Construction of English Translation Practice Teaching Mode Based on Deep Learning Model

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Abstract: Translation practice teaching occupies an important position in English teaching, but there are still many problems in the construction of the current English translation practice teaching mode. Guided by deep learning models and artificial intelligence, this research analyses the current problems of students' translation learning and teachers' teaching methods, and constructs English translation practice teaching strategies under the deep learning theory. Through classroom observation and questionnaire survey of college English teachers and students, as well as vocabulary detection and interviews with students, it is found that teachers neglect students' subject status and the cultivation of students' thinking ability in translation practice teaching. Teachers still use traditional teaching methods for the teaching of English translation mode, which leads to the shallow learning of students to a certain extent. Therefore, this paper further designs an English intelligent translation practice teaching assistant system, which can display various functions such as text, audio, images, and applies the English intelligent translation practice teaching assistant system in English translation practice teaching. Through comparison, it was found that with the statistics of the pre-test translation scores of the students in the experimental group and the control group (t=-1.9, p=0.064>0.05), the total number of translation errors (t=0.682, p=0.497>0.05), the post-test experimental group and control group students' post-test translation scores (t=0.036, p=0.036<0.05), and the total number of translation errors in the post-test experimental group (t=-2.88, p=0.005<0.05), there was a significant difference between the experimental group and the control group. The English translation practice teaching model constructed in this study can not only help to improve teaching efficiency, but also help students to consolidate English vocabulary.

1. Introduction

It is not only a national policy requirement but also the characteristics of college students themselves and the teaching status of colleges and universities for college students to learn English translation, showing that translation practice teaching is not paid much attention to. Therefore, specific measures are needed to change the attitudes of teachers and students towards translation

practice teaching, improve the efficiency of translation practice teaching, and then improve the status of translation practice teaching. Therefore, it is necessary to construct an English translation practice teaching mode.

This research not only has theoretical value, but also has practical value. Exploring the blended teaching mode of the deep learning model classroom makes it richer and more perfect, which is conducive to expanding the theoretical research of English classroom teaching. Meanwhile, it can also provide theoretical reference for the application of this blended teaching model in other subjects at the university level. In addition, from the practical perspective, English translation blended with teaching model of deep learning model and artificial intelligence classroom can promote teachers to change traditional teaching concepts. Active exploration and innovation of teaching methods of English translation is also conducive to the communication and interaction between teachers and students in order to achieve the organic unity of teaching and learning and provide experience and inspiration for more front-line English teachers to apply this blended teaching model.

2. Related Work

Translation practice teaching is of great significance in improving students' core literacy of English subjects. It can effectively help students understand and master not only the humanistic and scientific knowledge contained in English but also Chinese and foreign excellent cultures, which promotes the development of students' self-learning awareness and error-correcting ability. Trace believed that the prospects and challenges of information management in the humanities had attracted great attention and interest. Research libraries and archives, as well as groups from the humanities, are providing strong support for information management practices, including helping humanities scholars use appropriate digital technologies in ways that are sensitive to discipline-based cultures and practices. However, significant obstacles hinder this work, mainly because the infrastructure (services, tools, and collaborative networks) to support academic information management is still under development [1]. Fabiana considered that descriptive cross-sectional studies could be divided into: translation of the original instrument into Brazilian-Portuguese by two independent translators; construction of a consensus version based on the two translations; two independent English back-translations of the consensus version [2]. Zhou S believed that in this new era, learners were faced with two major problems -- information overload and knowledge fragmentation [3]. Li L believed that with the continuous advancement of globalization, English translation became more and more important as a medium for direct communication with the outside world. He first analyzed the problems existing in traditional English translation practice teaching, and proposed an innovative CLP teaching mode according to the characteristics of the Internet+ era. He also used a binary discrete choice model to verify the validity of the CLP model [4]. Their English translation practice teaching mode construction process is still not perfect. This article refers to the main viewpoints of some scholars and proposes a deep learning method to optimize the construction of English translation practice teaching mode.

Litjens G believed that deep learning algorithms have quickly become the method of choice for analyzing medical images. He discussed open challenges and directions for future research [5]. Chen Y believed that classification was one of the hottest topics in hyperspectral remote sensing. Specifically, as a deep learning architecture, stacked autoencoders aimed to obtain useful high-level features [6]. Michael considered geometric deep learning as an umbrella term for emerging techniques that attempted to generalize (structured) deep neural models to non-Euclidean domains (such as graphs and manifolds) [7]. Hou W proposed many learning-based IQA models. However, the learned mapping was difficult to be accurate enough because some information had been lost in

this irreversible conversion from verbal descriptions to numerical scores [8]. The deep learning technology proposed by them is very helpful for the construction of English translation practice teaching model, which will be explained in detail later.

