Research Article

College English Reading Teaching Integrating Production Oriented Approach from the Perspective of Artificial Intelligence

Xi Wang¹ and Ke Yan²

¹School of Foreign Languages and International Education, Chengdu Technological University, Chengdu 611730, Sichuan, China
²Department of Public Teaching, Nanyang Medical College, Nanyang 473000, Henan, China

Correspondence should be addressed to Ke Yan; 2016102005@stu.gzucm.edu.cn

Received 21 February 2022; Revised 10 March 2022; Accepted 15 March 2022; Published 24 June 2022

The objectives are to solve many problems in traditional English reading teaching, such as the passive acceptance of students’ learning situation, the rigid teaching mode of teachers and the difficulty in taking into account the individual needs of each student, and the forced averaging of students’ English learning ability and level. Firstly, a detection method of English reading level based on the Backpropagation neural network (BPNN) is designed. Secondly, the teaching process and specific teaching plan are designed with the Production Oriented Approach (POA). Finally, the detection method of English reading level is verified by simulation experiments, and the effect of the teaching method integrating POA is analyzed. The results show that (1) when the learning rate is 0.26 and the training time is 1000 times, the mean square error (MSE) of the model is the smallest. (2) The results of the practical experiment indicate that the number of people who sign up for the college English proficiency test, the number of actual exams, and the pass rate of the test in the experimental group using the teaching method are higher than those in the control group. Moreover, the number of people in the experimental group increased more than that in the control group after the experiment. There is no significant difference in the test results of the two groups before the experiment, and the average test scores of the experimental group are obviously higher than those of the control group after the experiment. The p value of the two groups of results is less than 0.05 in the t-test, indicating that there is a significant difference in the English reading level between the two groups after the experiment. Simultaneously, the difference between the results of class A before and after the experiment is larger than that of class B, showing that the teaching method integrating POA is more effective for students with higher English levels. Therefore, compared with the traditional teaching method, the teaching method integrating POA is more effective in improving the English reading level of college students. It aims to transform POA theory into practice and provide a great reference for college English reading teaching.

1. Introduction

The requirements of college English teaching courses emphasize that on the basis of developing students’ comprehensive language ability, they should focus on improving students’ ability to acquire information, process information, analyze problems and solve problems in English [1]. In the current era of mature wireless networks and abundant electronic resources, new teaching theories and methods that conform to the characteristics of the times have been gradually put forward. The concept teaching method advocates that teaching starts from concepts and allows students to discover the differences between different language systems through conscious comparative analysis [2]. The task-based teaching method is based on system functional linguistics and organizes teaching by designing tasks, emphasizing “learning by doing” [3]. The presentation, assimilation, and discussion (PAD) teaching method retains the lecture style teaching method and absorbs the core concept of cooperative learning, which increases the proportion of discussion in the classroom [4]. The Production Oriented Approach (POA) is an effective way to solve the problem of separation of theory and practice in the process of teaching.
Zhou pointed out that the POA is a teaching theory based on the output-driven hypothesis. In the whole teaching process, the teacher is the center, promoting the development and implementation of the whole teaching activities. By adopting the POA in the teaching process, teachers can reconstruct traditional classroom teaching, better solve the problems existing in traditional college English courses, and further implement a student-centered teaching model [5]. Wang proposed the POA theory of combining learning and application in foreign language teaching in view of the current situation of separation of learning and application in foreign language teaching in China. The theory takes the unit task with potential communicative value as the teaching goal. Under the guidance of the teacher, the students selectively learn the input materials and finally achieve the effective output and complete the communicative task. It was found through research that this method can effectively stimulate students' enthusiasm for learning and creative willingness [6]. Zhang proposed that the POA with effective learning as the core was put forward to address the problems of text centralization, separation of learning and use, and "dumb English" in Chinese English classroom teaching. This study applied POA to college English classroom teaching to examine its impact on students' English learning and to explore its implications for English teaching [7]. Xie surveyed 172 students from English majors and non-English majors to investigate their needs for POA and their perceptions of strategies for the effective implementation of a business English program at a university in China. The research results indicated that the application of POA theory was of great significance for the reform and theoretical development of business English teaching in Chinese universities and for further innovation and improvement of the teaching process in other cultural and educational contexts [8].

With the breakthrough and development of wireless networks and artificial intelligence (AI), rich extracurricular teaching resources have optimized the quality of classroom reading materials, and the combination of offline and online teaching methods has broken through the limitations of time and space and improved learning efficiency. AI technology can track and record the trajectory of college students' English learning and use new technologies such as data mining, regression prediction, and correlation analysis to generate an English learning database, summarize the laws of college students' English learning, and analyze the personalized learning characteristics of each student [9]. In the process of the development of POA theory, the theoretical assumptions for college English teaching problems are applied to teaching practice, which is not only expected to improve the effect of college English teaching but also can help the development of the theory.

