The Choice of English Vocabulary Learning Strategies by Chinese Students in the Era of Intelligentization: Problems and Challenges

Yang Ziqi[1], & Khairul Azhar Jamaludin[1,2,3]

[1]Faculty of Education, Universit Kebangsaan Malaysia, Bangi, Selangor, Malaysia, [2]University Researeh Group on ELITEE: Enhanced Learning for lnclusive Transformatiom Education Experience, [3]University Research Group on Eduxcellence: Development of lnnovative Cumiculum &Pedagogy
Email: P132584@siswa.ukm.edu.my, khairuljamaludin@ukm.edu.my

Abstract

In the era of intelligence, cutting-edge technologies such as artificial intelligence (AI), big data, and cloud computing have been widely applied in the field of education, leading to innovations in traditional English teaching models and enhancements in teaching efficiency and quality. However, the intelligent age has also brought about certain problems and challenges. This article explores the issues and challenges faced by Chinese students in their vocabulary learning strategies in English study under the background of the intelligent age. The study finds that in the intelligent age, the English vocabulary learning strategies of Chinese students mainly face three major challenges: the challenge of cultivating learning motivation and autonomous learning skills, the challenge in the application of technology and teaching resources, and the challenge of updating teaching content and methods. This research will provide valuable references for educators to design more effective teaching strategies and curriculum content that are conducive to the personal development of students, and it is also of great significance for improving the overall level of English education in the country.

Keywords: Intelligence Age, English Vocabulary Learning Strategies, Chinese Students, Issues, Challenges

Introduction

In today's era, the rapid advancement of technology is continuously driving transformation in the field of education. Particularly, cutting-edge technologies such as Artificial Intelligence (AI), big data, and cloud computing have begun to play an increasingly vital role in the educational sector, especially in the domain of English language teaching. The application of these technologies not only offers innovative opportunities for traditional teaching models but also provides new avenues for enhancing the efficiency and quality of teaching. On one hand, AI technology can, through personalized learning systems (Hashim et al., 2022), offer customized teaching content and paces based on each student's learning

habits and abilities, thereby improving learning efficiency. For instance, AI can analyze students' learning data, predict potential difficulties they might encounter, and provide corresponding tutoring and resources in advance. On the other hand, the integration of digital technology also fosters innovation in teaching methods (García-Martínez et al., 2024). For example, through Virtual Reality (VR) and Augmented Reality (AR) technologies, students can immerse themselves in simulated English environments for more vivid and authentic language practice.

China's digital transformation is advancing at an unprecedented pace, profoundly impacting various fields including the economy, society, and culture (Demiryurek et al., 2020; Khitskov et al., 2017; Vey et al., 2017). On the policy front, the Chinese government has issued guiding documents such as the "Overall Layout Plan for the Construction of Digital China," providing solid policy support for digital development. These policies have not only spurred rapid growth in the digital economy, with the overall size of China's digital economy expected to reach 70.8 trillion yuan by 2025, but have also accelerated innovation and application of key technologies like 5G, artificial intelligence, and big data. China's digital transformation is a comprehensive and in-depth process that encompasses not only technological innovation and economic growth but also extends to social governance, public services, and international cooperation. With continuous technological advancements and ongoing policy support, China's digital transformation is expected to further accelerate, bringing new opportunities and challenges for the country's development. Consequently, China's intelligent background is bound to provide a wealth of resources and tools for English education.

Vocabulary is the foundation of language learning, and effective vocabulary learning strategies are crucial for improving the efficiency and outcomes of English learning (Tilfarlioglu & Bozgeyik, 2012; Jaikrishnan & Ismail, 2021). These strategies not only enhance students' memory capabilities but also strengthen their accuracy and fluency in actual communication. On one hand, the core of vocabulary learning strategies is to help students build a systematic memory network. Through associative memory techniques, students can link new words with known vocabulary or concepts, thereby deepening their memory impression. For instance, when learning the word "apple," one can associate it with its synonym "fruit" or related phrases like "apple pie." Additionally, by using categorical memory techniques, students can group words by theme or usage, such as categorizing "apple" under the "fruits" category. On the other hand, contextual learning is key to improving vocabulary usage skills. Students should learn new words within sentences or articles so that they can understand not only the meaning of the words but also grasp their usage in different contexts. For example, by reading an article on healthy eating, students can learn the word "nutritious" and understand its application when describing food. Moreover, students can also exchange learning experiences with others through social media and forums to gain advice on vocabulary learning. Online courses and MOOCs offer structured vocabulary learning programs that help students learn vocabulary systematically.

