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An Analysis of AI Utilization in Learning Basic-Level Mandarin Writing Skills

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Artificial Intelligence, Mandarin Language Learning, Writing Skills, Educational Technology

Abstract

The development of technology, particularly Artificial Intelligence (AI), has brought significant changes in various aspects of life, including education. The presence of AI has opened new opportunities to create a more effective, interactive, and adaptive learning process tailored to students' needs. This technology can be applied in nearly all aspects of academic learning, from providing information resources to supporting cognitive processes and practice activities. In the context of language learning, especially Mandarin writing skills, AI plays an important role as a learning tool that helps students overcome various challenges, such as difficulties in understanding sentence structures, writing hanzi, and composing grammatically correct paragraphs. This study employed a mixed-methods research approach using a convergent parallel design, which combines quantitative and qualitative data to gain a comprehensive understanding. The findings indicate that AI can serve as an effective learning aid when used appropriately and responsibly. In writing skills, AI has been shown to assist students in understanding vocabulary, sentence structure, translation, and organizing short, structured paragraphs. However, the use of AI should be guided to ensure that students do not become overly dependent on it, but rather use the technology to strengthen their conceptual mastery and develop independent writing abilities. Therefore, AI should function as a supportive learning tool, not as a replacement for the teacher's role in the Mandarin language learning process.

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INTRODUCTION

Technological advancements have brought significant changes in various aspects of life, including education. One of the rapidly developing and widely used innovations today is Artificial Intelligence (AI). Artificial Intelligence aims to develop methods and systems capable of solving problems that typically require human intellectual activity, as well as to enhance the performance of computer-based information systems. (Susatyono, 2021) AI can be utilized to assist in nearly all aspects of academic learning and has recently become a subject of growing research interest. (Empati et al., 2024)

AI in education has opened new opportunities in the learning process, particularly in enhancing learning effectiveness. (Subiyantoro et al., 2023) This technology offers various features such as adaptive learning, data analysis, and AI-based interactions that help improve students' understanding and learning skills. Technology in education is not merely about knowledge itself but also serves as a source of information and a learning medium that supports educational needs and facilitates the teaching and learning process. (Nurillahwaty, 2021)

In language learning, particularly in Mandarin, AI can serve as a highly useful tool. Mandarin is known as one of the most challenging languages to learn. To master it, learners must acquire three main aspects of the language: pronunciation, vocabulary, and grammar. However, students often face difficulties in pronunciation, text comprehension, and developing writing skills. (Pamuji et al., 2023) Therefore, the use of AI technology can help students overcome these challenges.

Several AI-based applications such as Duolingo, Pleco, Google Translate, and ChatGPT have been widely used in learning Mandarin. For example, ChatGPT offers a variety of features that students can utilize, such as speech recognition, which helps them practice pronunciation. In addition, it provides tools to assist students in understanding word meanings, constructing grammatically correct sentences, and receiving feedback or corrections on grammatical errors. (Supriyono & Prihandono, 2024)

As one of the higher education institutions that continues to innovate in learning methods, Universitas Negeri Semarang (UNNES) has great potential to optimize the use of AI in Mandarin language learning. Students of the Mandarin Language Education Study Program are expected to utilize AI as a learning aid to enhance their skills in listening, speaking, reading, writing, and comprehending Mandarin more effectively.

This study focuses on the use of AI in learning basic-level Mandarin writing skills, both in classroom activities and independent learning, as a tool to assist students in completing their assignments. Basic-level writing skills include knowledge and understanding of Hanzi, vocabulary, grammar, simple sentence construction, and short paragraph writing.

Although the use of AI offers many benefits, there has been limited research specifically examining

the impact of AI on Mandarin language learning at the higher education level, particularly at Universitas Negeri Semarang.