2. Methods

2.1. POA. POA is a new foreign language teaching theory constructed by Chinese scholars. The purpose is to solve the problem of "separation of learning and application" in college English. It has undergone several revisions and has been perfected by the cycle of theory-practice-interpretation [10]. The teaching operation process of this system is based on the original input and output theory and advocates the division of labor and cooperation between teachers and students in English learning [11]. The related research on POA mainly focuses on college students, among which the undergraduates as the research object account for about 88% of the available research literature, which is in line with the requirements of the theory for middle-level and high-level learners [12]. The POA theory creation team of the International Language and Education Research Center of Beijing Foreign Studies University, China, has carried out a lot of teaching practice in major universities in China and has achieved fruitful research results. The textbook compilation mode of "two-wheel drive of teaching theory-action research" is proposed. The basic idea and teaching effect of the "processed" language promotion links are designed. Based on multiple rounds of reflective teaching practice, the principle of evaluation focus and the specific method of "promoting learning through evaluation" are determined [13–15]. In recent years, with the active international cooperation of the team, POA has gradually exerted an international influence and has been the subject of keynote reports in academic seminars many times.

POA is a new teaching theory proposed for middle and high-level foreign language learners to solve the problem of "separation of learning and application" in foreign language teaching and thus improve classroom efficiency [16]. POA takes knowledge output as the teaching goal and teachers' input learning and evaluation as an intermediary as a means to guide students to combine learning and use it to achieve the effect of optimizing the classroom [17]. The POA theoretical system is divided into three parts: teaching concept, hypothesis, and process. The teaching concept is the guiding ideology, the teaching hypothesis is the theoretical support, and the teaching process is a practical way. The three stages of the teaching process are intermediated by teachers, playing a leading, designing, supporting, and other roles [18]. The theoretical system of POA is shown in Figure 1.

2.2. BPNN. BPNN is a typical representative of Artificial Neural Network (ANN) and is currently the most widely used ANN [19]. The BPNN is generated by simulating the neuron network (NN) structure of the human brain, which is a complex network composed of a large number of nodes connected to each other [20]. BPNN is a multilayer perceptron structure, which mainly contains three layers of input layer, hidden layer, and output layer [21]. The three-layer BPNN structure is shown in Figure 2.

The input layer and the output layer mainly store and transmit external information. All networks contain an input layer and an output layer. The main difference is that the number of hidden layers in the middle is different [22]. The hidden layer is not directly connected to the outside world, but its changes will have a direct impact on the relationship between the input layer and the output layer [23]. The BP algorithm includes two processes of signal forward and backpropagation in the process of learning. Forward
propagation is carried out from the input layer to the output layer. If the error between the actual output signal and the expected output signal is too large, it needs to enter the backpropagation. Backpropagation is to propagate the output error layer by layer in the direction of the input layer through the hidden layer, distribute it to all units in each layer, and adjust the weight of each unit based on the error signal obtained by each layer. The connection strength and threshold between the input layer, the output layer, and the hidden layer enable the error to gradient descent. This process is repeated continuously until the error tends to the allowable range or reaches the presupposed practice frequency, and then the learning will be terminated [24].

The BP algorithm can be implemented through the following specific processes:

1. Select the appropriate input data and target data as the sample data for training the BPNN;

2. Establish a neural network model and initialize network parameters;

3. Through the constructed network training sample data, it is automatically completed by the computer program, and the cycle is continuously repeated until the preset value is reached;

4. Complete network training, determine weights and thresholds and output the results [25]. The specific process is shown in Figure 3.

In short, the BP algorithm can transform the signal input and output problems into nonlinear optimization problems. Combined with the gradient descent method, an iterative algorithm is used to solve the weights, and the added hidden layer nodes are used to increase the adjustable parameters of the optimization problem. The optimal solution can be obtained [26].

---

**Figure 1:** The theoretical system of POA.

**Figure 2:** The three-layer BPNN structure.
2.3. A Detection Method of English Reading Level Based on BPNN. A detection method of English reading level based on BPNN is designed, and it is used as one of the evaluation methods to carry out the teaching practice experiment integrating POA. The overall design of the method is shown in Figure 4.

The data is divided into two categories: student behavior data during online teaching and online reading test results. The former is subdivided into the downloads of courseware during online learning, video viewing, the number of operations during video viewing, the check-in situation of live interactive classrooms, classroom participation, etc. The latter is subdivided into classroom test results, random questions, and after-school online test results. The overall design of the detection method of the English reading level based on BPNN is shown in Figure 4. Firstly, the above two types of data are preprocessed, including noise removal and outlier detection. Secondly, two BPNNs are designed to process the characteristic data of learning behavior and of online reading test results. The “learning behavior feature network” and “online reading test results feature network” are constructed, and the neural network training and parameter tuning are carried out. Finally, the stability and robustness of the model are improved by the weighted average method [12].

