Research and Analysis of Students' English Learning Effectiveness in the Context of Big Data Computing

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Abstract. Higher vocational students are the main body of educational and teaching activities in higher vocational schools, and psychological factors are important factors affecting the effectiveness of students' independent engagement in learning. Many vocational school students cannot hear well in class, cannot do their homework independently after class, and most of them have little interest in learning and lack learning goals. From a psychological perspective, we encourage higher vocational students to use their positive strengths to overcome mental health problems, emphasize teachers' use of positive qualities and potential to invest in teaching, including treating higher vocational students with a more positive attitude, increasing students' positive learning potential, building their own self-confidence in learning English, and increasing their sense of well-being in life.

Keywords: Psychological Perspective · Higher Education Students · English Learning · Teaching Strategies

1 Introduction

In today's world, as communication between countries becomes more frequent and the trend of globalization becomes more pronounced, English has become the most widely spoken language in the world, has become an important means of economic, cultural and technological exchange between China and abroad, and is playing an indispensable role in building a common future community for humanity. Therefore, high-level English speakers can not only contribute to the overall development of the country and society, but also become a powerful force for the integration of the world economy; therefore, English courses show a unique value that cannot be replaced by other disciplines [1]. In higher vocational education, English courses, as continuous courses, are an important part of training advanced English professionals. English courses should not only provide a good foundation for language learning,but should also focus on improving practical language skills [2].

2 Applicability Analysis of BP Neural Network Application Evaluation

2.1 BP Neural Network Algorithm Theory

BP (Back Propagation) neural network is a multilayer feed-forward neural network that continuously trains the error backwards and belongs to the most used neural network models [3] (Fig. 1).

According to the universal approximation theorem, a continuous function for a closed interval can be fitted by a BP neural network even if there is only one implicit layer [4]. These three layers are the input layer (I), the implicit layer (H) and the output layer (O), as shown in Fig. 2 below.

$$h = \sqrt{m+n} + a$$

where h denotes the number of nodes in the implicit layer, m denotes the number of nodes in the input layer, n denotes the number of nodes in the output layer, and a denotes a regulation constant between 1 and 10.

BP neural network works in two processes: one is the sample signal forward transmission process [5]. Assume that the input node x_i with the output node y_j there is a connection between the weights of w_{ij}, nodes y_j the threshold value of b_j, The equations from the input layer to the output layer are shown [6]:

$$S_j = \sum_{n=0}^{m-1} w_{ij} x_i + b_j$$

$$y_j = f(S_j)$$

where $f(x)$ denotes the activation function. In BP neural networks, where the input has no threshold, the activation function usually has three choices: a sigmoid function, or a step function, or a RELU function.

The second process is the reverse transmission process of the error signal. Assuming that the values of each node in the final output layer have been obtained after the forward operation $A(Y_1, Y_2, Y_3)$, after the least squares method the error can be derived as:

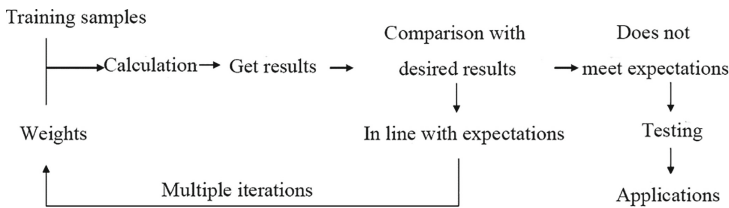$$E(w, b) = \frac{1}{2} \sum_{j=0}^{n-1} (Y_j - y_j)^2$$

Training samples

Calculation → Get results →   Comparison with   Does not
                              desired results → meet expectations

Weights   In line with expectations   Testing

        Multiple iterations   Applications

Fig. 1. BP neural network logic diagram

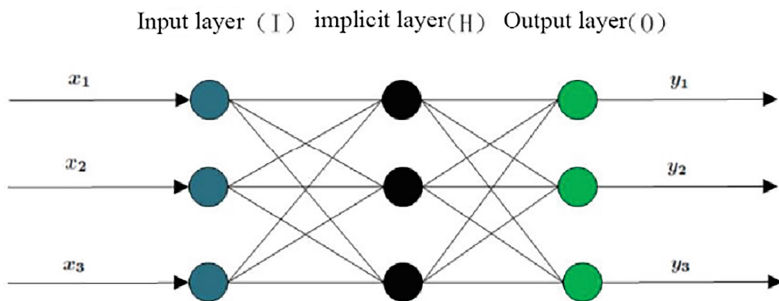Input layer (I) implicit layer(H) Output layer(O)

Fig. 2. Basic structure of BP neural network

3 Survey on the Current Situation of English Learning of Higher Vocational Students

3.1 Data Acquisition

A total of 400 questionnaires were distributed and 387 questionnaires were collected. Therefore, the content needs to be analyzed twice before and after in the analysis process, not just from the pre-test analysis of the English thinking ability status of the senior students (Table 1).

