Development and Application of Comprehensive English Deep Learning Resources for SPOC Platform

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Abstract: In recent years, the effectiveness of college English teaching has continuously aroused people's thinking. Numerous researches have been conducted in this field so as to promote the proficiency and effectiveness of College English Teaching. Comprehensive English is the basic curriculum for English majors and it is the very foundation for any professional qualification. Hence, the teaching of comprehensive English requires great attention and long-term planning. While in reality, the current situation is that the organizational mode of English teaching in universities is lack of deep learning and training high-level thinking abilities, which, as is known to all, are very essential for the personal development of any language learner. With that as the ultimate purpose, this article attempts to construct three learning stages for comprehensive English based on the field of deep learning in the actual learning process of pre-class, in class, and post class. Through the SPOC (Small Private Online Course) platform, student data was collected to verify testing effectiveness. The data analysis results of SPOC teaching platform showed that the comprehensive quality of students in thematic research, classroom demonstrations, and other aspects was 10% higher than that of regular teaching, and most students successfully completed team work.

1 Introduction

In the context of informatization, the network and digital teaching models have broken through the traditional language teaching model dominated by shallow learning, providing students with ideological, resource, and environmental support from shallow learning to deep learning. This article is based on deep learning theory and constructs a foreign language teaching model based on SPOC, aiming to improve students' language proficiency, enhance their comprehensive quality, and provide a model for the reform of English courses in universities.

The reform of English teaching methods should help students engage in deep learning, cultivate their ability to apply knowledge, and analyze and solve problems, thereby improving their learning efficiency. This article intends to establish a teaching model for deep learning of English in universities based on SPOC, and explore its optimization conditions and strategies, based on in-depth research of the above issues.

2 Related Work

Deep learning can enable students to critically learn new concepts and facts while understanding the learning content, and combine them with existing cognitive structures, combining old and new knowledge, transferring existing knowledge to new environments, and making decisions and

solving problems. Deep learning can help students better understand knowledge, process new knowledge in depth, and combine it with existing knowledge to solve learning problems in new contexts. Zhou Xiaoqin studied English at a university in North China and found through qualitative and quantitative research that "micro courses" can effectively stimulate students' interest in English and promote their English achievement [1]. Wang Lei believed that in college English listening and speaking classes, by improving students' deep learning abilities, they can better integrate the content they have learned and thus master advanced thinking in English [2]. Ding Mingjie planned to study an intelligent classroom teaching model for college English listening, speaking, and listening based on deep learning from the perspective of deep learning, highlighting the differences between individual knowledge, improving the knowledge system, and cultivating students' deep learning ability and creative thinking [3]. Zhang Cailian believed that the application of information technology has changed the foreign language teaching ecosystem. From the perspective of educational ecology, deep learning is used to promote student semantic construction, cultivate critical thinking ability in collaborative exploration, and achieve coordinated and efficient integration of various elements of the teaching ecosystem. This is not only beneficial for improving the quality of English teaching, but also for building an intelligent foreign language education ecosystem [4]. Yang Tian believed that as the main battlefield for cultivating talents, universities should continue to promote the reform of English teaching. Deep learning is different from shallow learning in that it requires a higher learning environment, while deep learning can help students build a complex knowledge system and have a deeper understanding of knowledge [5]. Based on deep learning and case studies, Liu Lamei explored the teaching design of college English reading courses, analyzed how to carry out deep learning in the classroom, enabled students to engage more deeply in the classroom, and achieved a progressive process from shallow learning to deep learning, thereby improving the overall literacy of learners [6]. Cheng Fen planned to study blended learning of college English based on deep learning, using both online and offline methods to stimulate students' active exploration and deep processing of knowledge, and to use higher-order thinking to construct their knowledge abilities [7]. However, their research lacks novelty, and the learning outcomes of students are not very good.