In the era of intelligence, students' vocabulary learning strategies have been greatly enriched. Electronic dictionaries, such as NetEase Youdao Dictionary, are no longer just word lookup tools; they integrate AI technology to provide diverse functions like voice input, handwriting recognition, and photo translation. They also offer features like human pronunciation and reading training, making learning more interactive and practical. Online

learning software like Anki and Quizlet utilize spaced repetition techniques to help students consolidate memory at the optimal time, with customizable learning cards and progress tracking, making learning more efficient (Zeitlin & Sadhak, 2023). Mobile applications like Duolingo and Memrise incorporate gamification elements into the learning process, setting up levels, rewards, and achievement systems to make learning fun while emphasizing grammar, sentence structure, and vocabulary memorization (Hasif & Darmi, 2024). Additionally, platforms like Lingvist use artificial intelligence algorithms to personalize learning content, ensuring that users can focus on learning the most practical vocabulary (Sarnovska, 2024). These tools and platforms often provide highly interactive community features, allowing users to share courses and discuss learning strategies, increasing the social motivation for learning. Multimodal learning resources, such as videos and images, along with cross-platform learning support, enable users to continue learning on any device, even offline. Intelligent learning tools are becoming increasingly personalized, for example, Memrise's personalized recommendation feature, which provides customized learning materials based on the user's memory situation, further enhancing learning efficiency (Zhang, 2019). Overall, these intelligent learning tools and resources are changing the way students learn vocabulary, enabling them to master new languages more efficiently and enjoyably.

However, while the intelligent era brings positive impacts on English vocabulary strategies, it also brings some problems and challenges, but few documents systematically discuss and elaborate on this issue. For instance, students may become overly reliant on technology, neglecting traditional learning methods such as paper reading and handwriting practice. Moreover, the application of intelligent technology also requires teachers to have certain technical skills, which puts forward new demands for teachers' professional development. In view of the rapid development of intelligent reform in today's era, especially in China, it is necessary to understand the specific challenges faced by Chinese students' vocabulary learning strategies in the context of the intelligent era, which is of great reference value for language education in China.

In the context of intelligentization, the challenges and issues faced by Chinese students in English vocabulary learning are multifaceted. This study aims to deeply analyze these challenges and explore how to optimize students' vocabulary learning strategies through intelligent means. The research will collect specific problems encountered by Chinese students in English vocabulary learning through methods such as questionnaires, interviews, and classroom observations, such as difficulties in vocabulary memorization, insufficient understanding of context, and limited vocabulary usage skills. At the same time, the study will also focus on how intelligent technology affects students' vocabulary learning process, including the use of online learning platforms, the degree of dependence on vocabulary learning software, and the effectiveness of AI-assisted teaching.

The findings of the study will provide valuable references for educators to help them design more effective teaching strategies and curriculum content. For example, educators can develop teaching methods adapted to the intelligent environment, guide students on how to select and utilize a vast array of online resources, and improve their information literacy. In addition, the research results will also guide the development of intelligent learning tools that are more in line with student needs, such as personalized vocabulary learning applications and interactive learning platforms that can simulate real contexts.

Ultimately, the implementation of these strategies will not only improve students' efficiency in learning English vocabulary but also enhance their motivation and confidence, thereby improving the overall learning experience and outcomes. This is beneficial not only for the personal development of students but also has significant importance for improving the overall level of English education in the country.