Feature sequences need to be designed and characterized to be converted into numeric vectors that can be fed into the model interface [27]. For the characteristics of student behavior in online teaching, the Bag of Words (BoW) model is used, which does not consider the order and only uses the frequency of words or eigenvalues in sentences as the basis [28]. After the vectorization is completed, Term Frequency-Inverse Document Frequency (TF-IDF) technique is used to weigh the features to prevent overfitting [29]. TF-IDF can be expressed as shown in the following:

\[ TF - IDF(l, id) = TF(l, id) \times IDF(l). \]  

Equation 1

TF \((l, id)\) is the frequency of the behavior feature \(l\) in the student \(id\). IDF \((l)\) is the inverse document frequency, indicating the importance of the behavior feature \(l\), and IDF \((l)\) is shown in the following:

\[ IDF(l) = \log \frac{N}{n_l + 1}. \]  

Equation 2

\(N\) represents the total number of students, and \(n_l\) means the number of students with behavioral characteristics \(l\). For the test data of the numerical class, the original data is scaled by a certain range mapping through normalized preprocessing [30].

To make the weights of the NN approximate to the real environment, the model initializes the weights and then multiplies them with random numbers and trains to obtain the approximate actual output of each layer of the network [31, 32].

\[ x(i) = f(s(i)) = f(w(i) \times x(i-1)), \]  

Equation 3

\(x(i)\) is the output value of the \(i\)th layer, \(s(i)\) is the dot product value of the output of the \(i - 1\)-th layer and the weight. \(f(s(i))\) represents the output value processed by the activation function, and \(w(i)\) is the weight of the \(i\)-th layer. The output process of the model feature network is shown in Figure 5.

In Figure 5, the learned behavior features in the original features are firstly vectorized through Bow and TF-IDF, then trained through the BPNN, and finally connected to the output unit. The designed BPNN has 23 input nodes in one input layer. The research problem is mainly the prediction of continuous values. Therefore, the Relu activation function is used for the hidden layer, and the linear activation function can be used for the output layer. The same design approach is used in the reading test results feature network.

First, the training error \(\delta_j(i)\) is calculated, as shown in the following:

\[ \delta_j(i) = f'(s_j(i)) \sum \delta_k(i+1)w_{kj}(i+1). \]  

Equation 4

\(\delta_j(i)\) is the training error of the \(j\)th neuron in the \(i\)th layer, and \(w_{kj}(i+1)\) expresses the connection weight value of the \(k\)th
neuron in the \( i \)-th layer connecting to the \( j \)-th neuron in the next layer.

Then, the weights are updated through backpropagation, and the correction of the weight value is shown in the following:

\[
\omega_{ij}^{(l)}[k + 1] = \omega_{ij}^{(l)}[k] + \eta \delta_j^{(n)} x_i^{(l-1)}.
\] (5)

\( \eta \) is the learning rate.

The training objective function is shown in the following:

\[
E = \sum \frac{1}{2} \sum (d_{ij} - y_{ij})^2,
\] (6)

\( E \) is the expected sum of errors in all training processes. \( d_{ij} \) is the expected output value of the \( j \)-th neuron in the \( i \)-th layer, and \( y_{ij} \) is the prediction error of the \( j \)-th neuron in the \( i \)-th layer.

The widely used online learning system Moodle framework is selected as the development prototype. The detection system of English reading level can be divided into three parts: learning dynamic operation module, user basic information module, and online classroom participation module, among which the learning dynamic operation module is the core of the system \cite{33}. The system obtains the predicted value close to the real result by constructing a complete operation chain, timely warns the students who are not in a good state, and optimizes the design of the subsequent courses. The structure diagram of the detection system of English reading level is shown in Figure 6.

2.4. The Practice of College English Reading Teaching with Integrated POA. It attempts to materialize POA into college English reading teaching. On the basis of the POA classroom teaching process, it refines and supplements specific content to optimize the teaching design. The objectives of optimizing the classroom teaching process with integrated POA are shown in Figure 7.

The specific practice methods of college English reading teaching are as follows:

Teaching background: The effective duration of the planned teaching experiment is two semesters, 32 study weeks, 4 classes per week, and each class is 45 minutes. Due to the impact of the epidemic, online teaching is becoming more and more common, and most comprehensive universities have established their own teaching platforms or conducted live interactive teaching through software. To unify the experimental teaching form and control the variables, it takes online teaching as the practical teaching form, and the type of online teaching platform selected by teachers is not limited.
Teaching content: Volume 3 and Volume 4 of the textbook "New Horizons College English" reading and writing course for college English.