3 SPOC Based Deep Learning Model for College English

3.1 SPOC

SPOC first appeared on MOOC, which is a way of integrating online MOOC teaching with traditional school physics classroom teaching. It can be divided into three stages: pre class teaching, offline classroom teaching, and online post class teaching [8, 9]. Reforming the teaching process is an important strategy for deep learning. Traditional classroom teaching is transformed into teacher-student interaction, deep cooperation, and problem-solving. Before class, high-quality online teaching resources on MOOC can also be utilized to stimulate learning interest and help students better remember knowledge. After the classroom ends, students can also sublimate their knowledge through tests and other methods. This article explains how to use SPOC technology for deep learning in college English [10]. The SPOC deep learning model can be used to address the problems of a large amount of teaching content, short teaching hours, strong practical communication, significant differences in needs, and learning fatigue in the current third year English courses in universities, which are difficult to overcome in the first and second years [11, 12].

Deep learning model optimization formula:

$$E = F(W, X, Y) + \lambda ||W|| \qquad (1)$$

Among them, E is the expected value of the model's prediction error. $F(W, X, Y)$ is the loss function can measure the difference between the predicted results of the model and the actual results.

Gradient descent algorithm formula:

$$T_X = M - \alpha \nabla E(W) \qquad (2)$$

Among them: α is the learning rate, which controls the magnitude of each weight update.

3.2 Pre Class Knowledge Explanation

The pre class knowledge explanation is the foundation for SPOC deep learning. Teachers cannot take the first step of SPOC mode lightly [13]. High quality classroom teaching design can stimulate students' interest and motivation in learning. Only when students earnestly learn basic skills before class, can internalized interaction in

future classes not become mere formality. In the purpose of deep learning of "application, analysis, evaluation, and creation", designing pre class videos should clearly know whether the new knowledge learned in this unit is within the knowledge system of this field or in the relationship with some previous knowledge. Because teachers and students use chat groups the most frequently, and students also provide feedback through chat groups after class, teachers can upload these teaching resources to the class's "Chat Advanced English" platform and provide detailed explanations for students' homework. Due to the full utilization of the online teaching advantages of MOOCs, SPOC allows students to decide their learning progress and the speed of watching videos at any time based on their own situation, such as pausing or repeating at any time [14, 15]. While watching the video, students can answer some simple questions and get answers to them at any time.

After watching the video, the teacher conducts pre presentation discussions using methods such as task learning and collaborative exploration. After the students submit their questions, the teacher encourages them to actively participate in the discussion and summarize some common and difficult to solve problems. At the end of the course, the teacher provides a quiz to help students better consolidate their knowledge in class, while also providing appropriate evaluations for each student in the first few stages of the class. Overall, through group discussions and peer testing, students have already mastered the basic knowledge of the unit before class.

3.3 English Classroom Teaching Process

In the process of classroom teaching, the problems encountered by teachers and students in the classroom are closely related. The internalization of in class knowledge is an important manifestation of SPOC deep learning. Teachers should keep in mind the difficulties that students encounter before class, guide them to participate in classroom discussions, and collaborate to solve problems. MOOC adopts various forms such as online testing, machine scoring, and peer evaluation. Due to the integration of physics classroom teaching, SPOC integrates the advantages of online testing, machine scoring, peer evaluation, and classroom evaluation in evaluation methods [16]. The communication between teachers and students is not only online communication before class, but also face-to-face communication, challenging and colliding with each other. In the class, interaction between classmates,

teachers, and groups can promote students to individually revise their previous knowledge, build connections between new and old knowledge, apply knowledge, criticize and gain a deeper understanding of new knowledge.

3.4 SPOC Deep Learning Process

In response to common problems that arise in the classroom, first, they are answered and corresponding exercises are designed based on the learned content, so that students can better understand the basic knowledge learned in the classroom.

In the course, scenario simulation and group collaboration are used to solve high-level thinking, such as transfer application, critical innovation, and deep level problems. The teacher arranges group discussions based on the problems.

Step 1: Each group should prepare 3-5 questions to test the other groups in the class, so that the questions are no longer limited to simple, known, and mechanically memorized questions like "what", but extend beyond the current knowledge learned and involve reflective questions in scientific categories such as "why" and "how". This indicates that the questioner is very clear that if it is only superficial questions, such as mechanical memory, scattered, and what they have learned now, they are likely to lose this game. Students have gained a deeper understanding of the English text while previewing the questions, in order to better answer questions from other groups in the future [17, 18]. During group discussions, teachers should pay attention to the questioning content of each group, check if there is any repetition in the questioning content of each group, and check if there are any ambiguities in the questioning content.

