

# *Development of Digital English Education in the Context of Artificial Intelligence*

Wei Feng<sup>1,a,\*</sup>

<sup>1</sup>*School of International Education, Jiangsu Vocational College of Finance and Economics, Huai'an, Jiangsu, 223003, China*

<sup>a</sup>*19831426@jscj.edu.cn*

<sup>\*</sup>*Corresponding author*

**Keywords:** English Education Development, Artistic Intelligence, Digital Model, Analytical Hierarchy Process

**Abstract:** Digital English education has entered a new era before the emergence of artificial intelligence (AI). The adoption of AI teaching into China's teaching reform has become inevitable. AI has effectively integrated and shared educational resources in China. This paper aimed to study how to analyze and research the development of digital English education based on AI. At the same time, Analytic Hierarchy Process (AHP) was used to evaluate AI's promotion of digital English education. After the questionnaire survey was distributed to 500 students, this paper analyzed 488 valid questionnaires. Among the tendencies in English education, 85.04% of students chose to use multimedia equipment to assist teaching. It can be seen that multimedia assisted instruction has become the first choice for most students. In addition, a questionnaire survey was conducted among teachers of English majors. Among 200 valid questionnaires, 59.00% of teachers chose to show their learning content for the purpose of using multimedia materials. It can be seen from this that most of the teachers in the school are still at the stage of displaying the content. To sum up, in order to enable students to better accept digital teaching, their initiative and enthusiasm to better use and manage digital resources and other related information technologies and carry out independent and effective learning in a digital environment has been enhanced, so that they can better use and manage digital resources and other related information technologies to understand their own learning in a digital environment.

## 1. Introduction

English is the dominant language in the world today. It occupies a large proportion in the international trade of various countries, and is also a language with the largest population in the world. English teaching has been widely used in various aspects such as curriculum development, teaching evaluation, scientific research, examination, professional translation, etc. As the cross-fertilization of information technology and education teaching deepens, English teaching has been widely utilized in all major courses.

As the times go by, the development of English education has become a major research hotspot.

Villafuerte Jhonny's research aimed to analyze the government's education policy, focusing on English as a foreign language teaching for disabled students from 1912 to 2020. This work first determined Ecuador's current inclusive education policy and revised the country's previous laws on English as a foreign language. The conclusion confirmed that it was necessary to strengthen the Ecuadorian government's policy of using English as a foreign language for learners with special educational needs from an inclusive perspective [1]. Coady Maria R reviewed the research in the cross field of rural education and English learner education. This review called for an organized national research agenda to begin to unlock the education of rural English learners and provide a consistent direction for scholars, teacher educators and policymakers [2]. Haidar Sham discussed the language ideology, policies and the role of English in Pakistan and China, two countries where English played different roles in education. He summarized how the debates related to English teaching were connected with various language ideologies [3]. Hao Kuang-Chung researched and developed four augmented reality games, and investigated their impact on English learning in Grade 5 by integrating learning theories based on digital games, attention related confidence satisfaction models and different types of digital games [4]. However, AI needs a method to evaluate effectiveness in facilitating the growth of English education.

This paper intends to analyze the development trend of digital English teaching from the status quo of English education, in order to give some reference for future teaching reform and development. The innovation of this paper lies in the combination of AI and digital English education, and the detailed introduction of the analytic hierarchy process for the development of digital English education.

## **2. AHP for the Development of Digital English Education**

### **2.1 Current Situation of English Education in China**

Nowadays, most of the students have their own characteristics in English education. In traditional English teaching, teachers usually teach one unit or several units first, and then teach the content of the next unit, or first teach a simple word or sentence, so that students can remember and understand it, and then teach students how to use it correctly [5-6]. In this model, classrooms tend to be teacher-centered and student-led in their learning.

In the current English teaching, many students just passively accept various forms of courses and learning materials, and they cannot digest and absorb all the knowledge they have learned. Therefore, there is a need to develop relevant English teaching resources utilizing multimedia technology in various forms, channels and ways to enable students to better utilize English, thus enhancing their interest in learning [7].

AI technology has been widely applied in a variety of industries, and the demand for new technologies and skills has increased. English is a world language, which has its own characteristics in terms of functional advantages and functions. It is evident from the usefulness of AI in teaching English that AI plays a more and more essential role in the growth of English teaching, and people pay more and more attention to it [8].