Research object: Non-English major sophomore students are taken as the research object. They are divided into 2 A classes and 2 B classes based on the English score of 130 in the college entrance examination, with 30–35 students in each class. An experimental group and a control group are set up, and each group had a class A and a class B.

Experimental design of POA teaching: The experimental group integrates POA method teaching, and the control group adopts traditional methods of teaching. To control the variables, the English reading courses of the two groups of students are taught by the same teacher, and the teaching is carried out according to the teaching plan uniformly formulated by the Teaching and Research Office of the School of Foreign Languages. There are three differences in the teaching of the two groups. One is that the experimental class in the guided course will specifically explain the POA teaching method. The second is that the experimental group needs to improve students’ autonomy through the “driving” link. The third is that in addition to completing the chapter reading of the textbook, the experimental group also needs to carry out “promote” link learning to cultivate cross-cultural awareness. Besides, in the “promote” link, teachers choose appropriate auxiliary materials for the design of the study plan and upload them to the online teaching platform. In the “evaluation” link, the detection method of English reading proficiency based on BPNN designed above is used to evaluate the teaching results of two groups for two semesters. This part of the results can be used as a reference for optimizing the classroom process and has a learning promotion effect for students. Teachers make mutual evaluation forms, students conduct evaluations, and electronic files are made simultaneously. Teachers evaluate students’ online classroom performance. Finally, the final evaluation results are formed by the evaluation results of students’ mutual evaluation, teachers, and models in a ratio of 2:3:5.

In the reading teaching activities carried out around the 10 units of the textbook, each unit has set reading ability improvement goals and humanistic reading appreciation goals. The experimental group completed a total of 8 reading output tasks every two weeks. To reduce the difficulty, students are gradually adapted to the POA teaching mode. The output tasks of each unit are divided into different small subtasks. The details of some reading tasks are shown in Table 1.

In the reading teaching activities carried out around the 10 units of the textbook, each unit has set reading ability improvement goals and humanistic reading appreciation goals. The experimental group completed a total of 8 reading output tasks every two weeks. To reduce the difficulty, students are gradually adapted to the POA teaching mode. The output tasks of each unit are divided into different small subtasks. The details of some reading tasks are shown in Table 1.

The reading tasks are grouped by teachers in a heterogeneous way, and the teacher’s tasks are mainly arranged online and specific requirements are put forward. Taking the sixth reading task as an example, it introduces the specific implementation process of English reading teaching that integrates POA.

Driving link: First, the background of reading articles is built, and then students are guided to have a brief discussion and share to mobilize enthusiasm. Finally, the chapter articles are read, and the intragroup translation is carried out in the group as a unit. After that, the teacher will lead the reading and ask the students to try small-paragraph translation. After the chapter reading task is completed, an extracurricular reading training is carried out, and the reading task acceptance is carried out in the second reading training class.

Facilitating link: 1 short video and 3 extracurricular reading articles are prepared by the theme of the chapter as input materials, and students are guided to
Figure 8. The steps of model training are as follows:

1. The model network weight \( w \), bias term \( b \), sample iteration times \( q \), error \( E \), learning rate \( \eta \), and model training accuracy \( E_{\text{min}} \) are initialized, respectively [35]. After initialization, \( w \), \( b \), and \( \eta \) are random numbers. \( \eta \) is in the interval \([0, 1]\). \( q \) and \( E \) are 0, and \( E_{\text{min}} \) is a small positive number [36].

2. The preprocessed raw data is input into the model to calculate the result. Simultaneously, the feature vector \( L \) and the real value \( d \) are initialized, and the output layer vector is calculated.

3. The training data is set as \( n \) groups, and the model error is calculated. The error \( E_k \) of the model for the \( k \)th sample is shown in the following:

\[
E_k = \sqrt{\frac{1}{n} \sum_{k=1}^{n} (d_k - h_k)^2},
\]

where \( d_k \) is the real value of the \( k \)th sample, and \( h_k \) is the output value of the \( k \)th sample in the output layer. The total output error \( E_{\text{RME}} \) is shown in the following:

\[
E_{\text{RME}} = \sqrt{\frac{1}{n} \sum_{k=1}^{n} (E_k)^2}.
\]

Error signal of each layer is shown in the following equations:

\[
\sigma_k^0 = (d_k - h_k)h_k(1 - h_k),
\]

\[
\sigma_j^1 = \sum_{k=1}^{n} \sigma v_{j,k} y_j(1 - y_j).
\]

2.5. Design of Experiment in Practice. The postclass quiz and final grades are the most intuitive ways to reflect students’ learning and knowledge in the whole semester. Therefore, the model verification indicator is based on the scores of the online postclass quiz and the reading module in the final English test. The data includes 4 readings of different difficulty levels. The article consists of 20 objective multiple-choice questions. The model test data set is identified with the student number as the serial number, and the multidimensional data is converted into structured data and preprocessed for model training. The model algorithm flow based on BPNN is shown in Figure 8.