Step 2: How to solve the selected questions is discussed through group drawing. The first group draws the questions given by the second group of students. After drawing lots, everyone enters the discussion stage. To correctly answer the extracted questions, other groups need to discuss with their classmates and have their own unique insights into the learned content, rather than just emphasizing rote memorization and simple understanding. In this situation, both the questioner and the respondent have shifted from simple memory and shallow understanding to expansion, reflection, and deeper understanding.

Step 3: Teachers organize competitions and conduct evaluations and summaries. Each group first answers the other's question, and then the group that asks the question scores the group that answers. If the respondent is not satisfied with the result of the question, the teacher can

evaluate it. In order to prevent some top students from monopolizing the classroom, the teacher requires each team member to answer questions. In summary, there has been a significant improvement in the interaction between teachers and students, students and students, and students and groups on the SPOC platform [19]. During the competition, the entire class and teachers evaluate the students' grades. In actual teaching, teachers have found that students who are not good at talking on weekdays would also actively participate in competitions to seek collective honor and achievements. Some students may argue when they are not satisfied with the grades of other groups. The learning attitude, learning methods, and learning outcomes of students are all influenced by evaluation and feedback. Under this diversified evaluation mechanism, students' communication skills, critical thinking abilities, and comprehensive knowledge abilities are greatly improved.

In discussions and demonstrations, students can use the SPOC platform to reflect and modify existing knowledge, deepening their understanding of new knowledge [20, 21]. The teacher has already gained a basic understanding of the learning difficulties of this unit before class, such as rhetorical methods such as irony, puns, and contradictions, allowing students to establish their own preliminary rhetorical knowledge. Students are divided into different groups, each with three different rhetorical devices, and present them after the discussion. The course mainly introduces the differences between various rhetorical devices in Chinese and English environments, and applies them to English. By reviewing single background knowledge, learners can stimulate their existing rhetorical knowledge

and integrate it with their existing rhetorical knowledge. Based on this, it takes root in the comparative process of cultural traditions, gradually expanding the scope and depth of construction. After the demonstration in different groups, the teacher asks the students to conduct self-evaluation.

4 Experimental Development of Comprehensive English Deep Learning Resources for SPOC Platform

4.1 Comparison of Rhetoric Test Scores Between Conventional Teaching and SPOC Deep Learning Groups

In the SPOC course, students watched a difficult point in teaching - rhetoric in advance, and internalized the knowledge they learned through group discussions. Then, they tested their rhetoric learning for the day in class. The proportion of 81-90 students in the regular teaching group was 30%, and the proportion of 91-100 students was 20%. The SPOC deep learning group consists of 20% of 81-90 students and 40% of 91-100 students. The experimental results indicate that SPOC teaching can significantly improve teaching quality. The comparison of rhetorical test scores between conventional teaching and SPOC deep learning is shown in Figure 1.
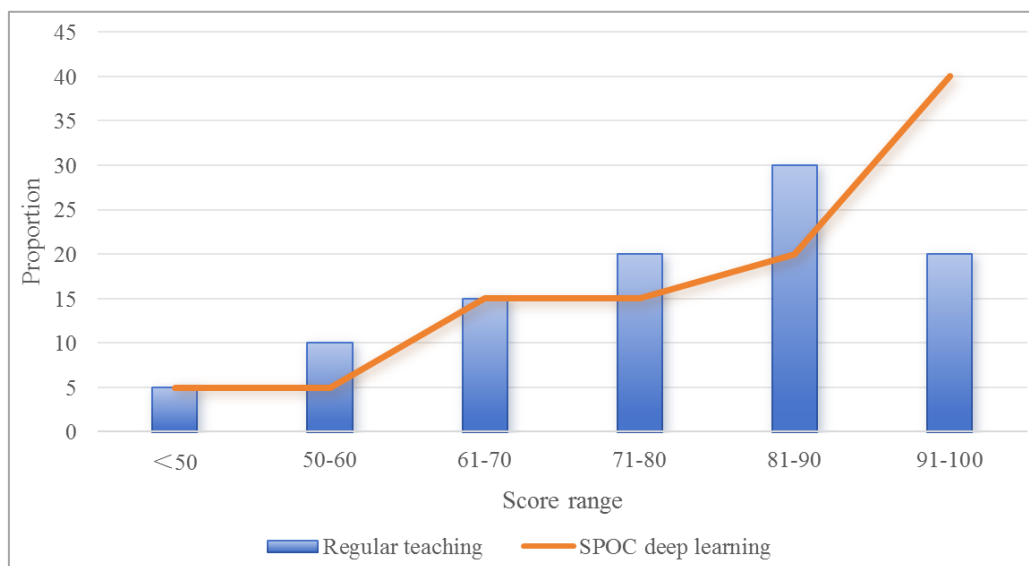

