

Research and Application of Vocabulary Integration into Articles Using ChatGPT

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Abstract: This study focuses on exploring the application of ChatGPT in the field of language learning, particularly in vocabulary memorization and article integration. Starting from the current state of natural language processing (NLP) and artificial intelligence (AI) technologies in education, the study specifically analyzes the technical characteristics of ChatGPT and its potential in language teaching. This paper discusses the application of ChatGPT in vocabulary memorization through empirical methods, demonstrating how randomly selected vocabularies can be effectively integrated into coherent stories to enhance learners' memory and understanding of these words. The study shows that ChatGPT can provide a rich, personalized learning experience, effectively promoting learners' vocabulary retention and language comprehension. Moreover, the study explores the advantages of ChatGPT in vocabulary learning compared to traditional methods and its potential impact in the field of educational technology. While demonstrating significant potential in educational applications, the study also points out the limitations of ChatGPT and directions for future research. It emphasizes the importance of combining the latest AI technology with traditional teaching methods, offering new perspectives and methodologies for the field of language learning.

Keywords: ChatGPT, Language Learning, Vocabulary Memorization, Natural Language Processing, Educational Technology, Personalized Learning.

I. INTRODUCTION

With the rapid development of technology, artificial intelligence and natural language processing technologies have played an increasingly important role in the field of education. These technologies not only change traditional teaching methods and learning patterns but also provide new possibilities for personalized and efficient learning. Particularly in the field of language learning, the use of artificial intelligence and natural language processing technologies can achieve personalized teaching for learners while providing practical teaching aids for educators. Therefore, this study begins with this premise, aiming to explore and analyze the application and potential value of these technologies in language learning, providing theoretical support and practical guidance for the future development of educational technology.

A. Research Background and Motivation

In recent years, the application of natural language processing (NLP) and artificial intelligence (AI) technologies in the field of education, especially in language learning, has been increasing. Natural language processing, an interdisciplinary subject of computer science, artificial intelligence, and linguistics, focuses on enabling computers to understand, analyze, and generate human language. The development of this technology has brought revolutionary changes to language learning. Tools like ChatGPT, in particular, have shown tremendous potential in assisting language learning. ChatGPT can effectively help users learn foreign languages and improve their language skills by simulating real language environments and providing instant feedback.

In the context of globalization and rapid development of information technology, mastering one or more foreign languages has become essential for people to adapt to modern society. However, traditional language learning methods are often inefficient and unable to meet the needs of personalization and flexibility. In this context, the emergence of artificial intelligence tools like ChatGPT offers a new solution. They can adjust teaching content according to users' learning progress and styles, making learning more efficient and personalized.

Furthermore, the application of ChatGPT in the field of education also demonstrates the progress of artificial intelligence technology in simulating human intelligence. It can not only understand and generate natural language but also learn and adapt to different language environments through interaction with users. This capability makes it an ideal tool for learning foreign languages, especially without natural language environments.

In summary, the application of natural language processing and artificial intelligence technologies, especially tools like ChatGPT, in language learning is not only a reflection of technological advancement but also an important direction for innovation in the field of education. This study explores how these technologies can help improve the language learning process and enhance learning efficiency and quality. By deeply studying the application of ChatGPT in language learning, we can better understand and utilize these advanced technologies, bringing new ideas and methods to the field of language education.

B. Problem Statement

In the language learning process, memorizing and mastering vocabulary have always been challenging. Especially in effectively integrating newly learned vocabulary into articles, allowing learners to remember the words themselves and understand their application in specific contexts is complex and challenging. Traditional vocabulary learning methods often focus on repetitive memorization and rote learning of vocabulary lists. Although this method may be effective in the short term, it has limited effects on long-term memory and practical application skills. Learners often struggle to apply isolated memorized words in actual contexts, leading to unsatisfactory learning outcomes.

