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College English Teaching Model Based on Deep Learning and Artificial Intelligence

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Abstract: In the process of "artificial intelligence+education" to open a new education model, teaching concepts and learning objectives have also changed. Learning objectives have changed from superficial learning such as memorization and understanding to high-level abilities such as transfer and application, complex problem solving, reflection and evaluation. Therefore, effective use of smart classrooms to strengthen deep learning in the teaching process has become a key measure to improve the quality of talent training at present and even in the future. However, through literature review, interviews with teachers and students in smart classroom teaching, and listening in class, the author found that there are problems in classroom teaching, such as low level of cognitive ability training and low participation of students, which restrict the development of smart teaching and the effectiveness of in-depth learning. In view of this, this research adopts the experimental research method to apply the constructed smart classroom teaching model to the practical teaching of College English in Grade 2019 of A University. The experimental data were collected by the method of survey and research, and paired sample T test was conducted on the collected questionnaire data, and the analysis was conducted from the aspects of students' performance, deep learning ability, learning process, emotional experience, etc. The results show that the classroom teaching mode constructed in this study can effectively improve the course performance of college students, and students have good learning process experience and emotional experience.

1. Introduction

Artificial intelligence is a new direction of modern social progress and a new feature of rapid development of information technology. Therefore, how to effectively apply AI technology in college education has become one of the difficulties in the integrated development of AI technology and college education [1].

In order to comply with the general trend of global informatization, many countries and scholars in the world have formulated a series of strategic plans, paying great attention smart teaching environment. The famous Active Learning Classroom was designed by Suminda University (USA). It is surrounded by a 360 ° display wall made of glass. Movable round desks are placed in the classroom. A computer is placed on each desk, which can provide a suitable place for students to cooperate in groups. Many monitors are arranged in the classroom to simulate the tropical rain forest, and students can use gestures to replace traditional equipment,intuitive way to interact in the classroom [2]. Intelligent technology intelligent classroom teaching. With the support of intelligent technology, the teaching method has changed from traditional classroom teaching to mixed teaching and personalized precision teaching. Just like the intelligent teaching framework designed by IBM, its core idea is to enable learners to learn at their own pace and gain experience of growth. During the experiment, we found that the intelligent terminal devices in the smart classroom model can help children learn and develop better [3]. To this end, in order to better provide resources for learners, a series of intelligent learning platforms have been built abroad [4]. Among them, the most famous is Knowton, which can make statistics and analysis of learning data and intelligently push learning materials suitable for different students to promote students' in-depth learning [5]. The essence of innovative teaching is to reform the teaching mode, build an equal relationship between teachers and students based on wisdom and development direction, and play an important role in classroom teaching [6]. On the basis of the development stage of smart classroom, Chinese scholars proposed the advanced development of teaching mode, which can maximize the value of smart classroom teaching [7].

In the context of artificial intelligence, intelligent classroom teaching is the main teaching form in the future. Use the characteristics of deep learning to reverse design the intelligent classroom teaching mode, so that college students' learning can change from superficial learning such as memorization and understanding to high-level goals such as migration and application of deep learning, complex problem solving, reflection and evaluation, and provide teachers with referential teaching modes and methods, guide their teaching practice, help teachers effectively carry out teaching in the intelligent teaching environment, and improve the quality of classroom teaching, The purpose of this study is to improve the quality of talent training. Based on the research and analysis of the deep learning technology, this paper discusses the possibility of its application in college English teaching, and conducts a controlled experiment on the 2019 students of A University. The experimental results are analyzed.

2. Overview of Related Concepts

2.1. Basic Structure of Convolutional Neural Network

The most common processing object in computer vision is a picture. A picture is usually composed of multiple pixels. During algorithm processing, a sample picture contains multiple eigenvalues. If a linear model is established using traditional machine learning methods, combining these eigenvalues will form a large number of polynomial terms, which means a huge amount of computation [8-9]. The convolution neural network is different. Each step of two-dimensional convolution operation only acts on the local area of the image. Its output is to perceive the local area of the input image, and finally integrate this local information to obtain global information [10]. Therefore, convolutional neural network is very suitable for image classification, face recognition and object detection[11].