3. Methods of Constructing English Translation Practice Teaching Mode

3.1 Construction of English Translation Practice Teaching Mode

Globalization and the rapid development of information technology have driven the rise of the language services industry. As a bridge connecting different countries, nations, culture, translation plays a vital role in the fields of information exchange and cultural communication. The translation major has formed a relatively complete teaching system in China's higher education system, getting rid of the teaching mechanism attached to the foreign language major. However, not only how to break out of the myth of language teaching for the newly independent translation major, but also how to establish a complete and scientific curriculum and teaching system around its own subject characteristics and talent training needs, as well as how to explore effective teaching models, had become a matter of stability and sustainability for this major.

After students have learned a certain knowledge point, homework practice is a more effective way to maintain and apply the knowledge they have learned, as well as to evaluate the students' knowledge mastery through a student's answer to the homework practice [9].

3.2 Deep Learning Model

Deep learning is actually a method of understanding, applying, analyzing, constructing and improving knowledge. Through deep learning, learners will transfer and analyze related knowledge as a whole, and then build a comprehensive knowledge system so as to improve learners' overall grasp of information and knowledge. Deep learning theory plays a vital role in guiding learners' thinking growth. All in all, deep learning is not only a learning state, but also a learning method and process, and it is also a research activity for learners to feel the fun of learning [10].

$$e = -\frac{1}{2}\sum_{i=1}^{m}(d(k) - y(k)) \tag{1}$$

In Formula 1, $d(k)$ is the expected output and $y(k)$ is the actual output.
Then the input and output values will be calculated as Formula 2 and Formula 3 [11]:

$$H_i(j) = \sum_{i=1}^{m} d(k) - b \tag{2}$$

$$H_o(j) = f(h_i(k)) \tag{3}$$

$$y_i(j) = \sum_{i=1}^{m} wd(k) - b \tag{4}$$

In Formula 4, $y_i(j)$ is the output layer input.
The partial derivative of the error function to each neuron in the output layer will be calculated as Formula 5 [12]:

$$\delta(k) = \sum_{i=1}^{m}(d(k) - y(k))(1 - y(k)) \tag{5}$$

Then the partial derivative of the error function to each neuron in the hidden layer will be calculated as Formula 6 [13]:

$$\delta_h(k) = \sum_{i=1}^{m} \beta(\delta(k))(1 - v(k)) \tag{6}$$

Modified connection weight $X_i(j)$ and threshold $F_i(j)$ can be output as Formula 7 and Formula 8:

$$X_i(j) = X_i^n(j) + \chi\delta(k) \tag{7}$$

$$F_i(j) = F_i^n(j) + \eta\varphi(j) \tag{8}$$

The whole error E can be got through Formula 9 [14]:

$$E(j) = \frac{1}{2m}\sum(d(k) - y(k))^2 \tag{9}$$

3.3 Teaching English Intelligent Translation

The intelligent teaching assistant has an integrated courseware production function that can display various media materials such as text, audio, and images. To design and produce courseware in the courseware production tool, it must be easy to operate, insert a variety of media, and save. On the whole, the intelligent teaching assistant will use the cloud storage method to save the designed courseware in the cloud, which simplifies the process of copying the courseware for teachers and facilitates the direct access of the teacher's login account at any terminal. The teaching framework of English intelligent translation is shown in Figure 1.
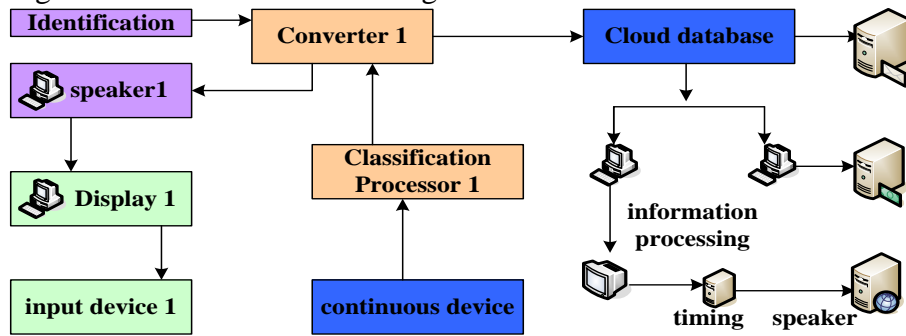

Figure 1: Teaching framework of English intelligent translation

(1) Login verification requirements: Verification to meet security requirements and user permissions.