Moreover, integrating new vocabulary into articles requires a deep understanding of the meanings of words and the ability to apply them in appropriate contexts accurately. This process involves multiple aspects of language knowledge, including polysemy, collocation rules, grammatical structures, etc. Without sufficient language environments and practice opportunities, learners find it difficult to apply newly learned vocabulary effectively in actual writing or conversation. Therefore, how to help learners not only remember new vocabulary but also flexibly use them has become a pressing issue in the field of language teaching.

In the current educational environment, utilizing artificial intelligence and natural language processing technologies to assist in language learning, especially vocabulary memorization and application, offers new possibilities. For example, context-rich example sentences or short stories generated by intelligent systems can help learners understand and remember new vocabulary in authentic contexts. Additionally, these systems can provide personalized learning suggestions and materials based on learners' progress and feedback, improving learning efficiency and quality. Therefore, exploring and researching how to effectively combine advanced artificial intelligence technologies with traditional language learning methods is of significant theoretical and practical significance for enhancing language learners' vocabulary memorization ability and language application skills.

C. Objectives and Significance of the Study

The core objective of this study is to explore how to utilize ChatGPT to improve and optimize vocabulary memorization methods. With the rapid development of artificial intelligence technology, especially the advancements in natural language processing, tools like ChatGPT have shown great potential in language learning. This study aims to analyze in depth how ChatGPT can be effectively applied in different language learning scenarios, particularly in assisting learners in better memorizing and mastering new vocabulary. Through experiments and data analysis, we will evaluate the effectiveness of ChatGPT in improving vocabulary memorization efficiency and quality, exploring its practical application value in language teaching.

This study also aims to explore the differences and advantages of vocabulary learning methods assisted by ChatGPT compared to traditional methods. Traditional vocabulary learning methods often rely on mechanical memorization, lacking effective contextualized learning and practical application. ChatGPT promises to change this status quo with its rich context

and interactive learning experience. We will analyze how ChatGPT can help learners understand the meanings and usages of words more deeply through personalized learning plans, real-time feedback, and interactive exercises, thereby enhancing learning outcomes.

Moreover, the significance of this study also lies in its contribution to language learning theories. By deeply researching the application of ChatGPT in vocabulary learning, we can not only improve the practicality of learning tools but also propose new insights into language learning theories and methods. This is particularly important for language educators and researchers, as it helps them better understand how technology impacts the language learning process and how to integrate these new technologies into existing teaching frameworks.

Finally, this study is also significant for the development of the field of educational technology. By empirically researching the application of ChatGPT in language learning, we can promote the deep integration of educational technology and language teaching, providing new directions and application scenarios for the field of educational technology, which not only enhances the efficiency and quality of language learning but also provides valuable practical experience and theoretical support for the future development of educational technology.

D. Overview of Thesis Structure

This thesis is divided into four main parts, systematically and logically unfolding the research on the application of ChatGPT in language learning, especially in the field of vocabulary memorization. First, the introduction section provides the background and motivation of the study, elucidating the importance of natural language processing and artificial intelligence in the field of education, particularly in language learning applications. Next, the problem statement section discusses language learners' challenges in vocabulary memorization, emphasizing the difficulty of effectively integrating new vocabulary into articles. Following this, the objectives and significance section clarifies the main purpose of the study, which is to explore how to use ChatGPT to improve vocabulary memorization methods, highlighting the contribution of this study to the fields of language learning and educational technology.

Subsequent chapters delve into the current state of application of natural language processing and artificial intelligence in language teaching, particularly the specific application cases of ChatGPT in the educational field. This includes a detailed introduction to ChatGPT technology, its functionality analysis, and application examples in different teaching scenarios. Building on this, the thesis further studies and demonstrates the vocabulary integration into articles memorization method based on ChatGPT, providing specific methodologies and case analyses, showing how ChatGPT-generated story-type articles can help learners memorize and understand new vocabulary. Finally, the thesis summarizes the main findings and arguments of the entire study, discussing the main contributions and innovations, while also critically discussing the limitations of the research and the potential directions for future studies. Through such a structural arrangement, this thesis aims to comprehensively and deeply explore and discuss the application of ChatGPT in language learning and its impact on the field of educational technology.