2.2. Convolute Layer

A group of weights acts on the local area of the input image to do dot product and sum. This group of weights is also called convolution kernel. The convolution kernel slides over the entire input image, traverses all positions of the image, calculates the sum result of dot product of all spatial pixel points, and produces an output mapping [12]. The convolution kernel will fully expand the input depth. For example, for an input RGB image, its size is 32 × thirty-two × 3, then the depth of the convolution kernel acting on the input image must be 3. The convolution operation is to multiply and sum the elements at each position of the convolution kernel and the pixel values of the corresponding image area, and its definition is shown in the formula [13]:

$$y_{mn} = f(\sum_{i}^{P-1}\sum_{j}^{Q-1} x_{m+i,n+j} w_{ij} + b), 0 \le m \le M, 0 \le n \le N \tag{1}$$

The size is P * Q, the weight at (i, j) is Wij, the size of the pixel value of the two-dimensional input data at (m+i, n+j) is x, b is the weight, M and N represent output of the convolution is ymn [14].

In practice, multiple convolution kernels are usually used, and each convolution kernel can obtain a special pattern or concept from the input. The convolution layer is the superposition of the maps obtained by applying these convolution cores to the input image [15].

When the convolution kernel is sliding in space, the pixel of each sliding is called the step size, and the space size of the output convolution layer is:

$$O = (N - F) / S + 1 \tag{2}$$

In the formula, N represents the input size of the convolution layer, F represents the size of the convolution kernel, and s represents the step size. In practical operation, sometimes the boundary of two-dimensional input data is filled with zero to ensure the resolution of the output of the convolution layer. Otherwise, after several convolution layers, the output will shrink rapidly, resulting in the loss of a lot of useful information [16].

2.3. Batch Normalization

In the training process of convolutional neural network, because the distribution of input data and output data in each layer of the network is different, the network needs to constantly learn different data distribution. The deeper the network layer overall distribution will be close to the upper and lower limits of the activation function. It is easy to have the problem of gradient disappearance when the network is back propagating. To solve this problem, an additional layer is usually added after the convolution layer or full connection layer of the neural network, so that the mean value of the activation value is 0 and the variance is 1. This layer is called the Batch Normalization Layer (BN) [17]. This is to force the data to conform to the standard normal distribution, so that the slight change of the weight matrix has little impact on the loss function, which can ease the gradient dispersion, thus reducing the difficulty of training. The specific operations are as follows. First, normalize the dat[18]:

$$\hat{x}^{(k)} = \frac{x^{(k)} - E[x^{(k)}]}{\sqrt{Var[x^{(k)}]}} \tag{3}$$

Where $x^{(k)}$ represents the k-th dimension of BN level input data, where the mean and variance are calculated from small batch data during training.

3. Design of College English Teaching Model Based on Deep Learning and Artificial Intelligence

3.1. Experimental Design

This experiment uses paired verify scores and deep learning abilities of the same group of students before and after the smart classroom teaching mode. This experiment needs to strictly control variables such as teaching environment, teaching content and teaching methods, and also needs to avoid the interference of experimental data caused by different teachers and different class numbers. Therefore, this study does not set up a control group, but adopts a single group of pre and post tests to reduce the error of the experiment. This section designs the teaching practice of the smart classroom teaching mode from the aspects of experiment purpose, experiment hypothesis, experiment object, experiment process, etc., which will be described in detail below.

3.2. Test Objects

The experimental subjects selected in this study are the second year undergraduate students of English major in University A, Grade 2019. The experimental course is College English. There are 52 students in this class.Gradually mature psychology, a wide range of learning knowledge, and the ability to think independently.