(2) Lesson preparation requirements: Lesson preparation module needs to have the function of intelligent courseware production and audio material production. The courseware production function is to help teachers design and produce intelligent voice courseware that can display course materials in the classroom, carry out teaching activities, as well as implement random reading, which can be stored in the cloud. The function of making audio material means that teachers use English text to make monologue or dialogue-type MP3 sound files. Teachers make teaching audio materials independently in order to realize the flexibility and scalability of teaching material production.

(3) Classroom teaching needs: Classroom teaching should have functions such as random

reading in the classroom, intelligent translation evaluation, intelligent roll call, resource sharing, word bank and sentence bank. Classroom random reading can cooperate with teachers to create a standard translation input environment in the classroom. Through this function, teachers can realize the point-and-click reading of words, phrases and sentences in the classroom. The translation evaluation function is to record the pronunciation of the students and then compare it with the standard pronunciation of the system. The system will use the automatic translation evaluation function to score the students' pronunciation in real time, so as to provide timely feedback. The resource sharing and downloading function means that teachers can specify and share teaching materials such as intelligent translation courseware, and can download teaching materials from the public resource library for use in teaching. The intelligent roll call function means that the system can automatically generate a student recommendation list based on the number of times and scores students have answered questions in the past. The word library function can import key words in batches in units for word learning, spelling practice and translation evaluation and other activities. The sentence library function can realize the batch import of key sentences in units, which can be used for key sentence pattern learning, recording playback and translation evaluation and other activities.

(4) Management requirements: The English subject intelligent teaching assistant should have management requirements such as personnel management and resource management. Personnel management means that administrators can add, modify, delete and query all personnel, as well as assign all permissions of teachers. Resource management means that teacher assistants have public teaching resources for teachers to download and use, and public resources can be deleted, added or modified with administrator rights [15].

The probability of students' translation to this topic, that is, the functional relationship is expressed as Formula 10:

$$p(\beta) = c - (1-c)\frac{1}{1+e^{-D}} \tag{10}$$

Then the likelihood function can be calculated as Formula 11 [16]:

$$L(1,\ldots,N) = \prod p(\theta)(1-p(\theta)) \tag{11}$$

In Formula 11, the probability that a person with a student's ability value θ answers this question correctly is $p(\theta)$.

Deep learning model parameter estimation is as Formula 12, Formula 13, Formula 14, Formula 15 [17]:

$$S_G = (1-p)p \tag{12}$$

$$O_t = g(vs) \tag{13}$$

$$s = f(ux - ws_t) \tag{14}$$

$$r_y = g(v(ux + ws)) = g(v(ux + wf(ux_1 + ux_2))) \tag{15}$$

O_t is the output at the corresponding time. g is the activation function. The subscript t represents the corresponding time.

Their inner product is defined as Formula 16:

$$N_J\langle x, y \rangle = \langle x, y \rangle = \sum xy \tag{16}$$

Then the widely used cosine similarity can be obtained through Formula 17:

$$\cos(x, y) = \frac{\langle x, y \rangle}{\|x\| \cdot \|y\|} = \frac{\sum xy}{\sqrt{\sum x^2} \sqrt{\sum y^2}} \qquad (17)$$