II. LITERATURE REVIEW

With the rapid development of technology, natural language processing and artificial intelligence have become two of the most active and rapidly developing branches in the field of technology. The advancements in these fields not only promote the development of computer science but also profoundly impact the transformation of various industries such as education, healthcare, and business. Especially in the field of education, the application of natural language processing and artificial intelligence has brought revolutionary changes to traditional teaching methods, particularly in language learning, providing more efficient and personalized learning pathways. Therefore, this section will focus on summarizing the development of natural language processing and artificial intelligence, discussing their current state of application in the field of educational technology, and their future development trends, to better understand how these technologies are applied and developed in language learning.

A. Development Overview of Natural Language Processing and Artificial Intelligence

Natural Language Processing (NLP) and Artificial Intelligence (AI) are among today's hottest fields. Natural language processing, an interdisciplinary subject of computer science, artificial intelligence, and linguistics, is dedicated to enabling computers to understand, analyze, operate, and generate human language. On the other hand, artificial intelligence aims to

extend and simulate human intelligence, enabling computers to perform complex tasks that typically require human intelligence. These fields have a substantial history of research achievements and have been widely applied in educational technology. Li et al. (2020) applied natural language processing technology in their study to analyze the content of American history textbooks in Texas, USA, uncovering issues of gender, race, and ethnicity, which demonstrates the potential of natural language processing in the field of education. Annika Bergviken and Lina (2022) also explored the history and impact of automation and artificial intelligence in education. They argue that the scale and impact of automation in education are changing with the integration of automation technology and global platform infrastructure. Moreover, Li (2022) provided a comprehensive and in-depth perspective on research in programming in natural language processing. He discussed established methods of extracting programs through manual annotation or from online resources. Zijie et al. (2021) investigated and summarized the natural language processing work in human-computer interaction, emphasizing the recent framework's focus on tasks, objectives, interpersonal interactions, and feedback-learning methods. These studies provide an in-depth understanding of the application of natural language processing in the field of education. On the other hand, Litman (2016) summarized research opportunities and challenges in natural language processing and educational technology fields to address the needs of teachers and students. Johri et al. (2020) discussed the history, evolution, tools, and technology applications of natural language processing in different fields and the role of machine learning and artificial neural networks in improving natural language processing. These studies provide a comprehensive discussion of the application of natural language processing in educational technology. In summary, the application of natural language processing and artificial intelligence in educational technology has broad development prospects and has already shown great potential in the field of education.

B. Current Status of Research on Article Memorization and Vocabulary Integration

The endeavour to enhance word memorization, particularly in foreign language learning, necessitates innovative strategies beyond traditional rote learning techniques, criticized for their ineffectiveness and disengagement issues (Yang, 2020). Integrating words into textual contexts emerges as a more efficacious approach. Xu et al. (2018) underscore this perspective, illustrating that foreign language vocabulary acquisition is significantly bolstered when words are learned through contextualized sentences rather than isolated texts. This methodology underscores the pivotal role of word-to-word connections in reinforcing memory retention, thereby facilitating more natural and lasting word recall (Xie et al., 2020).

Further support for the efficacy of sentence-based word memorization comes from seminal research by Craik & Tulving (1975). Their findings illuminate the profound impact of deep processing, such as embedding words within sentences, on enhancing episodic memory retention. This process, wherein the memorization of sentences indirectly fosters word retention, underscores the synergy between linguistic structures and memory mechanisms (Craik & Tulving, 1975). Complementing this, Bonhage et al. (2014) reveal that the sequential redundancy inherent in sentence structures, notably the predictable patterns of word order within specific grammatical frameworks, significantly contributes to successful memorization (Bonhage et al., 2014).