### **2.2 Application of AI to English Education**

The use of AI in English teaching can provide an interactive teaching environment for students to learn English and improve the learning situation of deaf mute English. It can also provide personalized teaching to improve teaching quality, so that teachers and students can better use English resources. English teaching has been optimized to enhance students' ability to solve problems and operate [9-10].

Because the English learning environment in middle schools is not as good as that in university, many universities are using English corners, foreign teachers, exchange students, foreign enterprise internships and other ways to create an interactive English environment. In the middle school English classroom, students do not have such an interactive atmosphere in the classroom [11]. However, AI technology can provide technical support for interactive English teaching in education. Using AI technology, multiple media such as text, graphics, images, and sound can be integrated to form a complete English teaching system [12]. AI provides three interactive modes for English teaching, including voice, text and image, which can be completed at the same time to achieve the corresponding teaching effect. AI provides a method of teaching interaction, as shown in Figure 1.

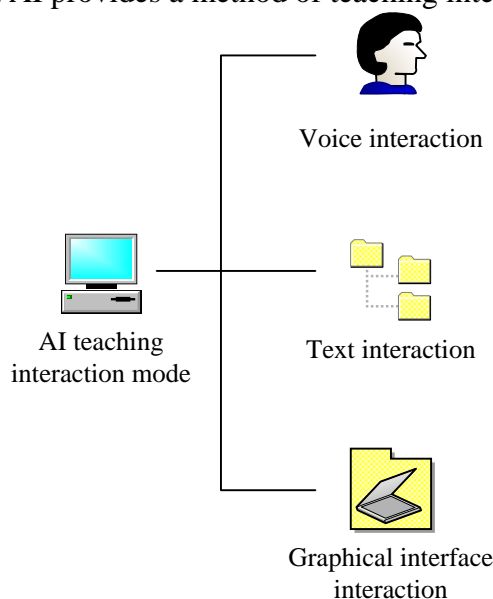


Figure 1: AI teaching interaction mode

English is one of the most important languages in middle school foreign language education. English is a compulsory course in basic education. This paper makes an analysis of this, so as to realize more clearly that the teaching goal of middle school English curriculum is to improve students' comprehensive language application ability.

English curriculum emphasizes students' subjectivity. Under the effective guidance of English teachers, a student-centered English classroom is constructed. Students' development is regarded as the starting point of English teaching, so as to give full play to and develop students' subjectivity. The basic knowledge of English is fully used to cultivate and develop language interest, and expand their cultural horizon, thus improving their language application level [13]. In English education, a scientific evaluation system should be established. Process evaluation is emphasized to make students' comprehensive development to be the main purpose of teaching. When evaluating, the problem of education can be reasonably solved by properly supporting performance evaluation, so that English teachers can embark on a road conducive to the comprehensive development of students [14].

To sum up, from the perspective of the curriculum standards of middle school English, it is not difficult to see that the ability to listen, speak, read, write and communicate in English has great limitations in the English curriculum objectives of primary education. It is obviously not in line with the current curriculum standards to simply test on paper. To effectively increase the comprehensive language use level of middle school students, the combination of information technology and English courses must be strengthened. AI technology is an innovative and effective method of middle school English [15].

## 2.3 Analytic Hierarchy Process

Intelligent learning technology affects traditional education methods and concepts to a certain extent. At present, the system can solve students' confusion in learning under the scenes of online learning, interactive communication, question answering and tutorship, virtual homework, etc., and provide personalized knowledge, so as to achieve the purpose of teacher-student interaction and online communication. Secondly, the integration of AI technology and educational technology brings more new skills and intelligent learning platforms. "Virtual classroom" is a teaching mode with the network as the carrier, students as the main body, and teachers as the leading role (teachers can design learning programs and assign homework topics in the background), so as to maximize students' learning initiative. Whether AI can promote the development of English education, this paper makes an analytic evaluation on it.

According to the criteria of the judgment matrix, the evaluation indicators of the next level are compared with those of the previous level to determine the proportion of this indicator in a certain indicator, and each element is compared.

