Practice of Hybrid Teaching Mode of English Writing Based on Artificial Intelligence

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Abstract. Based on the analysis of artificial intelligence teaching materials, the hybrid education mode of artificial intelligence provides a new teaching idea for schools that have not yet set up the hybrid education mode of artificial intelligence. This paper mainly studies the hybrid education of English writing based on artificial intelligence. This paper mainly describes the application of hybrid education model in English writing teaching. Taking a class as an experimental class, using the theory of teaching design, combined with the specific situation of class students' English writing teaching, a hybrid teaching model of English writing based on artificial intelligence is designed. Based on the analysis of students' growth characteristics and cultural basis, combined with the analysis of foreign classical teaching modes, this paper puts forward a hybrid teaching mode suitable for students' AI courses by using constructivism teaching mode, cooperative teaching mode and mastery learning mode. This paper mainly uses the teaching recommendation algorithm of artificial intelligence, through the intelligent statistics and analysis of the courses that students are interested in, recommends when and what courses the environment teachers should teach. The experimental results show that under the mixed teaching mode based on artificial intelligence, students' English writing level has increased by 40% compared with 2016, and the teaching efficiency under artificial intelligence has increased by 35% in 2016.

Keywords: Artificial, Intelligence, English, Writing, Mixed Education, Educational Informatization

1. Introduction
The rise of AI will not only have a great impact on our society, but also cause changes in economic structure, social ecology and work, which will also have an impact on the pattern of world economic development[1]. With the trend of globalization, English has gradually become a worldwide language[2]. This research is the distillation and breakthrough of classroom teaching, the systematic generalization of students’ written expression characteristics and the comprehensive comparison with native English speakers, to help find out the problem, so as to suit the case, enrich and improve the teaching theory of high school AI course to a certain extent, and provide reference for the teaching research of high school AI course in the context of digital age[3].

At home and abroad, there are many researches on the hybrid education mode under artificial intelligence, and in recent years, the trend is increasing. Robert M , on the basis of previous studies, explored the combination of artificial intelligence models and tools to use computers as teaching guidance more effectively[5]. The development of artificial intelligence technology has an impact on all aspects of social life, including education. In terms of artificial intelligence education, developed countries such as Britain, the United States and Japan started earlier. The curriculum system of these countries includes AI related courses. In addition, there are rich educational resources on the Internet[6].

Bundy a has released a report on artificial intelligence, which summarizes evidence from various sources, shows how they expect the development of AI, what kind of impact it will have and what actions it proposes to the U.S. government to take[7]. However, the report does not regulate the action, so the expected effect of the government may not be so good[8]. This paper mainly analyzes the content structure and objectives of the new curriculum standard as well as the requirements of the new curriculum standard for students’ artificial intelligence course, investigates the setting up of the artificial intelligence course in the stage of reading students in China[9], analyzes the current teaching situation of the artificial intelligence course in the stage of high school, investigates the development characteristics and cultural basis of high school students, and then expounds the significance of implementing the artificial intelligence course in the stage of high school. This paper analyzes the concrete embodiment of blended teaching on English writing, and designs the basic steps and methods of blended curriculum[10].

2. Artificial intelligence hybrid teaching algorithm

2.1. Hybrid Teaching BP algorithm

In the field of fault diagnosis, the most widely used and most effective is the forward multi-layer network. Because the network uses BP algorithm in the teaching process, it is also called BP network. In the teaching stage, the error is propagated back to the input layer, and in the working stage, the input vector is propagated forward to the output layer.
Let the connection weight from layer j neuron j to layer i+1 neuron i be \( w_j^i \), \( P \) is the current teaching sample, \( o_p^l \) is the output of layer l+1 neuron under \( P \) sample, and the transformation function goes to Sigmoid Function, namely:

\[
f(x) = \frac{1}{1 + e^{-(x)}}
\]  

(1)

For the \( P \) sample, the network output error \( E_p \) is:

\[
E_p = \frac{1}{2} \sum_{i=0}^{p-1} (t_{pj} - o_{pj}^l)^2
\]  

(2)

The modified weights and thresholds can be obtained through the hybrid teaching mode:

\[
w_j^i(n+1) = w_j^i(n) + \eta \sum_{i=0}^{l-1} a_{pj}^l o_{pj}^l - \alpha (w_j^i(n) - w_j^i(n-1))
\]  

(3)

2.2. Artificial intelligence teaching recommendation algorithm

Through the training of neural network, we can get the courses that students want to take most in the time period, and then use the collaborative filtering algorithm to recommend to students.