Marrero et al. (2020) add a nuanced dimension to this discourse by examining the emotive potency of words in memorization. Their research demonstrates that words with higher emotional arousal are more effectively memorized. Particularly, sentences structured to evoke avoidance relationships elicit more arousal than those suggesting approach dynamics, thereby enhancing memorization efficacy (Marrero et al., 2020). This revelation points to the intricate interplay between emotional resonance and linguistic structure in optimizing memory retention strategies.

Although the method of memorizing vocabulary through article integration has great theoretical feasibility, before the appearance of ChatGPT, many people used the method of stringing together about a dozen words into a story to help themselves remember, understand, and master the use of new words. However, it requires imagination and talent to generate an article, not to mention that this work takes much time, and ordinary people, especially students whose native language is not English, are not up to this task of stringing words into articles.

C. Overview of ChatGPT and Its Application Areas

ChatGPT, developed by OpenAI, is an AI tool based on a large-scale language model that excels in the field of natural language processing (NLP). The core technology of ChatGPT is based on the GPT (Generative Pre-trained Transformer) architecture, which can understand, generate, and respond to natural language. The GPT model learns the deep structure

and patterns of language through pre-training on a vast amount of text data, thus exhibiting strong performance in various language tasks. ChatGPT, through this pre-trained model, can understand complex language queries and generate coherent, logical text responses. Additionally, it provides information-rich, relevant answers based on context, greatly enhancing the naturalness and effectiveness of user interactions.

Functionally, ChatGPT is capable not only of basic question-and-answer tasks but also more complex tasks such as article writing, dialogue simulation, and text summarization. These functions are realized due to its powerful language understanding and generation capabilities, allowing it to be flexibly applied in different contexts. For example, in the field of education, ChatGPT can assist students in learning languages by providing customized learning materials and feedback, helping them improve their language skills. In the business sector, it can be used in customer service, providing quick responses to user queries through natural language processing, thus improving user experience.

Technically, ChatGPT relies on deep learning and neural network technologies, particularly the Transformer architecture. This architecture optimizes the efficiency and effectiveness of processing natural language, especially in understanding long-distance dependencies and contextual information. Through training on a large amount of data, ChatGPT can capture subtle variations and complex structures in language, thereby exhibiting high adaptability and accuracy in different application scenarios. This technological principle makes ChatGPT one of the most advanced tools in the field of natural language processing.

ChatGPT also shows extensive application potential in other fields besides its applications in education and business. In the medical field, it can assist doctors in case analysis and diagnostic suggestions; in the entertainment industry, it can be used for composing lyrics, scriptwriting, and other creative writing; in customer service, it can improve response speed and service quality. These application examples demonstrate the broad applicability and great potential of ChatGPT in various fields, indicating its significant role in the future.

D. Summary and Analysis of Current Research Status

Currently, in the fields of natural language processing (NLP) and artificial intelligence (AI), especially in the application of educational technology, research is rapidly developing and showing a diversified trend. These studies mainly focus on how to use AI technology, especially deep learning-based language models, to improve educational effectiveness and optimize learning experiences. In the field of language learning, researchers are trying to assist vocabulary memorization and language understanding through intelligent systems like ChatGPT, indicating the broad prospects of artificial intelligence in educational applications. However, most of the existing research is still in the exploratory stage and has not fully demonstrated the effectiveness and operability of these technologies in actual teaching.

This study is innovative in that it not only focuses on the application of ChatGPT in language learning but also deeply explores how to use this tool to improve and optimize vocabulary memorization methods. Compared to traditional memorization methods, using ChatGPT for vocabulary learning provides a richer, more interactive, and personalized learning experience. Moreover, this study attempts to combine theories of educational psychology and cognitive science to analyze and evaluate the effectiveness of using ChatGPT for vocabulary learning, which is not commonly seen in existing research.