Hierarchical single ranking refers to the relative weight of each factor in each evaluation matrix, which is essentially the calculation of the weight vector. Using the principle, the consistency judgment matrix of each column is standardized and the corresponding weight value is obtained. By normalizing each column, the approximate weight of each column is obtained, and the arithmetic mean of the  $m$  columns is calculated as the final weight  $\varpi_o$ . The formula is as follows:

$$\varpi_o = \frac{1}{m} \sum_{k=1}^m \frac{S_{ok}}{\sum_{l=1}^m S_{lk}} \quad (1)$$

Only when the overall consistency of the matrix reaches a certain degree can the logic rationality of the judgment matrix be determined. The consistency check shall be carried out:

$$CI = \frac{\gamma_{\max} - m}{m - 1} \quad (2)$$

$\gamma_{\max}$  represents the largest characteristic root. Consistency ratio CR is calculated for judgment:

$$CR = \frac{CI}{RI} \quad (3)$$

CI is the consistency index and CR is the consistency ratio. RI is an index with random consistency.

In case  $CR < 0.1$ , the consistency of the decision matrix is acceptable.

The overall ranking refers to the weight of each factor in each evaluation matrix at the target level. The weight is calculated from top to bottom and synthesized by layers. The relative weight of the  $m$  elements of the  $l-1$ -th layer and the whole object is  $\varpi^{(l-1)} = (\varpi_1^{(l-1)}, \varpi_2^{(l-1)}, \dots, \varpi_m^{(l-1)})^T$ . Let  $\mathcal{G}^{(l)} = (\mathcal{G}_1^{(l)}, \mathcal{G}_2^{(l)}, \dots, \mathcal{G}_m^{(l)})$ , which means that the elements of the first layer rank the elements of the sixth layer. Then, the total ranking of the elements of the first layer of the overall goal is:

$$\varpi^{(l)} = (\varpi_1^{(l)}, \varpi_2^{(l)}, \dots, \varpi_m^{(l)})^T = \mathcal{G}^{(l)} \varpi^{(l-1)} \quad (4)$$

Or:

$$\varpi_o^{(l)} = \sum_{k=1}^n \mathcal{G}_{ok}^{(l)} \varpi_k^{(l)} \quad o = 1, 2, \dots, m \quad (5)$$

The whole sorting results are checked for consistency again.

Generally, if the weight of factor  $m$  of layer  $S$  is  $\varpi_k (k = 1, 2, \dots, m)$ , the consistency between a factor of a layer and an indicator  $S_k$  of the upper level  $S$  is  $CI_k$ , and the corresponding random consistency index is  $RI_k$ , then the consistency ratio of the overall ranking of this level is:

$$CR = \frac{\sum_{k=1}^n \varpi_k CI_k}{\sum_{k=1}^n \varpi_k RI_k} \quad (6)$$

English is an important international language in China's basic education. However, there are some problems and defects in the concept, teaching mode, teaching content and teaching methods of foreign language education in China.

### 3. Digital English Education Development Experiment

#### 3.1 Digital English Education

The development of AI has made it widely used in all aspects of education. In the future, students would not only gain knowledge, but also apply what they have learned to resolve practical difficulties and create more new things.

English teaching in the AI era is a gradual process, which requires constant exploration, improvement and learning. In the classroom, students should be fully involved in the classroom, rather than just passing on knowledge. In terms of teaching forms, some different teaching methods (such as through various interesting teaching methods) can be tried to mobilize students' interest in English. In terms of class management, teachers can take various forms such as teacher teaching and small class management (such as small class size, small proportion of teachers and students, and small class members). In terms of management mode, small class management mode can also be adopted. In addition, students should constantly improve their academic qualifications (such as language ability and professional knowledge) and be constantly learning professional knowledge. With the development of society and the rapid development of science and technology, digital mode plays an increasingly important role in people's daily life.

Therefore, to better promote the development of English teaching in China's primary and secondary schools, its teaching model must be constantly reformed, innovated and improved, so that Chinese middle school students can have greater interest in English learning.

#### 3.2 Investigation on the Current Situation of English Education

Through a questionnaire survey, a total of 500 questionnaires (including online and offline) are collected from middle school students in various provinces of China, 492 of which are collected, and 488 are valid.

Figure 2 shows the current problems in English teaching and learning. According to the survey in Figure 2 (a), 69.47% of middle school students believe that the current English teaching in middle schools is boring and lack of interest. 61.68% believe that multimedia equipment is insufficient. 21.11% believe that there is a lack of specialized teachers. 35.66% of the students think there is no

good teaching environment.