Literature Review
Definition of Vocabulary Learning Strategies
In the discussion of language learning strategies, the development of vocabulary learning strategies has become an important research branch. Jerome Bruner introduced the concept of cognitive strategies in 1956, which laid the foundation for subsequent research on learning strategies. Subsequently, Newell & Shaw (1958) expanded the field of learning strategy research by studying problem-solving strategies through computer simulation. Building on this research, Bialystok (1978) proposed that learning strategies are an ideal method for extracting effective information and enhancing the efficiency of second language learning. O'Malley & Chamot (2001) more explicitly defined learning strategies, considering them as the techniques and methods adopted by learners during the learning process that can help improve learning efficiency, memory, and the consolidation of new language materials in terms of form and content. Oxford & Ehrman (1992) also emphasized the importance of learning strategies in the learning of new materials. Wen Qiufang (1995) in her research pointed out that learning strategies are measures taken to improve learning efficiency. These studies explore the role of learning strategies in language learning from different perspectives, providing a rich theoretical foundation and practical guidance for subsequent research.

Classification of Vocabulary Learning Strategies
As research into learning strategies continues to deepen, scholars have begun to focus more on the classification and systematic study of learning strategies. Oxford & Ehrman (1992) categorized cognitive strategies, compensation strategies, and memory strategies as direct strategies, while meta-cognitive strategies, social strategies, and affective strategies were considered indirect strategies. O'Malley & Chamot (2001) further proposed that learning strategies are composed of three core elements: metacognitive, cognitive, and socio-affective strategies, with metacognitive strategies including sub-strategies such as self-management, self-monitoring, pre-planning, and directing attention. Cohen (2012), in the context of vocabulary learning, proposed strategies such as inferring word meaning through context, key-word memorization, and root memorization. Building on the research of Schmitt & Oxford, Norbert & Schmitt (2002) proposed discovery strategies and consolidation strategies, further subdividing them into 58 specific vocabulary learning strategies. In addition, some researchers have used questionnaire surveys to explore vocabulary learning strategies (Gu & Johnson, 2010). Wen Qiufang (1996), in her study of English learning strategies, divided them into two major categories: learning concepts and learning methods, with the latter further divided into specific learning and management modes.

The Related Impacts of Vocabulary Learning Strategies

The selection of vocabulary learning strategies is crucial for the effectiveness of language learning. Good vocabulary learning strategies not only promote the accumulation of language knowledge but also accelerate the improvement of language skills. Numerous studies have shown that effective vocabulary learning strategies can significantly improve learners' English proficiency, which has been confirmed in many studies (Gu & Johnson, 1996). When exploring the relationship between vocabulary learning strategies and English proficiency, researchers have found that different learners differ in the selection and use of vocabulary strategies. For instance, Huh's study in 2009 pointed out that the effective use of vocabulary learning strategies can significantly enhance learners' vocabulary abilities (Huh, 2009). Furthermore, Tilfarlioglu and Bozgeyik's research in 2012 also found that the vocabulary learning strategies employed by learners are closely related to their improvement in English proficiency (Tilfarlioglu & Bozgeyik, 2012). Jafari and Kafipour's study in 2013 further discovered that learners of different English proficiency levels exhibit significant differences in the choice of vocabulary learning strategies. High-level English learners tend to use more cognitive and metacognitive strategies (Jafari & Kafipour, 2013). Ghalebi et al.'s survey research on Iranian students in 2021 also found similar results, that is, high-level English learners use various vocabulary learning strategies more frequently, while low-level learners do not significantly differ from high-level learners in the use of social strategies (Ghalebi et al., 2021).

Methodology

To delve deeper into the research problem, this study employs an interview research method. Interview research method is a qualitative research method that collects data by conducting face-to-face or telephone or online interviews with the research subjects (Jamshed & Shazia, 2014). Interviews can be structured, semi-structured, or unstructured, depending on the degree of control the researcher has over the interview content. Interview research method is a very valuable research tool that can help researchers gain a deep understanding of people's behaviors, attitudes, beliefs, and experiences.

