Innovation and Optimization Approaches of College English Vocabulary Teaching Enabled by Generative Artificial Intelligence

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Abstract: *According to the Input-Output Hypothesis, the problems of shallow processing, homogeneity and decontextualisation in the traditional method of teaching college English vocabulary will be addressed in this paper to improve students' pragmatic competence. Based on the above, this paper will explore how to integrate the features of generative artificial intelligence (Gen AI) in the teaching of college English vocabulary. To address the problems in the current teaching of vocabulary, Generative AI will be used in this paper to create various contexts dynamically and provide personalised modifications and prompts for feedback. Then, it will introduce new teaching models to help students learn new words better, build an optimisation system for the stages of teaching, human-AI collaborative teaching and dynamic vocabulary assessment, etc., to create a new teaching-learning-assessment model. The above results can help promote the digital and intelligent transformation of college English vocabulary teaching, and some practical suggestions for further research on the application of generative AI in foreign language education are also given here.*

Keywords: *Generative Artificial Intelligence, College English Vocabulary Teaching, Innovation and Optimisation*

Introduction

With the trend of digitalisation in higher education, one of the main directions for educational reform now is to introduce new technologies in college English teaching. The problem with the current teaching of vocabulary is that there is little time for students to learn the new words well. The old way of teaching does not consider the differences among students, so it has not achieved good teaching results. Based on the study of language acquisition, the two ends of the cycle for vocabulary learning are understandable input and good output. Generative artificial intelligence (Gen AI) can also be applied in the above cycle, and given that it can generate and respond to changes over time, it is hoped that new technological solutions for the teaching problems mentioned above will be provided. Therefore, the main problem of vocabulary teaching that this paper will address is the application of Generative AI. Analyze the current situation and theoretical requirements of the technology, explore how to apply it effectively in teaching, develop new teaching models, and put forward all-round optimisation paths for the reform of foreign language education in practice.

1. Current Problems and Theoretical Basis of College English Vocabulary Teaching

1.1 Main Obstacles to Students' Deep Vocabulary Learning

Many college students learn new words in their studies by rote memorisation after repeated reading and copying. Therefore, they are not very good at recognising small changes in words. Therefore, even students with a large vocabulary often make mistakes in their actual use of language because they have not been well-acquainted with polysemy, stylistic differences and collocations. The problem is more serious in the case of frequent word clusters. Students can usually recognise these expressions, but they are unable to remember or use them flexibly in actual situations; thus, their vocabulary knowledge does not become an enduring part of their language system. Moreover, since there is no good plan for reviews and the circumstances are not favourable, the new words that students have learned in class are easily forgotten after leaving school, and they are unable to apply what they have learned. The problem is that the students have not learned the new words well. Generally speaking, they set up a simple

one-to-one correspondence between English words and their Chinese equivalents and do not consider all the associations among form, meaning and function. Partial processing will directly hinder the learning of advanced vocabulary; thus, when students encounter difficult material in class, they will be unable to understand the meaning of these words or learn how to use them correctly.

1.2 Inherent Limitations of Traditional Classroom Vocabulary Teaching

Teaching vocabulary in college English is still mainly teacher-led instruction and rote memorisation by students. Teachers often introduce new words in a group and then have students use these words in a decontextualised manner, such as multiple-choice questions and translation exercises. Vocabulary is not linked to real life in this way, so students will only learn a few fixed words and not know how to use them in daily life. Teachers have limited class time and large classes, so it is difficult for them to give personalised instruction to all the students at different levels. Most exercises are still simple repetitions and do not show the collocation patterns and pragmatic functions of the words. Therefore, the students will not be able to perform well in productive tasks such as speaking, writing and translation. They do not have easy access to the original materials and various language materials, find it difficult to distinguish between synonyms, are easily confused by them, and cannot effectively recall and use the newly learned words. Over time, both the quantity and the quality of vocabulary input in traditional classrooms have failed to meet the demands of intermediate and advanced language application. Therefore, the learning of vocabulary will be a dull process of memorisation.

1.3 Implications of Input and Output Hypotheses for Vocabulary Pedagogy

According to Krashen's Input Hypothesis, one needs to be able to understand some parts of the language in order to learn it. Vocabulary teaching should not present a list of words only once. Teachers can organise all kinds of activities regularly to present the target words in many ways. Swain's Output Hypothesis also believes that only the input is not sufficient for good language production. Output activities can cause learners to pay less attention to meaning and more attention to grammatical and lexical features; thus, they will learn collocations and other lexical constraints better[2]. Therefore, students need to actively recall words for use in speaking and will make some mistakes in the process. The first kind of vocabulary teaching should have a good cycle of input and output. Rich Contextual Information needs to be added to the input side. At the output stage, activities to reduce the information gap and topic-based writing can be employed to help students improve their use of vocabulary and obtain early feedback. One way to teach it is by means of generative AI. Using a large-scale pre-trained corpus, generative AI can generate many kinds of various and realistic language materials on demand to address the problem of outdated and monotonous materials in traditional textbooks. At the same time, it can also be studied alone and is readily available.