According to the survey in Figure 2 (b), 70.08% of the students think that the biggest problem in current English teaching is lack of vocabulary. 50.61% of the students think it is difficult to learn. 22.34% choose to lack extracurricular guidance, and 16.39% of the students are not interested in English learning. This shows that students need to make greater efforts to learn English vocabulary.

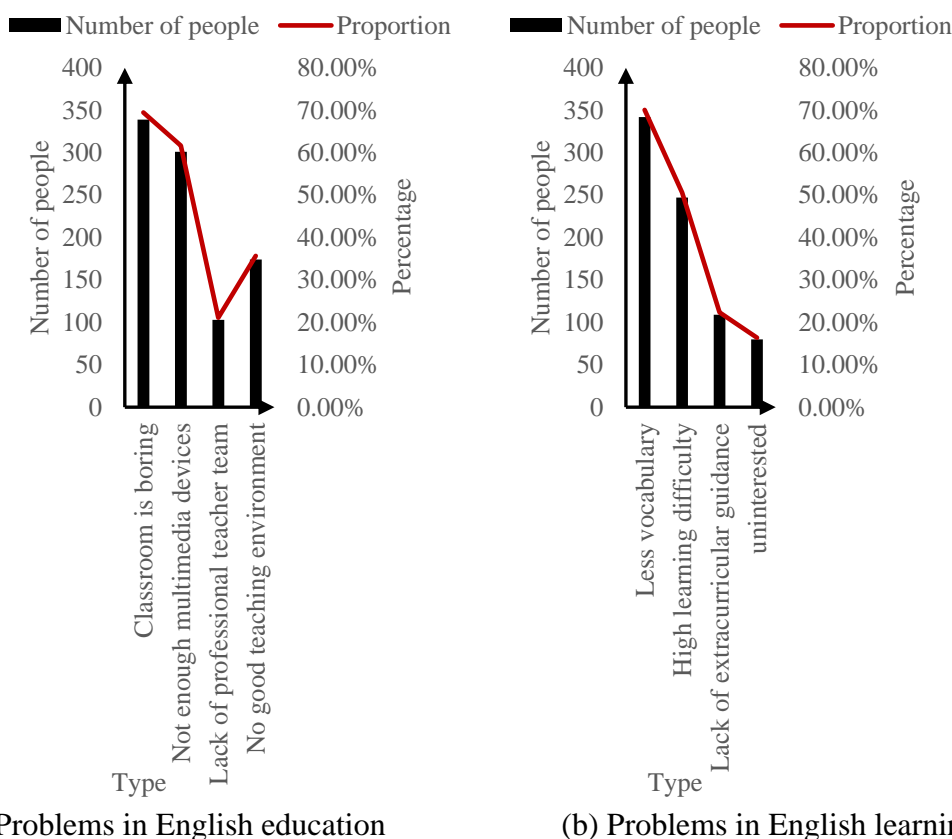


Figure 2: Problems in current English education and English learning (multiple choices)

Table 1 shows that 85.04% of students tend to use multimedia equipment to assist teaching, in which network and electronic equipment are used more frequently. 59.22% students pay more attention to how teachers interact with students. 20.08% of the students prefer online or paper textbooks.

Table 1: Tendency in English education (multiple choices)

		Number of people	Proportion
Tendency in English education	Multimedia Equipment Assisted Instruction	415	85.04%
	How to interact and communicate between teachers and students	289	59.22%
	Online or paper textbooks	98	20.08%

The survey results in Table 2 show that 46.93% of the students think that the classroom teaching mode is single; mainly teachers' teaching, and the classroom activities and evaluation methods are single. 29.30% of the students think that information technology is the most important, and there are many activities and evaluation method. Only 23.77% of the students choose network technology and multimedia interactive learning as a supplement. It can be seen that the current information

means and digital resources are not widely used.

Table 2: Current classroom teaching mode

		Number of people	Proportion
Current classroom teaching mode	The classroom teaching mode is single, with teachers giving priority to teaching, and the classroom activities and evaluation methods are single	229	46.93%
	Mainly information technology, many activities and evaluation methods	143	29.30%
	Network technology and multimedia interactive learning	116	23.77%

### 3.3 Investigation on the Application of Digital Teaching Resources

In addition, this article also conducts a questionnaire survey on English teachers. A total of 200 questionnaires are distributed and 200 questionnaires are returned, all of which are valid.

