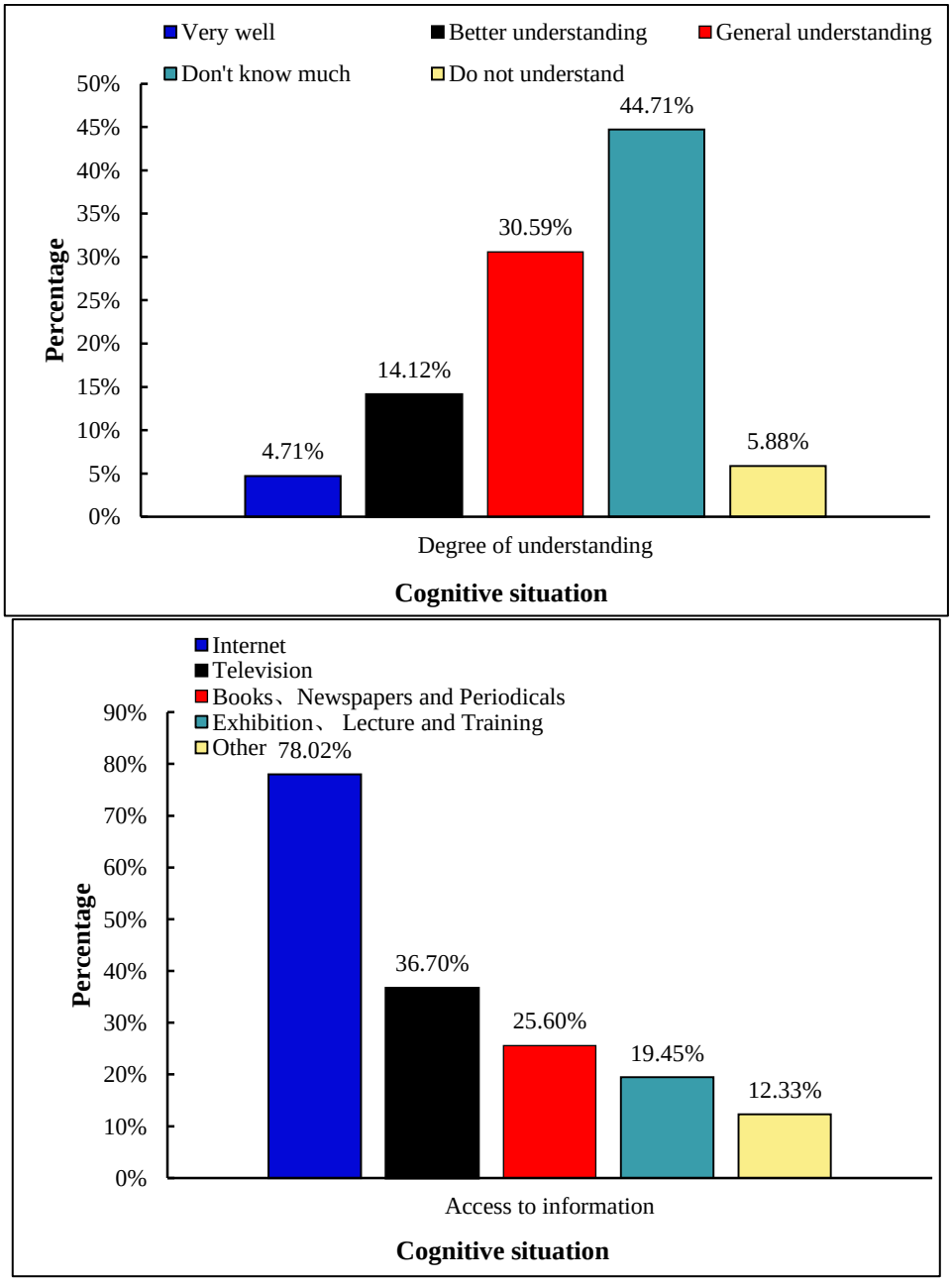

Figure 9. Teachers' perception of artificial intelligence

Table 2. Perceptions of English teachers on the application of artificial intelligence to the English teaching process