3.4 Artificial Intelligence Teaching Assistance and Collaboration

(1) Synergy of reading demonstration behaviors

The English translation reading interface is shown in Figure 2. The intelligent English translation practice teaching assistant should solve the problem of English voice input and empower teachers' spoken language. First of all, the intelligent teaching assistant must have the ability of speech synthesis, which can realize the effect of clicking and reading words and sentences in the classroom, and the synthesized speech is standard, smooth, which has no machine-like rigidity. It also can be comparable to the pronunciation of real people. Secondly, the intelligent teaching assistant should have a variety of voice types, which can imitate voices of male, female and children, so as to have the ability to pronounce in multiple roles and situations. Finally, when the intelligent teaching assistant uses the point-to-read function, it should have the function of adjustable speech speed to adapt to different levels of teaching. Using intelligent teaching assistants to cooperate with English teachers to carry out teaching can solve not only the problem of insufficient and non-standard teachers' voice input by technical means, but also the problem of English voice input from the root.
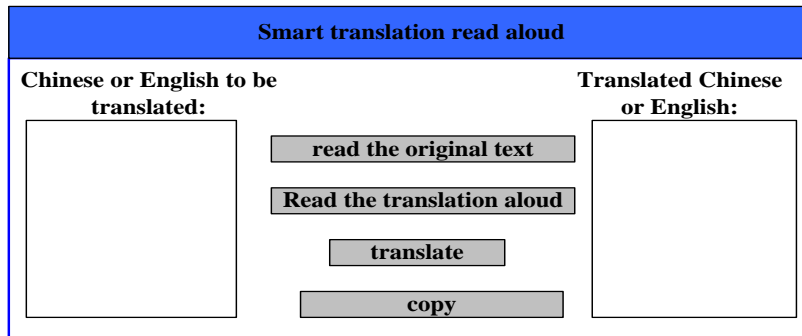

Figure 2: English translation reading interface

To measure the similarity of the two words A and B, the formula is expressed as Formula 18:

$$X(x, y) = \left| \frac{A \cap B}{A \cup B} \right| \qquad (18)$$

Their Hellinger distance is defined as Formula 19:

$$H(P, Q) = \sqrt{\sum \left(\sqrt{p} - \sqrt{q} \right)} \qquad (19)$$

Language model is a kind of algorithm or model that is specialized for word sequence distribution and saliency information statistics in the process of natural language processing. According to the language model, appropriate rules can be selected to express its content, such as predicting the content (part of speech and semantics, etc.) of the next word according to the current given word. The probability formula can be expressed as Formula 20:

$$P(w_1, w_2, \ldots, w_n) = \prod P(w_i | w_1, w_2, \ldots, w_{i-1}) \qquad (20)$$

$w_1, w_2, \ldots, w_n$ are the given words.

(2) Collaboration of classroom demonstration behavior

Based on the problems existing in the display behavior of English teaching, intelligent teaching assistants should have more advanced display methods, and pay more attention to the display of rich and vivid sounds on the basis of pictures and texts, so as to display text, voice, audio-visual and other display methods, which are organically combined. The intelligent teaching assistant must have the function of converting the Chinese and English text on the display page into standard and fluent speech, which requires it to have a powerful speech synthesis engine. In the teaching display, the text can be converted into text-to-speech in real time, and the image and text can be combined to create a teaching situation that emphasizes both image, text and sound. At this time, teachers will be freed from classroom demonstrations, making them focus on observing students and the organization and management of classrooms. They can also invest more emotional factors in teaching and hand over the areas that intelligent technology is good at to technology, in order to break the limitations of teachers and improve human beings. The uniqueness of teachers is fully reflected, which is conducive to fully exerting the advantages of intelligent technology and teachers themselves as shown in Table 1.

Table 1: Main software environment for system development

Name	Describe	Version
Development language	Java	2.0
Project Development Integrated Environment	MyEclipse	8.0
Static page development environment	Dreamweaver	8.0

To determine the structure of the new table, the user needs to make a decision on the number of columns in the table, the data type, the data type and data length of each column in the table, the constraint of the table, the index of the column, the null value of the column and the primary and foreign keys. The administrator information is shown in Table 2.

Table 2: Administrator information

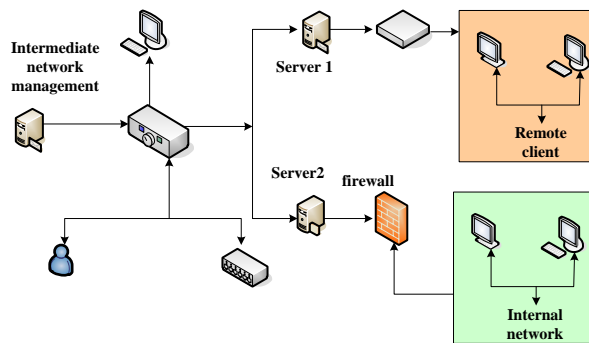| Field name	Type of data	Length
ID	Int	4
Adm in Name	Varchar	200
Password	Varchar	200