Furthermore, this study emphasizes the necessity of combining the latest artificial intelligence technology with traditional teaching methods. In the rapidly developing technological context, the field of education urgently needs to update and improve existing teaching strategies to adapt to new learning environments and learner needs. ChatGPT, as an advanced AI tool, offers new perspectives and possibilities for traditional language-learning teaching methods. Through this study, we can better understand how to integrate these new technologies into classroom teaching and self-study, thereby improving teaching efficiency and learning quality.

Finally, the analysis and research findings of this study not only contribute significantly to the field of language learning but also provide new directions for the development of educational technology. By studying the application of ChatGPT in vocabulary learning, we can better understand the potential and limitations of AI technology in education, providing theoretical and practical guidance for the future development and application of related technologies. Therefore, this study is innovative and necessary in the current research trend, and it is of great significance for advancing the development of educational technology and language education.

III. APPLICATION EXPLORATION OF VOCABULARY INTEGRATION INTO ARTICLES ASSISTED BY CHATGPT

Artificial intelligence technology, especially advanced natural language processing tools like ChatGPT, has shown tremendous potential in language learning. This study focuses on exploring how ChatGPT can play a role in assisting language learning, particularly in vocabulary memorization. We will analyze the effectiveness of language materials generated by ChatGPT in helping learners understand, memorize, and use new vocabulary, while also examining how this method compares with traditional vocabulary learning methods, and the innovations and improvements it may bring. Through this exploration, this study aims to establish a comprehensive language learning model that combines artificial intelligence technology with traditional teaching methods, thereby providing more efficient and personalized learning strategies for the field of language education.

A. Research on the Method of Memorizing Words through Articles

The traditional method of memorizing words through articles is primarily designed for students preparing for exams. This method helps students learn and remember new words in specific contexts by embedding them into a complete story or article. The advantage of this method lies in the fact that it not only provides the meaning of the words but also shows how they are used in actual contexts. For example, students preparing for English exams can better grasp each new vocabulary word in the article by reading and understanding the entire article. This method utilizes the coherence of the story and the richness of the context to make vocabulary learning more natural and effective.

However, this method also has limitations in practical application. First, it relies on the quality and relevance of the article or story. If the content of the article does not align with the actual needs or interests of the students, the effectiveness of learning could be significantly reduced. Second, this method requires students to have a certain level of reading comprehension ability, which might be challenging for beginners or students with lower English proficiency. Furthermore, this method may fall short in cultivating students' ability to use new vocabulary independently, as they might overly rely on the context provided by the article, neglecting the application of words in other contexts.

In the current educational environment, considering the diversity and individual differences of students, more flexible and personalized learning methods become particularly important. Although the traditional method of memorizing words through articles is effective in some cases, it is urgent to develop and explore new learning methods to accommodate a wider range of learning needs and improve learning efficiency. For instance, combining artificial intelligence technology, such as ChatGPT, to provide more personalized and interactive learning experiences could be an effective way to enhance the effectiveness of traditional vocabulary learning methods.

Therefore, this study aims to explore and analyze the traditional method of memorizing words through articles and consider how to improve and supplement it with modern technology. In this way, we can provide students with a more efficient, interesting, and personalized vocabulary learning experience, while also better adapting to the diverse learning needs and ability levels of different students. This not only helps to improve the efficiency of vocabulary memorization for students but also promotes their deeper understanding and application abilities in language.

B. Definition and Importance of the Method of Memorizing Words through Articles

The method of memorizing words through articles is a language learning strategy that integrates newly learned vocabulary into stories or articles. The core of this method is that by creating or selecting articles containing specific vocabulary, learners can naturally learn and remember these words while reading and understanding the plot of the story. In this process, the new vocabulary is not isolated but embedded in specific contexts, allowing students to associate and understand the meanings of these words through the plot and emotions of the story. This method leverages human narrative memory and situational memory capabilities, enhancing the memorization of new vocabulary.