	Item	Agree	Indifferent	Disagree
Cognition	It is necessary to apply artificial intelligence to English teaching	51.26%	41.08%	7.66%
	It is believed that artificial intelligence can improve English teaching better than traditional teaching	32.67%	52.33%	15%
	Competent for English Teaching under the change of artificial intelligence	29.94%	47.75%	22.31%
Emotion	Very interested in artificial intelligence, willing to learn and apply	18.85%	46.69%	34.46%
	Artificial intelligence will make English teaching easier	42.66%	38.89%	18.45%
	Don't think I feel pressure to learn new teaching techniques	27.25%	41.02%	31.73%
Behavioral tendency	Willing to actively learn new technologies and adapt to the information 2.0 era	56.81%	33.46%	9.73%
	Willing to actively apply artificial intelligence technology to English teaching	48.87%	29.93%	21.2%
	Willing always explore how to better integrate artificial intelligence into English courses	45.58%	36.64%	17.78%

5.2. The Use of Artificial Intelligence in English Teaching and Its Influencing Factors

Figure 10 shows the statistics of the utilization rate of artificial intelligence in English teaching and the constraints of its application. Judging from the usage rate, only a small number of teachers often use artificial intelligence-related products in English teaching, and 45.59% of teachers said that they rarely use information technology for teaching. This shows that even though many teachers have recognized the importance of artificial intelligence, not many have applied related technologies to actual teaching. From the perspective of constraints, teachers believe that the influence of different factors on the use of artificial intelligence in English teaching, from high to low, are: "Not familiar with the operation of intelligent language learning tools (64.47%)", "Related intelligent teaching products are not perfect (56.60%)", "Teachers and students have no motivation to use it (46.62%)", "High investment cost and difficult to maintain (27.63%)", "Others (15.42%)". Among others, the restrictive factors for teachers to fill in include: unscientific evaluation mechanism, difficulty in changing the inherent mode of English teaching, and insufficient informatization concepts. In fact, there are many and complex factors affecting the effective application of artificial intelligence in English teaching. To achieve a better application effect, resolving these constraints is the key.