Figure 3: Automated translation of network topologies

The topology of the automated translation network is shown in Figure 3. The automatic translation evaluation function can use translation evaluation technology to automatically evaluate the standard, fluency and completeness of students' translation, as well as give quantitative scores. Automatic translation evaluation can be divided into word translation evaluation and sentence

translation evaluation. Word evaluation can import key words into the word database, and the system will automatically use the words in the word database as the text material for word evaluation. When starting the translation evaluation, you can first show the standard manuscript to the students, and the system will automatically quantify and score the students' translation, and the students' translation process can be repeatedly revised to correct the students' translation quality problems. The automatic evaluation of English sentences is basically the same as the evaluation of words. Teachers can choose to add sentences into sentences in advance, and the system will automatically use the key sentences in the sentence library as the material for translation evaluation. Through the translation evaluation function, teaching activities such as reading evaluation, expression evaluation and repetition evaluation can be carried out, so as to improve the learners' translation, speaking, listening and other abilities.

3.5 Teaching Evaluation of Intelligent System

In this study, 80 non-English major freshmen in two selected natural classes were investigated for their learning background and pre-tested for translation. Through classroom observation and questionnaire survey, the error factors of college English translation learning were analyzed. Then through the method of corpus analysis, the translation errors in the collected corpus were marked, classified and counted, and the characteristics and causes of translation errors were analyzed. Before the teaching experiment, this study also investigated the consistency of the language level of the two classes, and used the comprehensive scoring method based on the Six Four Scale to evaluate the consistency of the subjects' translation level. After that, the translation practice teaching mode based on the English intelligent translation practice teaching system was implemented in the experimental group, and the translation practice teaching mode based on the translation product was implemented in the control group to test the teaching effect of the two teaching modes.

4. Results of the Construction of English Translation Practice Teaching Mode

In the survey of function modules, random reading in class, MP3 generation in dialogue, and MP3 generation in sentences have become the three functions that experience teachers think are most helpful to teaching, while word bank and sentence bank are less helpful to teaching. The situation of translation practice teaching assistance is shown in Figure 4.
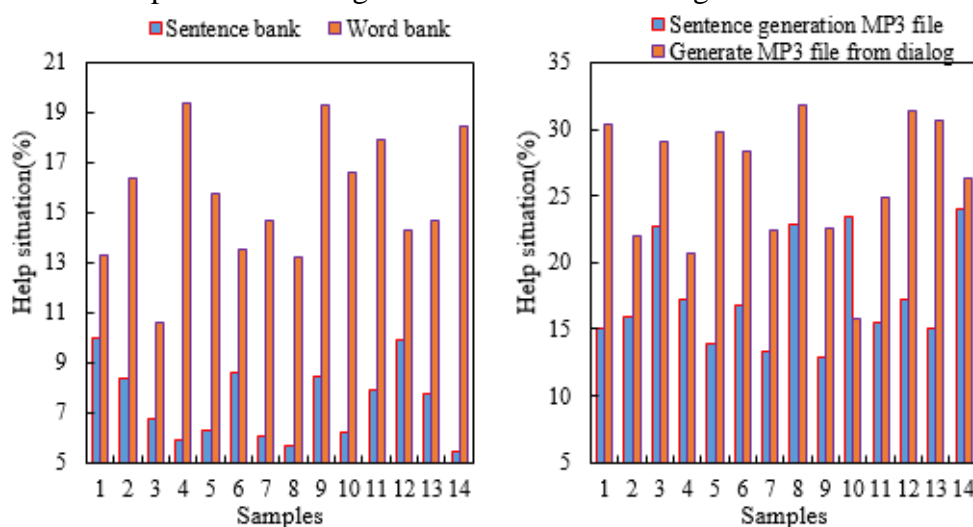

Figure 4: Translation practice teaching assistance

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Table 3: Division of translation errors

Serial number	Translation error	Language error
1	misunderstanding of the original	syntax error in target language
2	undertranslation	awkward expression
3	overtranslation	inappropriate register
4	minor deviations in translation meaning	too many literal translations

The division of translation errors is shown in Table 3. Translation errors include misinterpretation of the original text, under-translation, over-translation, slight deviations in the meaning of the translation, mistranslation due to unnoticed terminology. Linguistic errors include grammatical errors or awkward expressions in the target language, inappropriate register, excessive literal translation, excessive paraphrase, and inconsistent translation of wrong characters, inappropriate punctuation, or terminology.