The steps of model training are as follows:

1. The model network weight \( w \), bias term \( b \), sample iteration times \( q \), error \( E \), learning rate \( \eta \), and model training accuracy \( E_{\text{min}} \) are initialized, respectively [35]. After initialization, \( w \), \( b \), and \( \eta \) are random numbers. \( \eta \) is in the interval \([0, 1]\). \( q \) and \( E \) are 0, and \( E_{\text{min}} \) is a small positive number [36].

2. The preprocessed raw data is input into the model to calculate the result. Simultaneously, the feature vector \( L \) and the real value \( d \) are initialized, and the output layer vector is calculated.

3. The training data is set as \( n \) groups, and the model error is calculated. The error \( E_k \) of the model for the \( k \)th sample is shown in the following:

\[
E_k = \sqrt{\frac{1}{n} \sum_{k=1}^{n} (d_k - h_k)^2},
\]

where \( d_k \) is the real value of the \( k \)th sample, and \( h_k \) is the output value of the \( k \)th sample in the output layer. The total output error \( E_{\text{RME}} \) is shown in the following:

\[
E_{\text{RME}} = \sqrt{\frac{1}{n} \sum_{k=1}^{n} (E_k)^2}.
\]

Error signal of each layer is shown in the following equations:

\[
\sigma_k^0 = (d_k - h_k)h_k(1 - h_k),
\]

\[
\sigma_j^1 = \sum_{k=1}^{n} \sigma v_{j,k} y_j(1 - y_j).
\]
Hidden * Input + Output

(13)

Figure 8: The model algorithm flow based on BPNN.

| Learning rate (%) | Mean square error | Learning rate (%) | Mean square error |
|-------------------|------------------|------------------|------------------|
| 0.00              | 103.4606         | 0.50             | 95.9588          |
| 0.02              | 99.53603         | 0.52             | 94.80389         |
| 0.04              | 96.9959          | 0.54             | 94.10976         |
| 0.06              | 94.14807         | 0.56             | 92.87686         |
| 0.08              | 90.06871         | 0.58             | 89.95014         |
| 0.10              | 92.29888         | 0.60             | 88.87154         |
| 0.12              | 91.68075         | 0.62             | 89.63971         |
| 0.14              | 90.14138         | 0.64             | 90.25357         |
| 0.16              | 88.75418         | 0.66             | 89.09745         |
| 0.18              | 87.59866         | 0.68             | 92.78915         |
| 0.20              | 87.21192         | 0.70             | 92.1727          |
| 0.22              | 86.44132         | 0.72             | 93.71009         |
| 0.24              | 85.74764         | 0.74             | 94.55518         |
| 0.26              | 83.36181         | 0.76             | 96.70645         |
| 0.28              | 85.66798         | 0.78             | 97.78139         |
| 0.30              | 86.66707         | 0.80             | 96.70356         |
| 0.32              | 88.12709         | 0.82             | 98.39526         |
| 0.34              | 89.51064         | 0.84             | 99.31757         |
| 0.36              | 91.27759         | 0.86             | 100.471          |
| 0.38              | 93.50593         | 0.90             | 101.4699         |
| 0.40              | 93.19672         | 0.92             | 102.5458         |
| 0.42              | 92.57966         | 0.94             | 103.4679         |
| 0.44              | 93.96306         | 0.96             | 104.8518         |
| 0.46              | 94.11508         | 0.98             | 106.1589         |
| 0.48              | 95.65278         | 1.00             | 107.8498         |

$N_{\text{Hidden}} = \frac{N_{\text{Input}} + N_{\text{Output}}}{2}$

Table 2: The variation of the MSE of the model test with the learning rate.

The experimental results of the teaching practice take the results of students’ mutual evaluation, teacher evaluation, and model evaluation as the final evaluation results in a ratio of 2:3:5. The independent sample t-test is analyzed for the data, and the evaluation results of the two groups of students are compared with the results before the experiment starts. The practical evaluation of the college English reading teaching mode integrating POA is carried out.