From a psychological perspective, stories or articles provide a rich context that can stimulate learners' emotions and imagination, thereby promoting memory and learning. When people read stories, they not only understand textual information but also reconstruct the plot in their minds through imagination, a process that can deepen the understanding and memory of the meanings of words in the article. Additionally, the plot and characters in the story can serve as anchors for memory, helping learners associate new vocabulary with specific situations and emotions, a more effective memory method than mere repetition.

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In educational practice, the method of memorizing words through articles is very effective in increasing students' interest and motivation in language learning. By reading stories, students can enjoy the pleasure of reading while learning new vocabulary, making this learning method more engaging than traditional vocabulary learning methods. Moreover, this method also helps to improve learners' reading comprehension and literary literacy, as it requires students to understand not only individual words but also the context and meaning of the entire story.

However, this method has certain limitations. First, teachers or textbook authors must have a certain level of creativity to create or select interesting stories containing specific vocabulary. Second, if learners' language foundation is weak, they might find it difficult to understand complex story plots, affecting the effectiveness of learning. Therefore, this method needs to be adjusted according to learners' language level and interests.

The method of memorizing words through articles is an effective language learning strategy that combines vocabulary learning with story reading, providing a more vivid and engaging learning approach. This method not only helps to improve students' efficiency in memorizing new vocabulary but also enhances their language comprehension and reading interest. Therefore, in language teaching practice, applying this method can provide students with a richer and more effective learning experience.

C. Demonstration of Vocabulary Integration into Articles Assisted by ChatGPT

In this study, we demonstrate how ChatGPT technology can be used to integrate a randomly selected list of 20 English words (within the English CET 6 test range) into a coherent and readable story. Below is the list of 20 words and an example of their application in a story.

The input prompt is "Please generate a random vocabulary of 20 English words (English CET 6 test range). Then, please connect these 20 English words into one, all in English, and the article should be story-telling and readable. Output English, the whole process is step by step, and check whether the words are integrated into the English article while generating. Output in English." The output of ChatGPT is as follows:

TABLE: I Generated Random Words

Serial Number	Word
1	Resilient
2	Abundant
3	Juxtapose
4	Chronicle
5	Diligent
6	Imminent
7	Benevolent
8	Meticulous
9	Nostalgic
10	Enigma
11	Turbulent
12	Fluctuate
13	Obsolete
14	Gregarious
15	Lucid
16	Paradox
17	Surreptitious
18	Kinetic
19	Hypothetical
20	Quaint

Now, I will create a story integrating these words in a cohesive and readable manner. Let's begin.

"In a quaint village, known for its abundant harvests and gregarious community, there was a resilient old man named John. He lived in a small, kinetic house filled with nostalgic memorabilia from his past. John was a meticulous man, especially when it came to his garden, which was his pride and joy.

One day, a young writer named Emily came to the village to chronicle the lives of its inhabitants. She found John's life particularly interesting, an enigma wrapped in simplicity. Emily was diligent in her work, juxtaposing the old ways of the village with the imminent changes brought by modernity.

John, known for his benevolent nature, welcomed Emily into his home. They often engaged in lucid conversations about life's paradoxes. John explained how the village's once thriving culture was now becoming obsolete, fluctuating between the past and the uncertain future.

Their discussions often turned to hypothetical scenarios, where John would speak of turbulent times that tested his resilience. Emily, in turn, would share her surreptitious dreams of becoming a renowned author.

As the days passed, Emily realized that John's story was not just a chronicle of one man but a reflection of life's resilience in the face of change. She finished her manuscript, hopeful that readers would find the same inspiration in John's story as she did."

This demonstration shows that all the selected words have been integrated into an engaging and meaningful narrative. This showcases the effectiveness of using ChatGPT for vocabulary learning, as well as the feasibility of using story integration as a method of memorization.