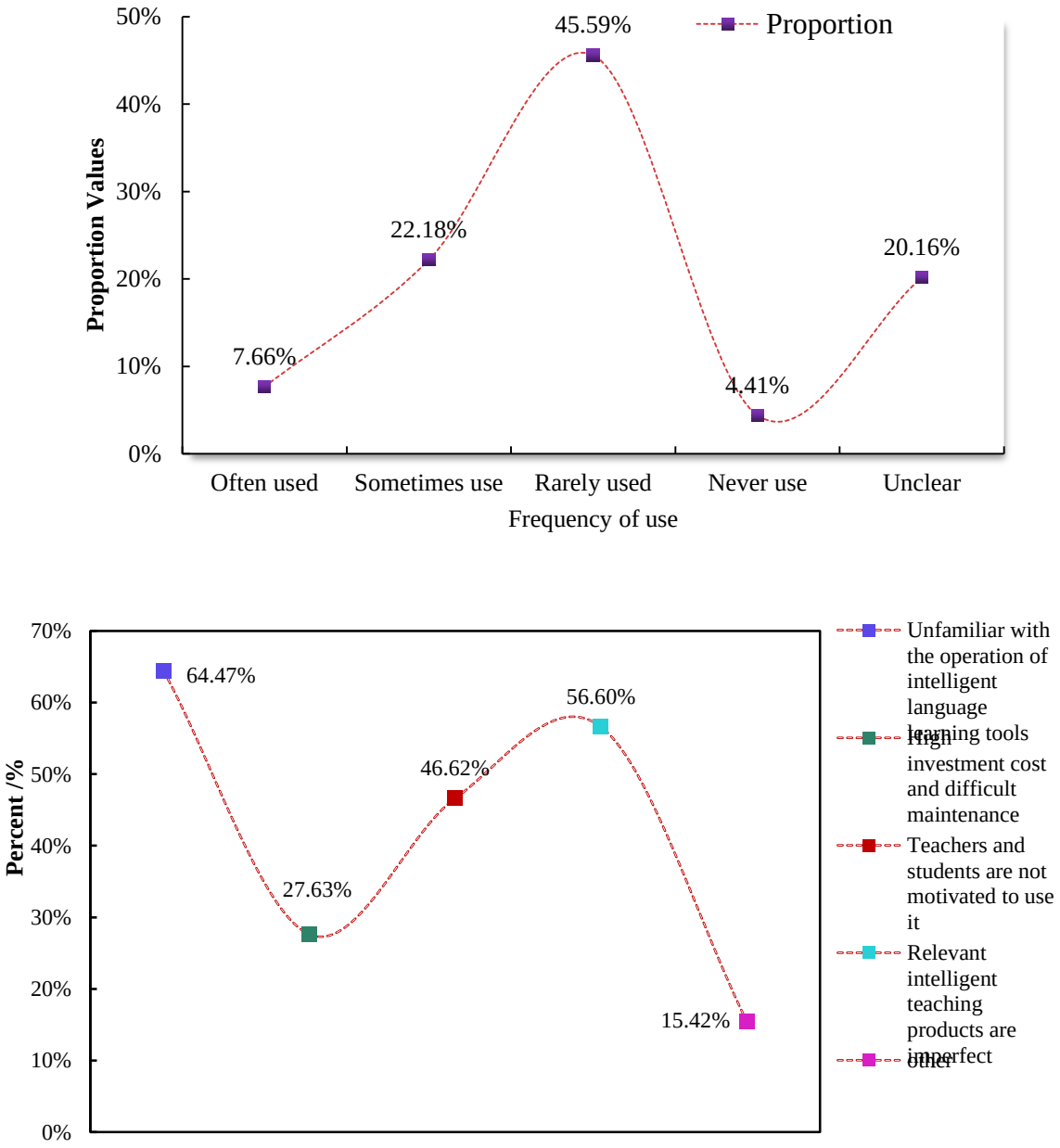

Figure 10. Statistics on the utilization rate and application constraints of artificial intelligence in English teaching

Pearson correlation analysis was conducted on the utilization rate of artificial intelligence in English teaching and various influencing factors, and the results are shown in Table 3. The study showed that there was no significant correlation between usage and age and educational level; there is a significant positive correlation between the utilization rate and acceptance and cognition. The greater the acceptance of teachers, the greater the possibility of using artificial intelligence technology in English teaching; There is a significant negative correlation between usage and constraints.

Table 3. The use rate of artificial intelligence in English teaching and the correlation test of various factors

Project	r value
Age & Utilization rate	0.78
Awareness & Utilization rate	0.62**
Acceptance & Utilization rate	0.49**
Constraints & Utilization rate	-0.58**
Education level & Utilization rate	0.93
**P<0.01 *P<0.05	

6. English Teaching Strategies Based On Artificial Intelligence

6.1. Design of Intelligent Teaching Mode

Based on the previous research, it is found that there are still many restrictive factors that need to be resolved for the good application of artificial intelligence technology in English teaching, especially in the relevant operation guidance of teachers and the personalized design of product functions. In this regard, this paper integrates teaching functions and proposes an improved intelligent teaching mode according to the relevant opinions put forward by teachers, as shown in Figure 11. Before class, teachers can push personalized content to students' learning space according to their learning goals in the system, so that students can preview independently. The intelligent platform will automatically generate a preview report, and learn the difficulties of students' learning according to the knowledge map; in class, teachers can interact with students in real time through the intelligent platform, and can also monitor the learning process of each student and provide personalized guidance; after class, students deepen the knowledge they have learned, and the intelligent teaching platform can provide teachers with targeted teaching method suggestions.