The survey results in Figure 3 show that none of the English teachers have ever used multimedia classrooms. 40.00% and 31.00% of the teachers choose to use multimedia classrooms infrequently and occasionally, respectively. 12.00% of the teachers say they always use multimedia classrooms. It can be seen that the utilization rate in English class is not particularly high.

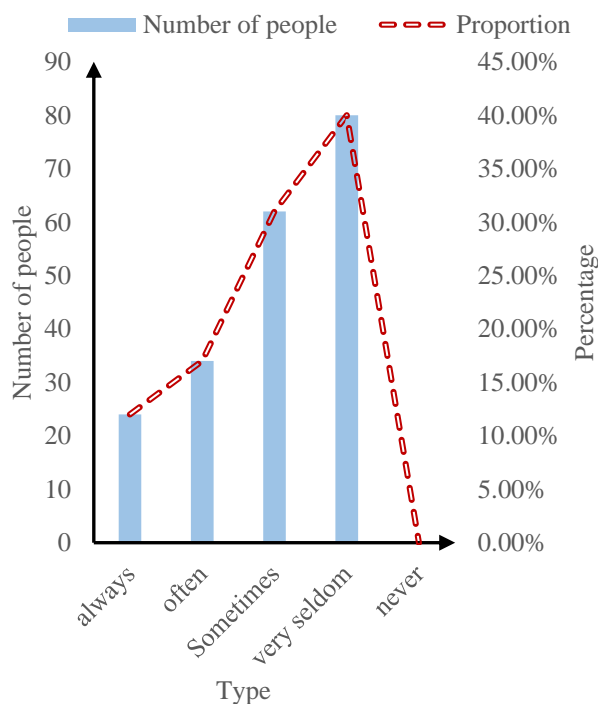
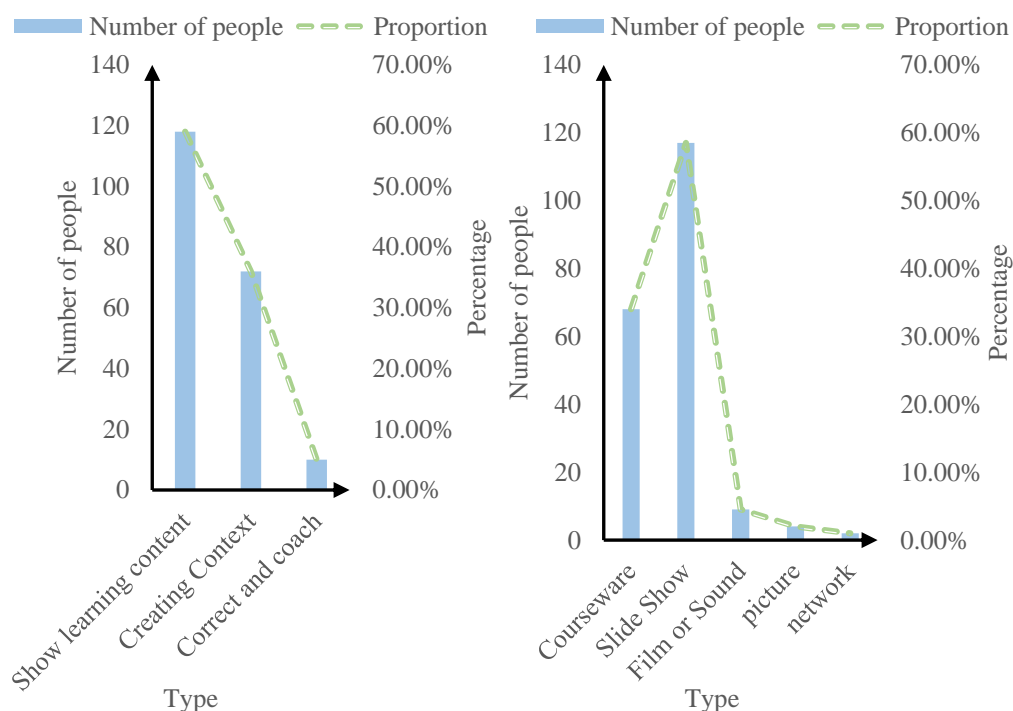


Figure 3: Frequency of using multimedia classrooms

According to the survey in Figure 4, 58.50% of teachers use slides as the most frequently used digital teaching resources in the classroom. 34.00% use courseware most frequently, and few teachers choose films, videos, sounds, pictures, and the Internet. It can be seen from this that English teachers have a strong dependence on slides, followed by courseware. This is also in line with the original intention of teachers to use multimedia resources. Most of the slides and

courseware are designed to show the learning content, and some are designed to create situations. They don't have much energy to solve some complicated problems.