3. Results

3.1. Test Results of English Reading Level Model Using BPNN. As the learning rate increases, the MSE of the model test is shown in Table 2 and Figure 9.
As the number of iterations increases, the MSE of the model test is shown in Table 3 and Figure 10. Figure 9 indicates that when the learning rate is 0.26, the MSE of the model is the smallest. As the learning rate increases, the MSE shows a linear growth trend. Figure 10 expresses that as the number of training increases, the MSE of the model decreases. Before the number of training is 1000, the MSE of the model decreases exponentially. After the number of training is 1000, the reduction of the MSE tends to be stable, and overfitting occurs, so the optimal number of training is 1000.

3.2. Survey Results of Students Applying for College English Proficiency Test. Figure 11 shows the specific conditions of the experimental group and the control group before and after the start of the experiment for the CET-4 and CET-6 exams and their pass rates.
Figure 10: MSE changes with the number of training.

Figure 11: Survey results of students applying for college English proficiency test ((a) number of applicants; (b) number of actual exams; (c) pass rate).
In Figure 11, A1 and B1 represent the experimental group; A2 and B2 represent the control group. Before and after the experiment, the number of people who signed up for the college English proficiency test, the number of actual exams, and the pass rate of the test group in the experimental group using the teaching method are higher than those in the control group. Moreover, the increase in the number of people in the experimental group is also higher than that in the control group after the experiment. It can be seen that the designed teaching method can effectively improve the enthusiasm of students to take the test and the pass rate.

### 3.3. The Results of College English Reading Teaching Practice Integrating POA

The independent sample t-test results of the comprehensive level of English reading in the experimental group and the control group before and after the experiment are shown in Tables 4 and 5.

Tables 4 and 5 show that the comprehensive English reading level of the two groups of students has improved after the experiment. Based on the total score of the comprehensive evaluation of 100 points, there is no significant difference between the average scores of the two groups before the experiment. However, the average scores of the two groups after the experiment, the gap is 9.88, of which the average score gap of class A is 6.21, and the gap of the average score of class B is 3.67. The comprehensive level of class A improves faster under the English reading teaching mode that integrates POA. The p value of the t-test of the results before the experiment is greater than 0.05, and there is no obvious difference in the comprehensive level of English reading between the two groups. The p value of the t-test of the test results after the experiment is less than 0.05, and there is an obvious difference in the English reading level between the two groups. Therefore, compared with the traditional teaching method, the teaching method integrating POA is more effective in improving English reading ability. In the two A classes with a higher level before the experiment, the teacher’s course progressed more smoothly, the completion of students’ tasks is better, and the experimental effect is obvious. While in the two B classes with a lower level, due to the gap in individual English level, some students are not adapted to the teaching method of “combining learning with use,” the progress of the course is slow, and the completion of reading tasks of each chapter is low.

### 4. Conclusions

The traditional English reading teaching has serious test-taking thoughts, and the improvement of application ability is not paid attention. The teaching mode mainly focuses on the reading of articles in the classroom and exercises after class. Theoretical knowledge is separated from practice, focusing only on problems such as problem-solving skills. With the popularization of wireless networks and the improvement of online education, the college English reading teaching method integrating POA under the perspective of AI has broad application prospects. According to the teaching process of POA, the evaluation part is taken as a vital research module, the detection method of English reading level is designed by the BPNN, and the students' learning status and English reading level are comprehensively assessed. The theoretical practice of POA is integrated into the actual college English teaching. The experimental results indicate that the BP model has the smallest MSE when the learning rate is 0.26, which is 85.36, and the relationship between the MSE and the learning rate is linear growth. With the increase of the number of iterations, the MSE of the model gradually decreases, and the optimal number of training is 1000 times. The experimental results denote that before and after the experiment in the experimental group using the teaching method, the number of people who signed up for the college English proficiency test, the number of actual exams, and the pass rate of the test group are higher than those in the control group. Moreover, the increase in the number of people in the experimental group is also higher than that in the control group after the experiment. There is no significant difference in the test results of the two groups before the experiment, but the average test scores of the experimental group are obviously higher than those of the control group after the experiment. The p value of the t-test in the two groups is less than 0.05, indicating that there is a significant difference in the English reading level between the two groups after the experiment. Meanwhile, the difference between the results of class A before and after the experiment is larger than that of class B, showing that the teaching method integrating POA has a better teaching effect on students with higher English levels. Therefore, compared with the traditional teaching method, the teaching mode integrating POA is more effective in improving the English reading level of college students. Through the combination of AI and POA theory, the English reading teaching mode can be designed in the objective and multidimensional analysis results to evaluate the learning results during the teaching period, and simultaneously, it can accurately and quickly find problems in learning and teaching. The disadvantage is that the amount of data used is small, which makes the model still have certain errors. The feature data that the future model needs to accommodate and also needs to be expanded to make the final prediction