IV. CONCLUSION

Before summarizing the research work, this article first reflects on and analyzes the achievements and significance of this study in the current context of educational technology development. Focusing on the application of ChatGPT in language learning, particularly in the field of vocabulary memorization, this study conducts a systematic exploration. Through an in-depth analysis of ChatGPT technology and real application case studies, this research not only demonstrates the tremendous potential of AI-based language learning methods in enhancing learning efficiency and quality but also points out the limitations of current educational technology in addressing personalized learning needs. Additionally, the paper discusses the challenges that ChatGPT technology may encounter in educational applications, providing references for future technology improvements and educational practices.

A. Summary of Research Work

This study comprehensively explores the application of natural language processing (NLP) and artificial intelligence (AI) in the field of language learning, particularly the potential and effectiveness of ChatGPT in assisting vocabulary memorization. The research begins with an overview of the current application status of natural language processing and artificial intelligence technologies in education, emphasizing the importance of advanced tools like ChatGPT in enhancing language learning efficiency and quality. By analyzing the challenges language learners face in vocabulary memorization, the study highlights the limitations of traditional vocabulary learning methods and proposes a new method of improving vocabulary memorization using ChatGPT.

The core part of the study focuses on exploring and demonstrating the vocabulary integration into the articles memorization method using ChatGPT technology. Through practical examples, the research shows how randomly selected vocabulary can be effectively integrated into a coherent and engaging story, thereby enhancing learners' memory and understanding of these words. This method not only makes vocabulary learning more vivid and interesting but also provides a rich context that helps learners better understand the usage and meaning of words.

Moreover, the study analyzes the contribution of ChatGPT's application in vocabulary learning to the field of educational technology. The research points out that applying AI technology like ChatGPT to language learning not only enhances learning efficiency and motivation but also promotes the realization of personalized learning. This technological application provides a beneficial supplement to traditional educational methods, making education more in line with the needs of modern learners.

The study emphasizes the importance and practicality of using AI tools like ChatGPT in language learning, especially in enhancing vocabulary memorization efficiency. By combining modern technology with traditional teaching methods, this study provides new perspectives and methodologies for the field of language education, offering valuable insights and inspiration for the future development and application of educational technology.

B. Main Contributions and Innovations

One of the main innovations of this study is the successful use of the latest ChatGPT technology to assist in language learning, particularly in vocabulary memorization. Traditional vocabulary learning methods often rely on repetitive memorization and standardized textbooks, lacking personalization and creativity. The application of ChatGPT enables each student to quickly generate personalized stories or articles containing unfamiliar words according to their needs. This approach not only makes learning more engaging but also enhances students' understanding and memorization of new vocabulary.

In foreign language learning, remembering the meaning of each word is crucial. With ChatGPT technology, students can quickly integrate challenging words into a narrative article. Compared to traditional learning reference books, this method provides a higher degree of personalization and specificity. Existing learning reference books often provide standardized materials with fixed vocabulary lists, unable to meet the diverse learning needs of each student. The application of ChatGPT technology allows each student to generate learning materials suited to their unique learning situation and vocabulary requirements.

Before the advent of ChatGPT, many learners attempted to memorize vocabulary by weaving a dozen words into a story, a task that typically requires considerable imagination and creative ability. This was a challenging endeavour for most ordinary students, especially non-native English speakers. With ChatGPT, even students lacking creative experience can easily generate exciting stories containing new vocabulary, significantly reducing the learning difficulty and time cost.

Additionally, this study challenges traditional methods in the field of language learning, demonstrating the enormous potential of AI technology in education. With ChatGPT, teachers and learners can explore more innovative teaching and learning methods, making the language learning process more efficient, enjoyable, and personalized, which not only helps to increase learners' motivation but also brings new teaching concepts and methods to the field of language education.