(a) Purpose of using multimedia materials (b) The most frequently used digital teaching resources in the classroom

Figure 4: The purpose of using multimedia materials and the most frequently used digital teaching resources in the classroom

Figure 5 shows the use of multimedia materials and the most commonly used digital teaching resources in the classroom. The survey in Figure 5 (a) shows that when teachers use multimedia resources to organize English teaching, the content of discussion and performance accounts for 48.00%. It shows that teachers pay more attention to let students use language actively and create a certain language environment. The proportion of teachers using resources to organize demonstration, retelling and other teaching content accounts for 30.00%. The proportion of teachers organizing students to complete design, reporting and other activities in English accounts for 22.00%. This shows that while teachers organize students to internalize language, they also emphasize the expression and understanding of language.

According to the survey in Figure 5 (b), the proportion of stimulating interest in learning purposes is the highest, with 34.00%. This shows that teachers have changed the concept of using learning resources. Other aspects such as assisting in activities, helping understanding, expanding knowledge, and simple demonstration account for 16.00%, 22.00%, 15.50%, and 12.50% respectively. Teachers have fully understood the needs of English courses. They are fully aware of the potential advantages and supporting role of digital English teaching resources in teaching, as well as the use of digital English teaching resources in the classroom, which can be used more appropriately.



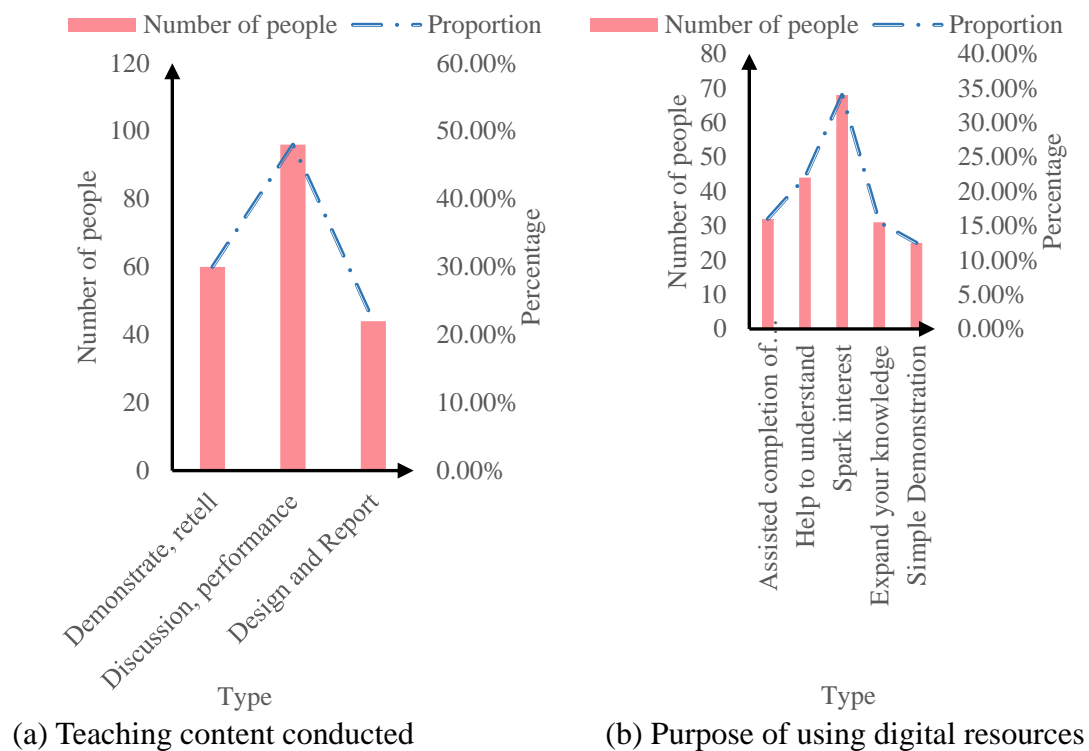


Figure 5: Teaching content and purpose of using digital resources

From the above data, it can be seen that English teachers' concept of using digital resources has changed a lot. It has changed from the traditional learning resources to the auxiliary means of students' learning to how students learn and how to establish memory models, and it is also an essential means of students' learning.