| Group    | Class | n  | Mean | SD   | t   | p    |
|----------|-------|----|------|------|-----|------|
| Experimental group | A1    | 32 | 85.98| 4.255| 0.384| 0.699|
|           | B1    | 30 | 72.56| 4.019|     |      |
|           | A2    | 31 | 84.22| 1.102|     |      |
|           | B2    | 32 | 73.43| 1.267|     |      |

| Group    | Class | n  | Mean | SD   | t   | p   |
|----------|-------|----|------|------|-----|-----|
| Experimental group | A1    | 32 | 92.37| 5.684|     |     |
|           | B1    | 30 | 78.33| 3.712|     |     |
|           | A2    | 31 | 86.16| 2.524| 1.345| 0.032|
|           | B2    | 32 | 74.66| 3.563|     |     |
structure closer to the true value. The teaching practice of POA theory also needs more long-term research and practice to adjust. It aims to transform POA theory into practice and provide a reference for college English reading teaching.

Data Availability

The data used to support the findings of this study are included within the article.

Conflicts of Interest

All the authors do not have any possible conflicts of interest.

Acknowledgments

This work was supported by Chengdu Technological University, research on construction of multi-dimensional teaching resources for online and offline hybrid courses of the glimpse of the Belt and Road under the background of integration of enterprises with vocational schools and universities (Project No. 20211103). This work was supported by Chengdu Technological University, research on design and practice of flipped classroom teaching model of College English based on WeChat public platform (Project No. 20210802).

References

[1] Y. Li, “The application of cloud computing-assisted teaching in the reform of teaching in higher education courses,” Journal of International Education and Development, vol. 5, no. 6, pp. 63–67, 2021.
[2] P. Thote and S. Gowri, “Evidence based learning: an analysis of impact of teacher’s design model on conceptual understanding,” International Journal of Regulation and Governance, vol. 9, no. 3, pp. 71–77, 2021.
[3] Y. D. Permatasari, T. Nurhidayati, and M. N. Rofiq, “The task-based language teaching as method in google classroom application for English learning approach,” IOP Conference Series: Earth and Environmental Science, vol. 747, no. 1, Article ID 012052, 2021.
[4] L. Ling, F. Feng, and Q. Sun, “Bisection class: a new model on classroom teaching reform in the innovation era,” Bulletin of Sport Science & Technology, vol. 27, no. 1, pp. 11–14, 2019.
[5] W. Zhou, “The application of production-oriented approach in college English teaching,” Journal of Frontiers of Society, Science and Technology, vol. 1, no. 3, pp. 112–114, 2021.
[6] X. Wang, “Research on construction of advanced English teaching based on production-oriented approach,” Theory and Practice in Language Studies, vol. 12, no. 2, pp. 337–341, 2022.
[7] H. Zhang, “Application of production-oriented approach in college English instruction in China: a case study,” English Language Teaching, vol. 13, no. 10, p. 14, 2020.
[8] Q. Xie, “Using production-oriented approach in business English courses: perceptions of China’s English-major and non-English-major undergraduates,” Sage Open, vol. 11, no. 2, Article ID 215824402110165, 2021.
[9] H. Wenning, “Simulation of English teaching quality evaluation model based on Gaussian process machine learning,” Journal of Intelligent and Fuzzy Systems, vol. 40, no. 2, pp. 2373–2383, 2021.
[10] B. Wang, J. Wang, F. Zhang et al., “Effects of biofeedback combined with pilates training on post-prostatectomy incontinence,” Urology, vol. 155, no. 6, pp. 152–159, 2021.
[11] L. Sun and A. Asmawi, “A literature review of studies on Production-oriented approach (POA) in China,” International Journal of Linguistics, Literature and Translation, vol. 4, no. 6, pp. 74–81, 2021.
[12] H. Sun and P. Shi, “Enlightenment of POA to integrated English teaching—a case study of USST English majors,” English Teaching in China and the United States, vol. 16, no. 11, pp. 452–456, 2019.
[13] M. G. Baye, M. A. Ayele, and T. E. Wondimuneh, “Implementing GeoGebra integrated with multi-teaching approaches guided by the APOS theory to enhance students’ conceptual understanding of limit in Ethiopian Universities,” Helijyon, vol. 7, no. 5, Article ID e07012, 2021.
[14] S. Huang, “Design and development of educational robot teaching resources using artificial intelligence technology,” International Journal of Emerging Technologies in Learning, vol. 16, no. 05, p. 116, 2021.
[15] S. Pu and H. Xu, “Examining changing assessment practices in online teaching: a multiple-case study of EFL school teachers in China,” The Asia-Pacific Education Researcher, vol. 30, no. 6, pp. 553–561, 2021.
[16] X. Chang, “An integrated model of teaching theory and action research in POA-based textbook writing,” Chinese Journal of Applied Linguistics, vol. 43, no. 3, pp. 359–372, 2020.
[17] F. Li and X. Li, “On the Practice of college English reading and writing course from the perspective of POA theory,” Open Journal of Modern Linguistics, vol. 10, no. 05, pp. 560–568, 2020.
[18] Y. Wu, “The application of the POA in college English teaching,” Open Journal of Modern Linguistics, vol. 10, no. 01, pp. 70–81, 2020.
[19] T. Li, J. Sun, and L. Wang, “An intelligent optimization method of motion management system based on BP neural network,” Neural Computing & Applications, vol. 33, no. 2, pp. 707–722, 2021.
[20] J. Wang, P. Shi, P. Jiang et al., “Application of BP neural network algorithm in traditional hydrological model for flood forecasting,” Water, vol. 9, no. 1, p. 48, 2017.
[21] B. Wu, S. Han, J. Xiao, X. Hu, and J. Fan, “Error compensation based on BP neural network for airborne laser ranging,” Optik, vol. 127, no. 8, pp. 4083–4088, 2016.
[22] Y. C. Lin, D. D. Chen, M. S. Chen, X. M. Chen, and J. Li, “A precise BP neural network-based online model predictive control strategy for the forging hydraulic press machine,” Neural Computing & Applications, vol. 29, no. 9, pp. 585–596, 2018.
[23] J. Liu, X. Jin, F. Dong, L. He, and H. Liu, “Fading channel modelling using single-hidden layer feedforward neural networks,” Multidimensional Systems and Signal Processing, vol. 28, no. 3, pp. 885–903, 2017.
[24] Y. Lv, W. Liu, Z. Wang, and Z. Zhang, “WSN localization technology based on hybrid GA-POSO-BP algorithm for indoor three-dimensional space,” Wireless Personal Communications, vol. 114, no. 1, pp. 167–184, 2020.
[25] X. Zhang, P. Yang, C. Tan, and W. Ying, “BP algorithm for the multireceiver SAS,” IET Radar, Sonar & Navigation, vol. 13, no. 5, pp. 830–838, 2019.
[26] Z. Zhao, Q. Xu, and M. Jia, “Improved shuffled frog leaping algorithm-based BP neural network and its application in...
bearing early fault diagnosis,” *Neural Computing & Applications*, vol. 27, no. 2, pp. 375–385, 2016.