3.3. Experimental Tools

In order to have a detailed and comprehensive understanding of students' learning in the intelligent process deep learning, the experimental data of this study is mainly collected from the following aspects: the first is to analyze the changes in the learning process, the second is results, including the changes in students' grades, deep learning ability and emotional changes. Because the case selected in this study is the chapter "Multimedia Teaching Resource Design Theory" in the fourth chapter of the course, the examination of the course is different from the final examination of ordinary courses. The course is based on the students' works as the final score, so the change of students' performance is evaluated through work analysis, and the change of in-depth learning ability and learning style is evaluated through in-depth learning ability questionnaire and process questionnaire, The emotional experience of students in the smart classroom teaching mode is evaluated through feedback questionnaires and interviews with teachers and students. In addition, the author, as the assistant teacher of teaching experiment, will carefully observe the state of classroom learning in each class. While assisting the teacher to complete some teaching tasks, he can also observe the implementation of each stage of the course in real time, as well as the students' learning state and progress, in order to eliminate other factors that interfere with the teaching experiment, so as to ensure the objectivity and accuracy of the teaching experiment.

4. Analysis of Experimental Results

4.1. Distribution of Scores before the Experiment

As shown in Figure 1, the students in this class are relatively ideal in terms of English performance, and the room for improvement is not particularly sufficient. However, the performance can be improved, which further indicates that the teaching effect under this mode is excellent.