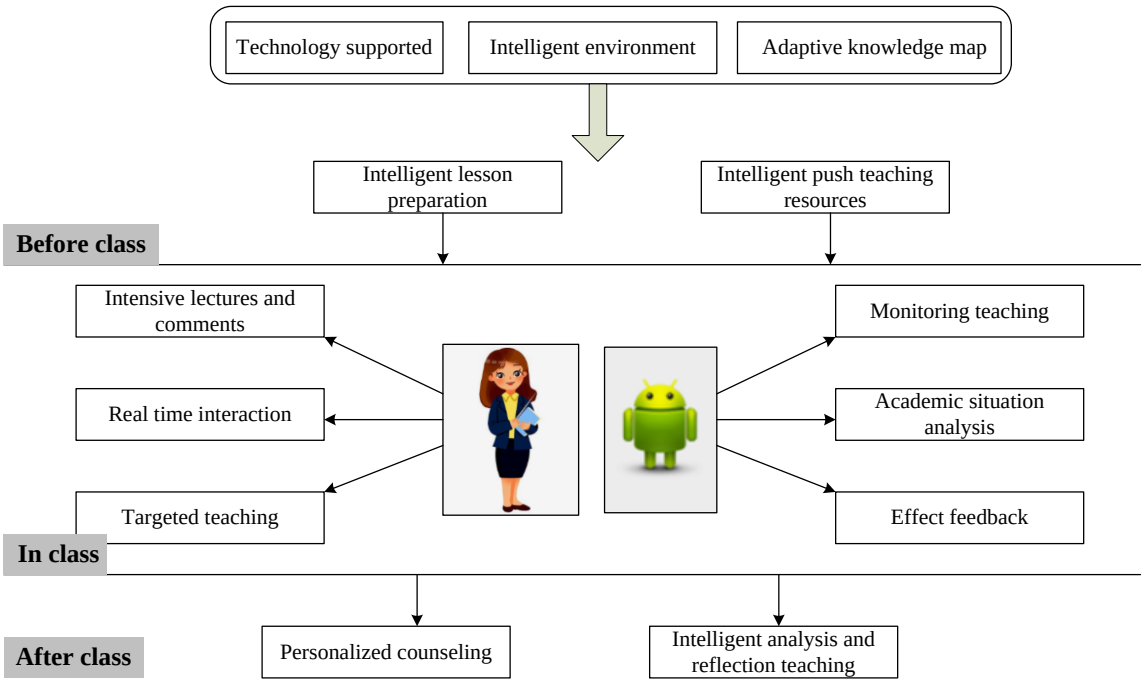

Figure 11. Intelligent teaching mode

6.2. Intelligent Campus Construction

At present, the construction of smart campuses jointly built by schools and enterprises mainly includes:

(1) Intelligent network infrastructure construction

It is necessary to upgrade, optimize and improve the existing school network infrastructure to create cloud intelligent infrastructure and virtual network storage space. It improves the upload and download speed, ensures the seamless coverage of the school's wireless network and the safe and stable operation of the campus network. It ensures that teachers and students can learn online and download resources anytime, anywhere.

(2) Interactive teaching environment

Schools should try their best to provide relevant interactive learning equipment and a platform for sharing resources. For example, classrooms can be equipped with enough LED screens, wireless communication equipment and flexible seating. This allows for personalized learning and teaching, and students can connect their smart collections or tablets to the screen to share their learning ideas.

(3) Intelligent management control center

For the problem that most schools think that the AI teaching system is difficult to maintain, which requires relevant enterprises to make more efforts in system maintenance and control. If a complete intelligent management control center is built, all intelligent classrooms can be equipped with a problem feedback system, which is convenient for timely maintenance, and can provide support for students' personalized learning and teachers' precise teaching.

7. Discussion

The main research direction of this paper is to use artificial intelligence technology as the main support to explore the development of English teaching in the information age 2.0 era. The first section of this study briefly summarizes the research background and main purpose of the article. The second section summarizes the relevant research content by reviewing the literature. The third section is an overview of artificial intelligence technology and related content in the era of information technology 2.0. The first is to describe the development path of education informatization, the process of informatization teaching and the change of teaching subject; the second is the application of artificial intelligence in education and teaching, which summarizes the development stage of artificial intelligence and its application classification in education and teaching. The fourth section is the specific application of artificial intelligence technology in teaching. It proposes a personalized English knowledge graph based on graph convolutional neural network and experimentally tests the performance of the model, and introduces an intelligent English assisted teaching system based on artificial intelligence expert system. The system introduces a contingency factor, which can make the fuzzy reasoning get a visual representation. The fifth section is a questionnaire survey on the application status of artificial intelligence in high school English teaching. The questionnaire analyzed teachers' cognition of artificial intelligence technology, teachers' acceptance of "application of artificial intelligence in English teaching", specific technology use and influencing factors that affect teachers' use of related metals. The results show that most teachers have a positive attitude towards "applying artificial intelligence technology to English teaching", but due to various complex factors, it cannot be implemented well. The sixth section presents the researchers' views on how to build an intelligent learning platform and an intelligent campus.

8. Conclusion

"Education informatization" refers to the comprehensive and in-depth application of modern information technology in the field of education to promote educational reform and development. It is clear that the use of ICT in education affects our education in many ways, including changes in how educational content is presented, how teachers teach, how students learn, and how teachers interact with students. Education informatization emphasizes the extensive application of information technology in the process of innovative education and teaching, and promotes the deep integration of information technology and vocational courses. This provides an integrated learning environment and effective, easy-to-use, useful and powerful learning tools for student learning and development. Significant changes in traditional behavioral patterns in teaching and learning and designing patterns for talent development.

Funding

This article is not supported by any foundation.

Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

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