Figure 1 Comparison of rhetorical test scores between conventional teaching and SPOC deep learning groups

4.2 Transformation of Deep Learning Dimensions

The scores and weights of the course indicators set in this article are shown in Table 1. The course platform scored 3.8; the course resources scored 4.2; the course outline scored 4.3.

Table 1 Scores and weights of the course indicators set in this article

Serial number	Course indicators	Score	Comprehensive weight
1	Course platform	3.8	0.022
2	Course resources	4.2	0.015
3	Teaching team	4.5	0.019
4	Course outline	4.3	0.018
5	Course objectives	3.9	0.022

4.3 Comparison of Pre-test and Post Test for Different Dimensions of Deep Learning

The comparison of pre-test and post test for different dimensions of deep learning is shown in Figure 2. In the dimension of deep learning strategies, the pre test mean was 2.55 and the post test mean was 3.99. In the dimension of deep learning motivation, the pre-test mean was 2.26 and the post test mean was 4.15.
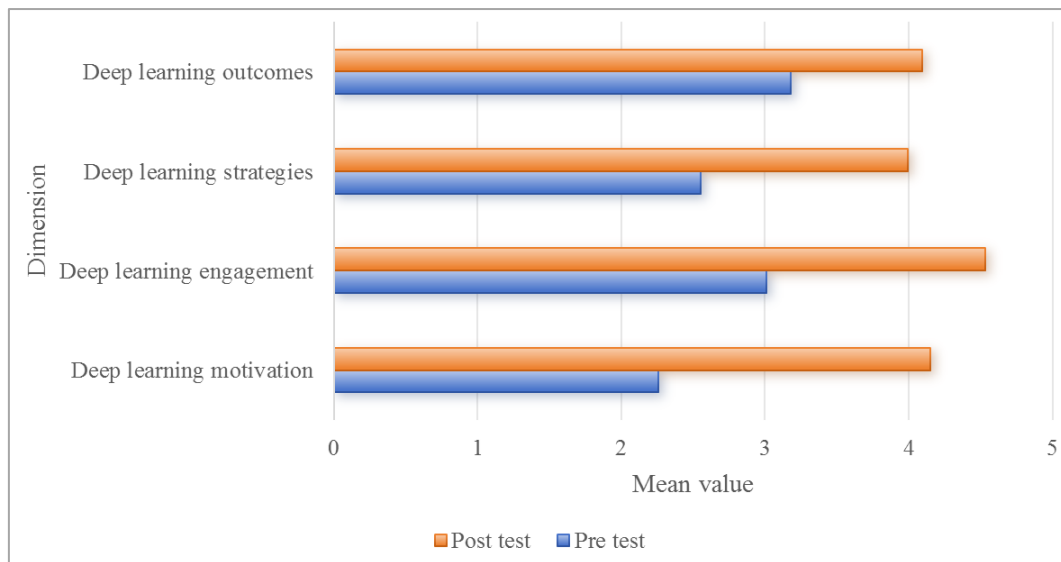