2. Synergies of Generative AI and Vocabulary Teaching

2.1 Integration of Dynamic Context and Semantic Understanding

To be semantically aware, we need to know not only the definitions of words in a dictionary but also how they are used in actual life. Traditional teaching is limited by the fixed content in textbooks and a short class time, so the range of available language materials is relatively small and lacks diversity. It will be difficult for students to learn how to use the same word in different situations and by different people. General AI is a good choice. Many corpora with the target vocabulary in various situations that are suitable for students' language levels and interests can be created relatively easily. Dynamic Corpora are less likely to be remembered by students. Regularly giving students many real-life examples helps them learn collocation rules and other pragmatic restrictions on language use. At the same time, teachers can organise such corpora systematically in pre-class assignments and lead-in activities to have students explore the different contexts in more depth and move from vague inference to precise application. Therefore, students will be better able to learn new words, and the problems of old teaching materials and lack of individualisation will also be addressed.

2.2 Application of Personalized Vocabulary Lists and Forgetting Curve

Teachers used to have a set time for introducing new words. However, the same speed does not consider the different forgetting curves of students with different levels of vocabulary mastery.

Generative AI can learn from the mistakes students make in their communication with the AI and then help them correct their vocabulary. Then it will change to the topic of the next talk. According to the principle of the forgetting curve, Generative AI can vary the frequency and time of presentation for new words to help students retain these words for a longer period. Teachers need to teach only a few basic words in class. Generative AI can then create a personalised study plan for each student and naturally add new words in the following lessons or homework. The intelligent scheduling method will change the problem of frequent vocabulary review into something that can be naturally integrated into daily study, helping students remember what they have learned at the right time. Therefore, this way can reduce the rate of memory decay and help to consolidate and transfer vocabulary from short-term to long-term memory[3].

2.3 Interactive Practice of Collocations and Pragmatic Functions

Collocation fluency and adherence to pragmatic norms in the English output of college students need to be improved. In fact, students often use collocations incorrectly and make pragmatic errors in both written and spoken English. The main reasons are that there is no immersive practice and instant correction of errors, so students are unable to apply what they have learned in daily life. General AI can understand and process natural language, so intelligent practice environments for students in the form of virtual reality can be created to solve the problems of traditional teaching. Therefore, the platform will help students learn through speaking rather than memorisation, and they will be able to use the new words in daily life. It will find and correct all kinds of language errors, such as incorrect verb-object combinations and misuse of fixed expressions. After many exchanges and timely corrections, students will gradually be able to speak in English and learn some expressions. At the same time, the teachers will also find common errors in the learning data collected from these interactive drills and give specific instructions on collocation rules and pragmatic situations. Therefore, the students will be able to use the new words they have learned in class[4].

3. Innovations in Vocabulary Teaching Models Driven by Generative AI

3.1 An Output-Oriented Reinforcement Model for Immersive Conversational Scenarios

A Goal-Oriented Reinforcement Model is employed to have people learn conversational vocabulary in a happy way via interactive virtual environments. The aim is for students to be able to use the new words learned in class. Live, interactive functions of Generative AI can be employed to create an interactive learning environment and help students learn how to use new words in speech. First, choose a popular topic for communication and some new words from the class. Then, have the students have several rounds of conversation with Generative AI, and at this time, the key words will be naturally included in the conversation, prompting the students to recall them and form sentences spontaneously. Teachers can design graded task sequences to gradually introduce the use of new words in an interactive manner and help students build a network of word associations. Generative AI can also provide many synonyms and generate various communication situations to help students learn about different meanings and rules for use in context. Many more practical situations will give the students more opportunities to see and use the new words, thus learning them better and more deeply[5].

3.2 A Training Model for In-Depth Polysemy Analysis and Collocation Differentiation

Train a model to enhance the cognitive processing of rich vocabulary knowledge and correct fragmented senses and rigid collocation patterns of polysemous words. With the help of Generative AI, teachers can carry out the above steps in actual teaching. First, for a polysemous word, GenAI will generate example sentences covering all the basic meanings of that word. By comparing sentences in different contexts, students can learn how to use the same word form in various ways according to syntax. To strengthen the sense of connection, Generative AI can be employed to generate several contexts with different meanings for the target word, and then students can trace how the function of this word changes in different sections of the text. Second, to help with collocations, generative AI can provide some examples and phrases for students. Then it will explain why some collocations are semantically favourable and why others are pragmatically flawed. Therefore, teachers can create tasks, such as paragraph cloze exercises, and have students choose appropriate collocations in various situations. Then Generative AI can offer some selection suggestions and show the distribution of frequent collocations. All of the above are combined to form an organised system of word knowledge

and solve the problem of shallow learning that is often associated with output-oriented word learning[6].