Specifically, this study randomly selected 10 experienced teachers from a primary school in Jinan, China, including 5 male teachers and 5 female teachers, and conducted semi-structured interviews with them. The main interview content was as follows:

(1) How long have you been teaching English? During your teaching career, have you noticed any changes in the way students learn English vocabulary?

(2) Do you recommend that students use intelligent tools to learn English vocabulary? If so, which tools do you recommend?

(3) How do you evaluate the role of intelligent tools in helping students learn English vocabulary?

(4) Have you noticed any tendencies in your students' choices of English vocabulary learning strategies?

(5) What do you think are the main problems and challenges that students face when learning English vocabulary in an intelligent environment?

(6) How do you help students overcome these challenges?

(7) How do you evaluate the effectiveness of students using intelligent tools to learn English vocabulary?

(8) With the development of intelligent technology, what do you think will be the changes in English vocabulary learning strategies in the future?

(9) What are your expectations for the future of intelligent English learning tools?

(10) What challenges have you faced in guiding students to use intelligent tools, and how have you overcome them?

This study conducted a descriptive analysis of the interview content, and the results are as follows:

The first is that the accumulation of teaching experience significantly influences teachers' observations of changes in Chinese students' strategies for learning English vocabulary. Specifically, among teachers with more than five years of teaching English, three female and two male teachers noticed a significant shift in Chinese students' strategies for learning English vocabulary. In contrast, among teachers with less than five years of teaching experience, only two female and one male teacher observed this change.

Second, intelligent devices have played a key role in significantly improving students' English scores, especially vocabulary learning software, which are considered the most powerful tools for English vocabulary learning. Through interviews with ten teachers, we found that they all recommended students use intelligent devices to assist their English learning. Among them, Memrise and other vocabulary memorization software were particularly praised by teachers for their efficient learning methods and personalized learning experiences.

Third, the role of smart devices in English language learning is a double-edged sword, and if used improperly, it may have a negative impact on students' English language learning. In a detailed analysis of the interview content of ten teachers, we noticed a common concern: improper use of smart devices may have a negative impact on students. Specifically, four female teachers and three male teachers pointed out that excessive reliance on smart devices may lead to a decline in students' ability to learn independently, as well as a lack of necessary guidance in choosing smart devices, which may affect learning outcomes.

Fourth, the teacher's proficiency in using intelligent devices to a large extent determines its effectiveness in English teaching. In the summary of interviews with ten teachers, we found an interesting phenomenon: only three male teachers and one female teacher fully recognized the key role of artificial intelligence in English vocabulary learning. They realized that intelligent devices are not just vocabulary learning software, but also include large language models such as ChatGPT, which play an increasingly important role in English learning. However, other teachers tend to focus only on vocabulary software when discussing intelligent devices, ignoring the potential and importance of these emerging technologies in improving students' English levels.

Finally, the intelligent age poses new challenges to the selection of English vocabulary learning strategies, which is not only a problem that students need to face, but also a topic that teachers must jointly address. In in-depth interviews with ten teachers, we noticed a notable trend: four female teachers and three male teachers all pointed out that the problems and challenges faced by students in choosing English vocabulary learning strategies were partly due to the teachers' own inadequacies in the field of intelligent knowledge. This inadequacy not only affects the teacher's effective guidance to students but also limits the potential of intelligent technology in English teaching.

Findings

Through further sorting and summarizing of these interview transcripts, this study has the following three findings. These findings provide a profound insight into the difficulties and challenges faced by English vocabulary strategies in the digital age, and by effectively addressing these problems and challenges, they will promote the healthy development of English vocabulary learning strategies, thereby enhancing English teaching capabilities and increasing students' English proficiency.

The Challenge of Developing Autonomous Learning Skills

In exploring the problems and challenges that students face in English vocabulary learning strategies in the era of artificial intelligence, we conducted in-depth interviews with ten teachers. Among them, four female teachers and three male teachers pointed out a critical issue: the lack of students' autonomous learning ability. They believe that in the context of the increasing popularity of artificial intelligence devices and software, students may become increasingly dependent on these tools, gradually losing their ability to learn and explore independently. This dependence may weaken students' flexibility in English vocabulary learning and affect their ability to apply it effectively in real English environments.