Reliability Analysis.
Quantitative data can visualize whether the results of the number of questionnaires are credible, in the SPS software, among the reliability analysis, through a technical test of internal reliability (Table 2).

Cronbach's coefficient to assess the reliability of the data is greater than 0.8, indicating that the questionnaire has high reliability, between 0.7 and 0.8 reliability is higher, while in 0.6 to 0.7 reliability is acceptable, if less than 0.6 reliability is lower, by concluding that the strength coefficient among the standard items is greater than 0.9, indicating that the study has high credibility and is based on continued research.

Table 1. List of questionnaires distributed and collected

Number of questionnaires distributed	Number of questionnaires returned	Number of valid questionnaires	Recovery rate	Efficient
400	387	385	95.75%	96.25%

Table 2. Coefficient statistics results

Sample size	Cronbach's Alpha	Standardization Project Cronbach's Alpha
385	0.983	0.983

Table 3. Reliability coefficients

Cronbach's Alpha	First half	**Numerical value**	**0.964**
		Number of projects	12a
	Second half	Numerical value	0.967
		Number of projects	12b
	Total number of projects		24
Coefficient values of front and back parts			0.958
Spearman-Brown	Equal length		0.978
	unequal length		0.978
Guttman Split-Half Coefficient			0.078

The analysis of the fold-half reliability coefficient is greater than 0.9 proves that the data reliability of the study is of high quality and can be further analyzed (Table 3).

Survey of English Learning Attitude.

In the survey about the importance of the current situation of English learning of higher vocational students in school teaching and research groups, the evaluation of
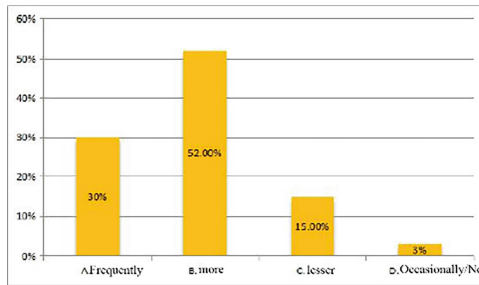

Fig. 3. Illustration of the development of English learning attitudes of higher vocational students.
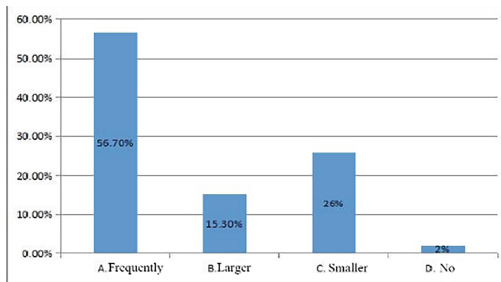

Fig. 4. Example of whether attitude change in English classroom learning helps improve student achievement.

higher vocational English teachers is different, and many of them may not have dabbled in this content, therefore, teaching about learning attitude change is more common among the factors to improve teaching ability, but the cultivation of students' learning attitude change is rarely mentioned by teachers in English teaching (e.g. Figure 3 and 4).

Regarding whether the teaching mode of English classroom English learning status helps to improve students' performance, 56.7% of senior English teachers think it is very much related; 15.3% think it is more related; 26% think it is less related and 2% think it is not related. This is mainly related to whether the teachers' teaching and research groups hold frequent summary meetings and whether they focus on the current teaching model of English learning in the English classroom.

4   Conclusion

In the cultivation of English learning attitudes, the English discipline has been exploring ways to improve the migration ability of higher vocational students, and the reasons for the problems of the concept being formal and neglecting the cultivation of English lie mainly in the following aspects: One is that the teaching in higher education focuses on skill-based education, English, as a professional basic course, is not paid attention to in the higher education stage, and teachers lack effective orientation to the subjects they lead.

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