[27] S. Soltani and R. Budiarto, “Developing software signature search engines using paragraph vector model: a triage approach for digital forensics,” *IEEE Access*, vol. 9, no. 2, pp. 55814–55832, 2021.

[28] R. A. Bhuiyan, S. Tarek, and H. Tian, “Enhanced bag-of-words representation for human activity recognition using mobile sensor data,” *Signal Image and Video Processing*, vol. 15, no. 8, pp. 1739–1746, 2021.

[29] O. Sharif and M. M. Hoque, “Classification of textual sentiment using ensemble technique,” *SN Computer Science*, vol. 3, no. 1, p. 49, 2022.

[30] T. J. Fawcett, C. S. Cooper, and R. J. Longenecker, “Machine learning, waveform preprocessing and feature extraction methods for classification of acoustic startle waveforms,” *MethodsX*, vol. 8, no. 5, Article ID 101166, 2021.

[31] S. S. Choudhury, S. N. Mohanty, and A. K. Jagadev, “Multimodal trust based recommender system with machine learning approaches for movie recommendation,” *International Journal on Information Technology*, vol. 13, no. 2, pp. 475–482, 2021.

[32] P. K. Koo, A. Majdandzic, and M. Ploenzke, “Global importance analysis: an interpretability method to quantify importance of genomic features in deep neural networks,” *PLoS Computational Biology*, vol. 17, no. 5, Article ID e1008925, 2021.

[33] U. C. Apoki, “The design of WASPEC: a fully personalised moodle system using semantic web technologies,” *Computers*, vol. 10, no. 5, p. 59, 2021.

[34] H. Rasooyar and F. R. Esfahani, “The effect of one-way and two-way jigsaw reading task on the writing performance of Iranian EFL learners,” *Language Teaching Research Quarterly*, vol. 12, no. 12, pp. 1–15, 2019.

[35] Y. Rimal, P. Pandit, and S. Gocchait, “Hyperparameter determines the best learning curve on single, multi-layer and deep neural network of student grade prediction of Pokhara university Nepal,” *Journal of Physics: Conference Series*, vol. 1804, no. 1, Article ID 012054, 2021.

[36] W. Li and T. Wang, “HELP: an LSTM-based approach to hyperparameter exploration in neural network learning,” *Neurocomputing*, vol. 442, no. 11, pp. 161–172, 2021.