Therefore, this study believes that in the context of the intelligent era, the application of artificial intelligence technology in providing personalized learning resources and environments for students may also pose challenges to the cultivation of their learning enthusiasm and autonomous learning habits. On one hand, students may weaken their self-motivation due to over-reliance on intelligent learning tools. When learning resources and paths are meticulously arranged by intelligent systems, students may reduce their motivation for self-exploration and proactive learning. This dependency may leave students feeling lost without the assistance of intelligent tools, unsure of how to learn independently and solve problems. On the other hand, the intelligent learning environment may reduce opportunities for students to face difficulties and challenges. Encountering and overcoming difficulties during the learning process is an important way to cultivate problem-solving skills. However, intelligent tools may help students bypass these difficulties instead of encouraging them to face challenges directly, thereby reducing opportunities to develop necessary learning perseverance.

Challenges in Technology Application and Teaching Resources

In ten in-depth interviews with teachers, we explored the challenges and future directions faced by students in choosing English vocabulary learning strategies in the era of artificial intelligence. Four male teachers and three female teachers emphasized the problems and challenges faced by students and teachers in adapting to new technologies. They pointed out that the rapid development of the artificial intelligence era has brought endless English vocabulary learning software and constantly updated intelligent educational equipment, which has increased the learning cost of students to some extent and made students confused in their choices, increasing the difficulty and cost of choice and thereby affecting the learning efficiency of students and the quality of education of teachers.

Based on this, this study believes that in the era of artificial intelligence, education, especially teaching methods and learning styles, has been deeply affected, which is undeniable. Both teachers and students need to adapt to new technologies, which brings

them new requirements and challenges. On one hand, the role of the teacher is undergoing transformation. They are no longer merely transmitters of knowledge but have become guides and facilitators of learning. Educators are expected to utilize intelligent tools and platforms, such as smart teaching platforms, to design and implement educational activities. This requires them not only to be proficient in new technologies but also to integrate them creatively into their teaching. Concurrently, teachers are tasked with helping students develop autonomous learning abilities, encouraging them to utilize intelligent resources for exploration and research. On the other hand, from the students' perspective, the intelligent learning environment offers a wealth of resources and tools, which undoubtedly increases their learning options. However, this also presents challenges. Students need to learn how to select and utilize these resources rather than passively receiving information. They must cultivate habits of autonomous learning, including self-management, time management, information literacy, and critical thinking skills.

Challenges in Updating Teaching Content and Methods

After in-depth discussions with ten teachers on the problems and challenges faced by students in English vocabulary learning strategies in the era of artificial intelligence, as well as the future development direction, three male teachers and female teachers put forward a critical challenge. They believe that the transformation of students' English learning strategies in the era of artificial intelligence is carried out simultaneously with the reform of educational content and methods. The emergence of artificial intelligence devices, software, and platforms provides students and teachers with rich resources, but also brings about a new revolution in learning content and methods. These revolutions not only affect traditional teaching modes but also have a profound impact on students' English vocabulary learning strategies. If educational content and methods cannot keep up with the times, it will lead to a lag in English vocabulary learning strategies and ultimately affect students' English level.

Based on this, this study believes that in the era of artificial intelligence, education is undergoing unprecedented changes. As direct participants and promoters of this transformation, teachers face the challenge of continuously updating their teaching content and methods to adapt to the rapid changes in the technological environment and the diverse needs of students. Firstly, teachers need to enhance their technological application skills. With the rise of technologies such as artificial intelligence, big data, and cloud computing, teachers must master the basic applications of these technologies and be able to effectively integrate them into their teaching practices. This includes not only using online education platforms for remote teaching but also employing data analysis tools to track students' learning progress, as well as utilizing virtual reality and augmented reality technologies to create immersive learning experiences. Secondly, teachers must update the content of their teaching to maintain its relevance to the times. This means that teachers need to keep up with the latest trends in technological development and integrate these trends into curriculum design, allowing students to understand and master the latest knowledge and skills. For example, with the development of artificial intelligence technology, teachers can introduce courses such as programming and machine learning, providing students with skills needed for future society. Lastly, teachers need to innovate teaching methods to adapt to the personalized learning needs of students. The intelligent era encourages teachers to explore new teaching models such as project-based learning, flipped classrooms, and collaborative

learning, which can better stimulate students' interest in learning, improve their initiative in learning, and enhance their critical thinking skills.