Figure 2 Comparison of pre-test and post test for different dimensions of deep learning

The actual situation is that for different dimensions of deep learning, students have shifted their motivation from simply "passing the English CET-4 or CET-6 exams" to "speaking up for their motherland in English" and "showcasing the beauty of China to the world". In terms of learning engagement and the application of learning strategies, in English tests, the initial focus was on answering questions, and later on, English news, novels, etc., were the main content, with English as the background. The improvement of learning motivation, the increase of learning engagement, and the improvement of learning strategies all invisibly affect the behavior and habits of students in English learning, enabling students to use English thinking to analyze and solve problems, train thinking and language expression skills, and thereby improve their confidence and self-efficacy in English learning.

4.4 SPOC Teaching Platform Data

After two semesters of teaching practice, statistics were conducted on classroom participation, comprehensive quality, self-evaluation, and other aspects on the SPOC teaching platform. It was found that 79% of students had a much higher level of classroom participation than traditional teaching methods. The comprehensive quality

of students was 10% higher than that of regular teaching, which was actually reflected in thematic research, classroom demonstrations, etc. Most students have successfully completed team work. Students actively engage in self-evaluation during the learning process, with 95% being able to conduct objective and effective self-evaluation. The data analysis results of SPOC teaching platform are shown in Figure 3.
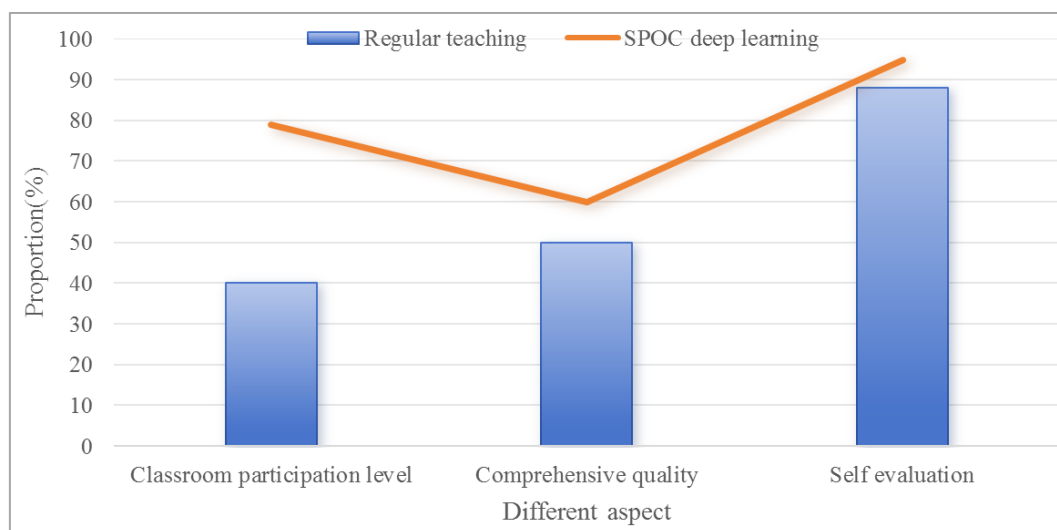

Figure 3 Data analysis results of SPOC teaching platform

The foreign language teaching model based on SPOC is beneficial for students to master and internalize language knowledge, and promotes the cultivation of their language proficiency. Through the SPOC teaching platform, teachers can have a comprehensive understanding of students' overall grades during the pre class, in class, and extracurricular stages, achieving more targeted and flexible teaching and improving student learning efficiency.

5 Conclusions

The development of comprehensive English deep learning resources for the SPOC platform can enhance students' learning enthusiasm, their learning motivation, their learning strategies, and their comprehensive English application ability, promoting the development of deep learning in college English. Due to limited research objects and time, this article only explores the integration and application of deep learning theory and experimental teaching models. In the future, based on this foundation, the research scope can be expanded and more empirical studies can be conducted to verify its feasibility and effectiveness, so as to achieve continuous improvement in practice.

Conflicts of Interest

The author(s) declare(s) that there is no conflict of interest regarding the publication of this paper.

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