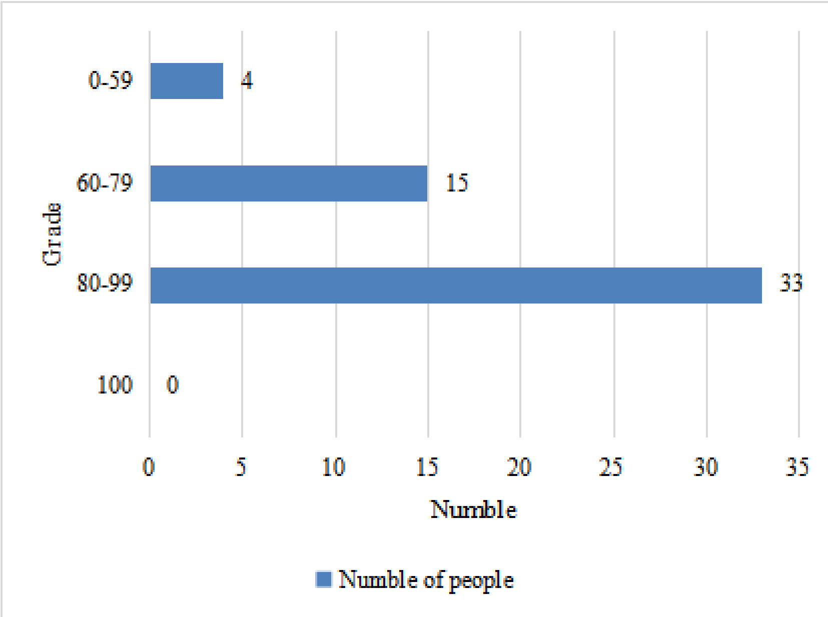

Figure 1. Statistics of pre class tests

4.2. Score Comparison Before and After Teaching

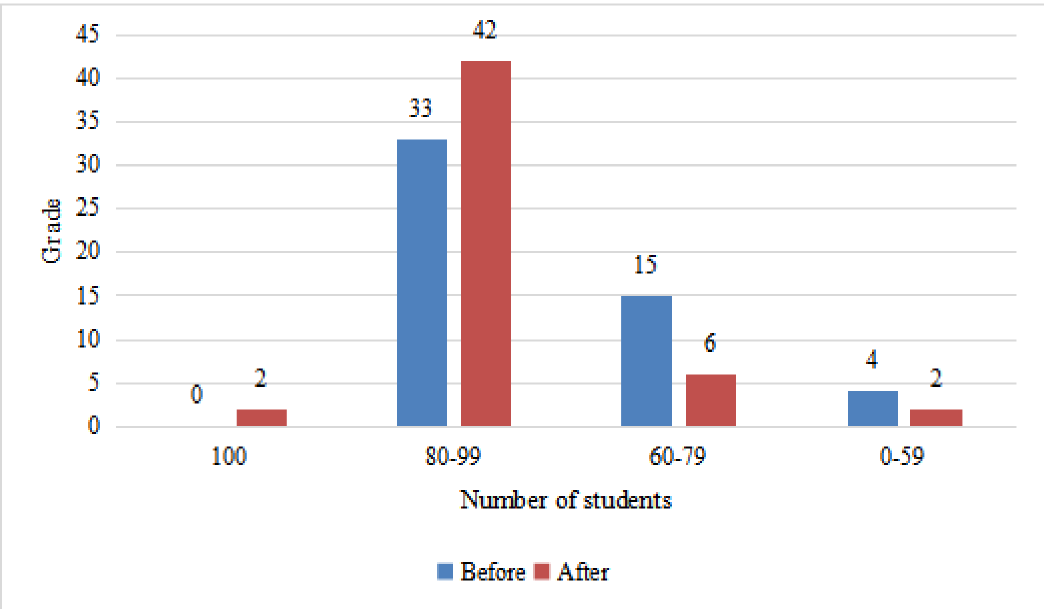

Figure 2. Comparison of grades before and after the course

There are 52 students in the class. It can be seen from the figure that these data can fully show that the excellent rate is much higher than the excellent rate of pre-test results, and the overall post test results are greatly improved. This can prove the effectiveness of the smart classroom teaching mode from the perspective of knowledge acquisition, which is conducive to improving students' performance, effectively transferring the learned knowledge, improving the ability of cognitive dimension, promoting the mastery of knowledge, and significantly improving the learning effect.

4.3. Student Emotion Analysis

The satisfaction of course teaching is set from the aspects of content setting, teaching form, class hour arrangement, activity design, test difficulty, evaluation criteria, etc. According to the statistical results, as shown in Table 1, most students are satisfied with this course teaching. The satisfaction of course teachers is set in terms of teachers' teaching ability, teaching quality, teaching style and teaching mode. According to the statistical results, more than 85% of students are satisfied with the Superstar Learning Platform.

Table 1. Satisfaction statistics

Option	Extremely dissatisfied	Dissatisfied	Commonly	Quite satisfied	Very satisfied	Average
Teaching form	0	0	6	30	18	4.22
Teaching hours	0	1	6	29	18	4.19
Activity design	0	0	7	26	21	4.26
Test difficulty	0	1	5	28	20	4.24
Evaluation criterion	1	1	9	27	16	4.04
Teachers' ability	0	0	2	23	29	4.5
Teaching quality	0	0	3	20	31	4.52

Considering all factors, the total number of students who are relatively satisfied and very satisfied exceeds 90%.

Table 2. Statistics of overall satisfaction with teaching quality

Option	Total	Proportion
Extremely dissatisfied	0	0
Dissatisfied	0	0
Commonly	4	7.41%
Quite satisfied	26	48.15%
Very satisfied	24	44.44%

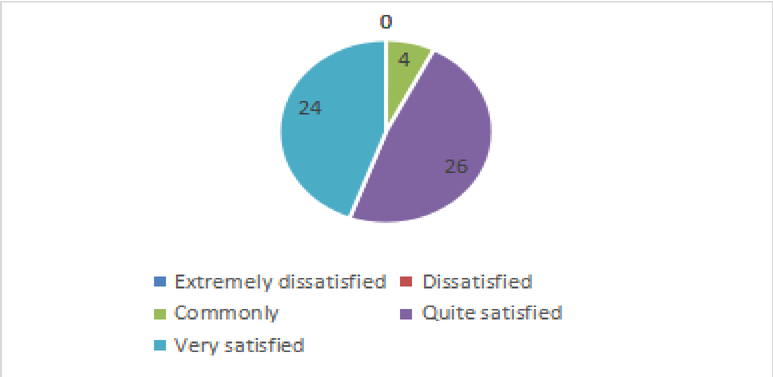

Figure 3. Statistics of overall satisfaction with teaching quality

5. Conclusion

Smart classroom teaching is the latest educational form of educational informatization, which supports the occurrence of deep learning. Deep learning can also optimize smart teaching. Smart classroom teaching has natural advantages in promoting deep learning. The development of smart classroom teaching needs to be guided by in-depth learning, and the research on in-depth learning should be based on specific smart classroom teaching practice. This research combines in-depth learning technology with smart classroom teaching, aims to promote learning, and combines theory with practice. With the support of smart learning environment, this research has realized the transformation from teaching students knowledge to cultivating students' ability, trying to provide reference for subsequent relevant theoretical research and practical research.

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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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