Discussion

The findings of this study offer valuable insights into the challenges and opportunities that Chinese students encounter in the era of intelligentization when adopting English vocabulary learning strategies. The integration of AI and digital technologies in education has transformed the learning landscape, providing a plethora of resources and tools designed to enhance the efficiency and effectiveness of vocabulary acquisition. However, this technological boon also presents a dual-edged sword, with potential drawbacks that need to be addressed.

First, one of the primary challenges highlighted in our study is the potential negative impact of intelligent learning tools on students' autonomous learning skills. The convenience offered by AI can lead to a decrease in self-motivation and self-directed learning abilities. Students may become overly reliant on AI for guidance, which could hinder their capacity to learn independently and solve problems without technological crutches. This over-reliance is a significant concern, as autonomous learning is a critical skill for lifelong education and adaptability in the rapidly changing job market.

Second, the application of intelligent technology in education demands a shift in the role of educators and students. Educators are expected to become facilitators of learning, requiring technical proficiency to integrate AI tools into their teaching. Students, on the other hand, must navigate a vast array of resources, which can be both empowering and overwhelming. The challenge lies in training teachers to effectively use these tools and equipping students with the skills to discern and utilize quality learning resources.

Third, the rapid pace of technological advancement requires continuous updating of teaching content and methods. Educators must stay abreast of new developments and integrate relevant, up-to-date material into their curriculum. This challenge is exacerbated by the need to adapt to personalized learning, which requires innovative teaching methods that can cater to individual student needs. The development of intelligent learning tools must also keep pace with these changes to remain effective and relevant.

Finally, educators need to be trained in the use of intelligent tools and be provided with resources to design lessons that foster autonomous learning. Policy makers must support the integration of AI in education by developing guidelines that ensure the ethical and effective use of these tools. Additionally, there is a need for policies that promote digital literacy and critical thinking skills among students to prepare them for the challenges of the intelligent era.

For future research, it is recommended that studies explore the long-term effects of AI on student learning outcomes and autonomy. Research could also focus on developing best practices for integrating AI tools into the curriculum in a way that enhances rather than replaces traditional learning methods. Furthermore, investigating the impact of AI on different student cohorts, such as those from diverse socioeconomic backgrounds or with different learning needs, could provide a more comprehensive understanding of the technology's role in education.

In conclusion, the intelligent era presents both challenges and opportunities for English vocabulary learning among Chinese students. By understanding and addressing these challenges, educators can leverage the benefits of AI to enhance the learning experience and outcomes for students, ultimately contributing to the advancement of English education in China.

Conclusion

In the era of intelligence, unprecedented opportunities have emerged for English learning, but a series of challenges have also arisen. Chinese students face challenges in vocabulary learning strategies, including information overload, over-reliance on technology, and the need for teachers to update teaching content and methods. To address these challenges, educators need to design teaching methods adapted to the intelligent environment, guide students on how to effectively use online resources, and improve their information literacy. In addition, teachers need to update teaching content to adapt to the rapid changes in the technological environment and the diverse needs of students. The development of intelligent learning tools and resources also needs to be more personalized to meet the learning needs of students.

By implementing these strategies, the efficiency and motivation of students in learning English vocabulary can be improved, thereby enhancing the overall learning experience and outcomes. This is of great significance for the personal development of students and the improvement of the overall level of English education in the country. Future research can further explore how to better integrate intelligent technology and traditional teaching methods to achieve more effective vocabulary learning.

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