3.3 Integrated Model for Real-Time Error Correction and Hierarchical Feedback

The problem above is late feedback in traditional classes. GenAI can immediately tell me if the words I am learning are correct or not. GenAI will quickly read what the students have written to find any errors in vocabulary and suggest corrections. It can also show the reason for the error, how to use it correctly, and clarify the differences in meaning and function. Students will correct their mistakes promptly and resubmit the work for continuous improvement in a cycle of production, feedback and revision. Generative AI will also save the correction history of all students. Based on how often a person makes mistakes, adjust the strength of the feedback. For example, it will show some additional example sentences and explanations for words that are often used incorrectly. Therefore, the model can quickly find the common mistakes students make in class from the backend data and provide specific remedial teaching to make better use of the limited class time. Therefore, we can correct the mistakes made by the whole class and help individual students solve their own problems in vocabulary learning.

4. Optimization Methods for Teaching College English Vocabulary

4.1 Use Generative AI to Organise Stage-by-Stage Vocabulary Training

The three stages of the Plan should consider how the new words will be introduced. The three stages of teaching are the time before class, during class and after class. Generative AI can be used in the preparation stage to create all kinds of vocabulary materials in line with the goals of the current lesson. Students learn to distinguish between meanings and then find the problems themselves. Based on the problems in the pre-class activities, teachers will plan specific activities for the in-class period, such as situation-based dialogues and collocation analysis. With the help of generative AI, more materials and personalised exercises can be created in real time to help students apply the new words they have learned, correct their mistakes in actual communication situations, and thus promote the transition from knowing to using vocabulary. Generative AI will create personalised notes and homework based on how well students participate in class after school. Vocabulary items that the students have not learned or are using incorrectly will be presented in new situations and reinforced through activities such as micro-writing and guided conversation. Therefore, the pre-class input provides the foundation for learning; new words are added in class for practice, and post-class review Organizes what has been learned. The three stages are in a circle around the target word. At the start of the term, the teacher only needs to set the vocabulary framework and difficulty level. Then GenAI can help create the rest of the materials and revise the plan. A closed-loop design will free up class time for other kinds of teaching and the development of high-level language skills, and it will also reduce the cognitive load on students in their after-school study[7].

4.2 Standardising Generative AI for Human-AI Collaborative Classroom Teaching

Teachers should carefully filter and modify the results provided by GenAI in the teaching of college-level English vocabulary. Therefore, they should set preset parameters for vocabulary difficulty, language style and sentence structure to avoid obscure expressions and content that do not meet the teaching goals. Even if the parameters are set reasonably, the example sentences and contexts generated by GenAI may still be too difficult for the students at present. Teachers need to manually modify the output or change the prompts to make them suitable for teaching in the classroom in such cases. Teachers need to change how often people are exposed to artificial intelligence in their teaching, or else there will be too much dependence on technology. Generative AI can provide students with instant feedback and related background information in many ways to help them learn, but teachers still need to lead the explanation of vocabulary and guidance on learning strategies. Division of labour can use the strengths of GenAI to keep teachers at the centre of educational decision-making. Therefore, teachers need to consider how GenAI will be used in light of the various language abilities of the students. Generative AI can be employed to help students with weak basic skills simplify the syntax and offer some semantic support. With the help of AI, create some difficult study materials or higher-order pragmatic problems for the good kids. Teachers can set boundaries for the use of technology, decide when to intervene, prevent generative AI from making judgments in teaching, ensure that the output meets the goals of vocabulary teaching, and thus build a stable system for human-AI collaboration.

4.3 Use Generative AI for Data-driven Dynamic Vocabulary Assessment

A closed-loop dynamic monitoring system for teaching, learning and assessment will be built, and with the help of GenAI platforms, personalised vocabulary portfolios for all students will be constructed. Over a long time, the platform has gathered word-use data from the students. Based on the above data, the platform will periodically release personalised test papers to check how well the students have learned the new words. Based on the diagnosis results above, the platform will automatically increase the difficulty of these words in the next few exercises and schedule spaced repetition to help you remember them better. The platform will also show the diagnosis and intervention status of students, as well as general data analysis of the class for teachers. Then, the students can rearrange the order of their study materials, and the teacher will modify the feedback accordingly. According to the above two-way communication, dynamic assessments of vocabulary learning by Generative AI will be added to the teaching materials. Therefore, late feedback on learning results can be used to adjust teaching and learning activities for all students in time. Therefore, students of all abilities can advance their use of words according to the zones of proximal development at different levels.

5. Conclusion

General AI can help teach new words for college students in English. It can improve the old way of teaching and learning, provide practice activities and feedback for students, and change vocabulary learning from rote memorisation to a system of comprehension and application. With the help of technology, more language materials have been added for students, and problems in their learning can be corrected promptly to improve the speed of vocabulary acquisition and application of language skills. The present tools are still too general in the generation of content. We also need to improve the collaboration between Generative AI and teachers, and individualised teaching plans for students of different abilities should be developed. Future research and application should aim to improve the GenAI algorithm in line with the patterns of vocabulary learning, expand situations and ways of use, establish a full-process dynamic evaluation system, explore effective ways to further integrate it into foreign-language classes, and achieve full educational results.

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