The statistics of translation errors made by students are shown in Figure 5. Language errors accounted for 41.90%. Comprehension errors accounted for 32.92%. Other errors accounted for 25.18%.
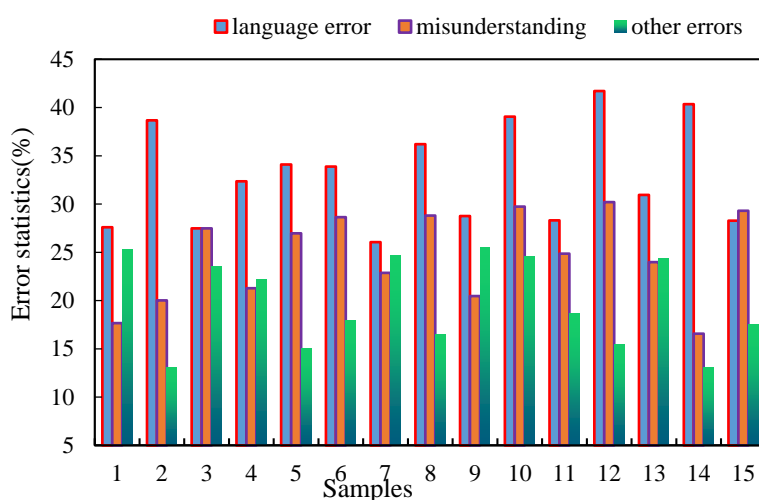

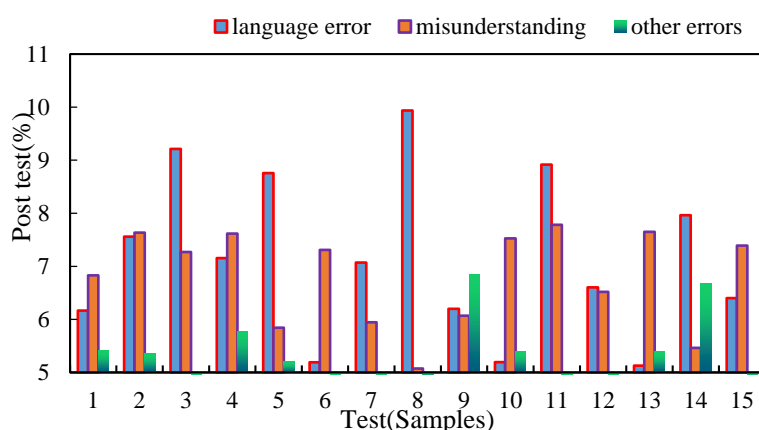Figure 5: Statistics of translation errors made by students

Figure 6: Post-test student translation error rate

Compared with the control group, the translation ability of the subjects in the experimental group was significantly improved. Before the experiment, the pre-test translation scores of the students in the experimental group and the control group (t=-1.9, p=0.064>0.05), the total number of translation errors (t=0.682, p=0.497>0.05), the comprehension errors (t=-1.57, p=0.121>0.05),

language errors (t=0.535, p=0.595>0.05) were not significantly different. After the experiment, the post-test translation scores of the experimental group and the control group (t=0.036, p=0.036<0.05). The total number of translation errors in the experimental group after the test (t=-2.88, p=0.005<0.05). Language errors in the experimental group after the test (t=0.009, p=0.009<0.05). These groups of difference data are statistically significant. The post-test student translation error rate is shown in Figure 6.

5. Conclusion

Through classroom observation and questionnaire survey, this paper finds that college English has problems such as inactive translation learning, insufficient translation learning depth, weak vocabulary transfer and use ability, and the difficulty of vocabulary teaching effect and learners' absorption and internalization effect. Therefore, under the guidance of deep learning theory, combined with teaching materials, the vocabulary teaching design is carried out, and the application of English translation practice teaching design under the guidance of deep learning theory is studied. Through the research, the following conclusions are drawn: Under the guidance of deep learning theory, students' enthusiasm for translation learning is improved. Under the guidance of deep learning theory, students' interest in translation learning is improved and translation learning efficiency has been improved. The thinking ability of students under the guidance of deep learning theory is also improved. These all show that vocabulary teaching under the guidance of deep learning theory is effective. Finally, guided by deep learning theory, teachers' teaching strategies are proposed. There is a small sample size problem in this paper, which needs to be strengthened in the follow-up work, and the situation of college students' English reading should be further explored.

Acknowledgement

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