#### 4. Conclusions

With the application of AI, digital English teaching mode has not only solved students' problems, but also promoted students' overall quality and social adaptability. Therefore, digital English education is very necessary. At the same time, it is also necessary to pay attention to training students' comprehensive ability level in information technology, so that they can actively learn and research, and dare to use network information tools to independently and effectively master and use information media resources. The relevant ability level and adaptation to social life practice have been improved accordingly, so as to further promote the reform and development process of China's basic education. Finally, it should be started from the group of teachers. The digital English teaching model has been optimized so that Chinese middle school students can master relevant digital technologies more quickly and effectively. Only in this way can students better adapt to the future society and make better use of various information technologies to improve themselves.

#### Acknowledgement

This work was supported by Fund of Philosophy Social Science of Jiangsu Provincial Department of Education (2021SJA1849).

#### References

[1] Villafuerte Jhonny, and Yhomaly Macias Mosquera. "Teaching English language in Ecuador: a review from the

- inclusive educational approach.*" *Journal of Arts and Humanities* 9.2 (2020): 75-90.
- [2] Coady Maria R. "Rural English learner education: A review of research and call for a national agenda." *Educational Researcher* 49.7 (2020): 524-532.
- [3] Haidar Sham, and Fan Fang. "English language in education and globalization: A comparative analysis of the role of English in Pakistan and China." *Asia Pacific Journal of Education* 39.2 (2019): 165-176.
- [4] Hao Kuang-Chung, and Lee Lai-Chung. "The development and evaluation of an educational game integrating augmented reality, ARCS model, and types of games for English experiment learning: an analysis of learning." *Interactive Learning Environments* 29.7 (2021): 1101-1114.
- [5] Kendiani Sefti, Dedek and Eka Apriani. "The Islamic characters in teaching English." *Journal of English Education and Teaching (JEET)* 4.03 (2020): 431-448.
- [6] Dos Santos Luis Miguel. "Bilingual English Education: Expectation of Parents Who Enrol Their Children in Bilingual Primary Schools." *International Journal of Instruction* 12.4 (2019): 747-766.
- [7] Sutisna Entis, and Lungguh Halira Vonti. "Innovation development strategy for hybrid learning based English teaching and learning." *English Review: Journal of English Education* 9.1 (2020): 103-114.
- [8] Syakur Abd, Sugirin, Margana, Junining Esti, Sabat Yulianto. "Improving English Language Speaking Skills Using "Absyak" On-Line Learning Model for Second Semester in Higher Education." *Budapest International Research and Critics in Linguistics and Education (BirLE) Journal* 3.2 (2020): 684-694.
- [9] Aditama Madya Giri, Rhizki Amelia, and Hikmah Pravitasari. "Implementation of Character Education in English Language Learning For Junior High School." *Jurnal education and development* 10.3 (2022): 367-370.
- [10] Rajabboyevna Alimova Nozima. "Organization of English Lessons Based on Advanced Pedagogical Techniques." *International Journal on Integrated Education* 3.3 (2020): 41-45.
- [11] Kusuma Heryan Ardhi, and Sigit Apriyanto. "Strategy on developing English learning material for specific purposes." *IJECA (International Journal of Education and Curriculum Application)* 1.3 (2018): 39-44.
- [12] Syakur Abd. "The effectiveness of english learning media through google classroom in Higher Education." *Britain International of Linguistics Arts and Education (BioLAE) Journal* 2.1 (2020): 475-483.
- [13] Haberman Phillip, Muhammad Afzaal, Abdul Ghaffar, Hind Alfadda. "Various Roles in the Development of EFL Learners' English Skills." *International Journal of Instruction* 13.4 (2020): 609-622.
- [14] Cai Lingling, and Lv Junlu. "Task-based approach to develop intercultural communicative competence in college English education." *Journal of Language Teaching and Research* 10.6 (2019): 1279-1287.
- [15] Sujanta Kazemanzadeh. *Distributed System Integrating Virtual Reality Technology in English Teaching. Distributed Processing System*, (2022), Vol. 3, Issue 1: 62-70.