By applying ChatGPT technology to language learning, especially in the field of vocabulary memorization, this study showcases the application value of artificial intelligence in modern education. This innovation not only improves the limitations of traditional vocabulary learning methods but also provides new possibilities for personalized and efficient language learning.

C. Limitations and Shortcomings

Despite the significant achievements of this study in utilizing ChatGPT for vocabulary learning, there are some limitations and shortcomings. Firstly, although ChatGPT excels in generating meaningful and coherent stories, it relies on algorithmically generated texts that may not fully meet the personalized needs of specific learners. The algorithm-generated content may sometimes lack specificity and depth, affecting learners' deep understanding of complex vocabulary and concepts.

Secondly, the study mainly focuses on word memorization and understanding, while other aspects of language, such as grammar, phonetics, and practical application skills, have not been given enough attention. Although vocabulary is a fundamental component of language learning, achieving fluent language use requires comprehensively considering grammar structures and language practice.

Furthermore, this study relies on ChatGPT technology, which may lead to an overdependence on the technology itself. Learners may face challenges in environments or situations with insufficient AI support or technological resources. Therefore, the applicability of this method may be limited for those with limited access to technology.

Additionally, in applying ChatGPT, the study may overlook the importance of cultural and linguistic background diversity in language learning. Learners from different cultural and linguistic backgrounds may have varying cognitive and emotional responses to vocabulary understanding and application. Therefore, algorithm-generated universal stories may not fully meet the needs of all learners.

Lastly, the study might not have sufficiently considered assessing long-term learning effects during design and implementation. While the application of ChatGPT may improve vocabulary memorization efficiency in the short term, its impact on long-term language proficiency requires further in-depth study and evaluation. Future research could explore effectively combining ChatGPT with traditional teaching methods to achieve long-term and sustainable language learning outcomes.

D. Suggestions and Prospects for Further Research

In response to the limitations and challenges identified in this study, future research should focus on further optimizing and expanding the vocabulary memorization method based on ChatGPT. Firstly, research should explore how to enhance the personalization of content generated by ChatGPT. Future systems could consider integrating advanced user input features, such as allowing learners to input specific interests, learning goals, or cultural background information, to generate learning materials more closely tailored to individual needs. This ensures that the generated content is linguistically educational and culturally and emotionally resonant with learners.

Secondly, future research should consider combining ChatGPT with other learning resources and methods for a more comprehensive language learning experience. For example, combining traditional teaching methods, such as classroom instruction, interactive learning activities, and practical language application exercises, can help students better understand and use newly learned vocabulary. Additionally, research could explore using ChatGPT to enhance learners' grammar, pronunciation, and conversational skills, thus developing well-rounded language learning.

Thirdly, future research should also focus on the issue of equity in technology access. Efforts should be made to develop more accessible and user-friendly ChatGPT applications, especially to support students learning in resource-limited environments. Moreover, research should consider how to make this technology applicable to learners from different cultural and language backgrounds, ensuring that all students can benefit.

Furthermore, evaluating the long-term learning effects is another important direction for future research. Studies should focus on the long-term effects of using ChatGPT for vocabulary learning, including improving learners' language proficiency and the sustainability of their learning motivation. A more comprehensive assessment and understanding of ChatGPT's role and impact in language learning can be achieved through long-term follow-up studies.

Finally, future research should also explore integrating the latest advancements in artificial intelligence technology and natural language processing to enhance the functionality and efficiency of ChatGPT further. Through continuous technological innovation and improvement, ChatGPT can become an even more powerful and flexible tool, providing language learners with a more efficient and personalized learning experience.

In summary, this study, by applying ChatGPT technology to language learning, especially in the area of vocabulary memorization, demonstrates the potential applications of artificial intelligence in modern education. This innovative approach not only addresses the limitations of traditional vocabulary learning methods but also opens new possibilities for personalized and efficient language learning, contributing significantly to the fields of language education and educational technology.

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