Here, denominator \( n(i) \) is the number of students who like the course, while numerator \( n(i) \) and \( n(j) \) are the number of students who like both course \( i \) and course \( J \). However, the existence of popular courses will lead to great deviation in the recommended results. To avoid recommending popular courses, use the formula:

\[
w_{i,j} = \frac{|N(i) \cap N(j)|}{\sqrt{|N(i)||N(j)|}}
\]  

(4)

The similarity can be obtained through the inverted operation of curriculum and student table. That is, student \( U \)'s interest in a course \( J \):

\[
p_{ij} = \sum_{k \in N(u) \cap S(i,j)} w_{ij} r_{ki}
\]  

(5)

3. Artificial Intelligence Teaching Experiment
Design the teaching experiment of artificial intelligence course, which is divided into teacher and student. The experiment content is that when the teacher makes the teaching content before, during and after class, the students follow the steps and methods of the teacher to practice. For example, when the teacher prepares the materials before class, the students should also preview the materials before class. When the teacher makes the content description during class, at this time, students should play their own brain hole, actively participate in and think about difficult problems. Observe the changes of students' English scores. The experimental requirements are that students do according to the requirements of teachers, and combine their own cognitive characteristics and existing structures. The specific experimental contents are shown in Table 1:

|                  | Teacher                                      | Student                                             |
|------------------|----------------------------------------------|-----------------------------------------------------|
| Before class     | Diagnostic materials before class            | Complete diagnostic evaluation before class         |
|                  | Establish project                            |                                                     |
|                  | Prepare teaching materials                   | Learning teaching materials and understanding project requirements |
| In class         | Set the situation and propose the project task | Cooperative learning and design projects            |
|                  | classroom instruction                         | Difficult questions                                 |
|                  | Summarize knowledge and ideas                 | project implementation                              |
| After class      |                                              |                                                     |
|                  |                                              | Formative assessment                                |

### 4. Analysis of English Writing in AI Hybrid Teaching

#### 4.1. Analysis of English Writing Results

According to Carl James' classification of errors, he divides errors into ontology errors, text errors and text errors. The main types of errors are punctuation errors, article organizational structure errors,
vocabulary and grammar errors, etc. The auxiliary research tools used are word and excel. Through the data analysis of the survey, we found that students' errors mainly focused on grammar, vocabulary and technical details. The author made statistical analysis on these three data, and the results are shown in Figure 1:

![Figure 1](image1.png)

**Figure 1.** Changes of English writing language errors

As can be seen from the above figure, through several composition training, all kinds of writing errors are significantly reduced. In the mixed teaching mode of artificial intelligence, grammar errors, as frequent errors, have been reduced from 96 to 28 and then to 15, while vocabulary errors have also been greatly improved, from 45 to 20 and then to 10, while technical details errors have been greatly improved, and finally to 6, with a high probability of accuracy reaching 100%.

4.2. Analysis of the Investigation Results of Artificial Intelligence Hybrid Education

According to the geographical distribution of data sources, as shown in Figure 2, we can see that the participants of the questionnaire come from 11 provinces and cities in China, such as Henan, Hunan, Beijing, Tianjin, Shandong, etc., and the respondents have a certain range, which can to a certain extent represent the current high school teachers of artificial intelligence in China.

![Figure 2](image2.png)

**Figure 2.** Geographical distribution of the investigated

Based on the analysis of the data of the basic information of the respondents, it can be seen that
most of the information technology teachers surveyed have received undergraduate education. In terms of major, it and educational technology are the two major disciplines, with 56.42% of the teachers with professional background in this survey, and 45.34% of the teachers with other scientific backgrounds such as physics, mathematics, educational management, electronic science and technology, and mechanical design. In terms of teaching years, 56.55% of the teachers surveyed have less than 3 years of teaching age, 31.29% have more than 8 years of teaching age. This result is consistent with the age response. In this survey, 49.02% of the teachers are under 30 years old, 38.37% are between 30 and 40 years old, and 17.69% are over 40 years old. Two of them are over 50 years old. In addition, 56.59% of the teachers in this survey have the professional titles of grade two or above, among which two have the professional titles of special grade teachers, 9.69% of senior teachers and 21.58% of grade one teachers. To some extent, teachers' teaching level and scientific research ability can be reflected by professional titles, which can also reflect teachers' teaching experience and their mastery of curriculum. The basic information sorting table is shown in Table 2:

**Table 2. Statistical table of basic information investigated**

| name               | Attributes               | Percentage |
|--------------------|--------------------------|------------|
| Educational structure | College and below         | 5%         |
|                     | Undergraduate             | 65%        |
|                     | Master degree and above   | 25%        |
| Professional background | computer                 | 29%        |
|                     | Educational Technology    | 28%        |
|                     | Mathematical Physics      | 16%        |
| Working years       | Three years and below     | 56%        |
|                     | Three to five years       | 9%         |
|                     | Five years and above      | 38%        |

However, according to the results of the survey on whether the teachers' school has set up the "preliminary artificial intelligence" module, 64.71% of the teachers' schools have not yet set up the "preliminary artificial intelligence" module, and only 35.29% of the teachers' schools have set up the curriculum of this module, which to some extent shows that although the state issued the "plan" and relevant policies strongly advocate the developers Industrial intelligence course, but there are still a
large number of schools in the current basic education have not yet opened the "preliminary artificial intelligence" module of the course, the opening of the module is still not optimistic.

5. Conclusion

In view of the current situation, this paper makes a prospect for the future of artificial intelligence. The traditional classroom teaching mode must be surpassed by the teaching mode under the network environment. In this situation, the design of the artificial intelligence hybrid teaching mode that meets the requirements of the subject can be accepted by the majority of learners. The teaching mode proposed in this paper has its own limitations as all other teaching modes. This teaching mode requires teachers to be familiar with and master the latest teaching methods. This paper only puts forward the teaching mode of students' AI course and designs the application for the specific teaching content, but it is not verified in the actual teaching. The next step can be used in the actual teaching, enriching and improving the proposed hybrid teaching mode of high school AI course.

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