METHOD

This study employed a mixed-methods research design based on Creswell & Plano Clark (Crewell et al., 2007), mixed-methods research is an approach that involves collecting, analyzing, and integrating both quantitative and qualitative data within a single study or a series of studies to provide a more comprehensive understanding of the research problem. The specific design used in this study is the Convergent Parallel Design, in which quantitative data (questionnaires) and qualitative data (observations and documentation) were collected simultaneously, analyzed separately, and then merged and compared to determine whether the results support or complement each other. This approach aims to gain a holistic understanding of students' perceptions of AI in Mandarin language learning, particularly in basic-level writing skills. The research subjects consisted of 46 students of the Mandarin Language Education Study Program at Universitas Negeri Semarang, class of 2024.

RESULTS AND DISCUSSION

This study focuses on two aspects: the utilization of Artificial Intelligence (AI) and the impact of AI use on learning basic Mandarin writing skills.

1. The utilization of Artificial Intelligence (AI) in learning basic Mandarin writing skills.

Based on the observations, all students used AI applications both during classroom learning and in independent study outside the classroom. In general, AI applications were used to search for new vocabulary, translate new words or Mandarin sentences into Indonesian, construct sentences in Mandarin, and find the stroke order of Hanzi. This indicates that AI has become an integral part of students' learning strategies to enhance their Mandarin language proficiency, particularly in basic writing skills.

Based on the questionnaire results, it can be seen that all students are familiar with AI technology and frequently utilize it in learning basic writing skills, both in class and independently outside the classroom. The most commonly used AI applications and websites include ChatGPT, Pleco, Google Translate, Duolingo, Gemini, Perplexity, Grok, and DeepSeek. In addition, several supporting applications are also used, such as SuperChinese, Stroke Order, Laoshi.io, Meta AI, Quizizz, Quizlet, Google Assistant, OpenAI, Character AI (c.ai), Chinesia, Chinese Converter (for Hanzi stroke order), Black Box, DeepL, English–Indonesian Dictionary, Mira, Stimuller, HelloChinese, HeyChina, HeyJapan, HeyKorea, Qwen, Claude AI, Cici, Papago, and Grammarly. Each of these platforms serves different functions, ranging from translating vocabulary, learning Hanzi stroke order, and

practicing conversations, to finding additional information related to the Mandarin language.

Most students use AI applications primarily to search for Hanzi characters, word meanings, pinyin, radicals, and stroke order. In addition, many students utilize them for vocabulary practice, example sentences, grammar correction (yufa), and assistance in composing essays or sentences. Additional features that are frequently used include speech recognition, audio transcription, and tools that help understand word usage and sentence patterns. Several respondents also emphasized the importance of these applications in improving pronunciation, providing detailed grammar explanations, and serving as supplementary references when dictionaries are unclear or when writing essays in Mandarin.

Based on the results of the observations and questionnaires above, it can be concluded that all students are aware of and have used AI technology in learning Mandarin. The most widely used applications are ChatGPT, Pleco, and Google Translate, while other applications such as Duolingo, Gemini, DeepSeek, Perplexity, SuperChinese, Laoshi.io, and Papago serve as supporting tools according to specific needs.

Most students frequently use AI, particularly for completing assignments, searching for Hanzi along with their meanings, pinyin, tones, radicals, and stroke order, as well as for practicing vocabulary, grammar, pronunciation, example sentences, and essay writing. Some also take advantage of features such as speech recognition, audio transcription, and answer correction to support their language skills.

Thus, AI plays a significant role as a comprehensive learning tool that not only facilitates access to information related to writing skills but also effectively supports the development of reading, listening, and speaking skills in Mandarin language learning.

2. The impact of AI use on basic Mandarin writing skills.

Observation of this second aspect was carried out by examining students' scores on daily assignments and midterm exams. This aimed to measure the level of students' understanding when completing tasks with and without the assistance of AI. The observation took place from the first week of the course until the eighth week, which coincided with the midterm examination. During daily assignments, students were allowed to use AI as a supporting tool to compose short essays; however, certain limitations were applied. Students were required to follow the assigned themes, vocabulary, and grammar structures, and collaboration among students was strictly prohibited. If identical essays were found, the involved students would receive a score of zero. In contrast, the use of AI was not permitted during the midterm exam.

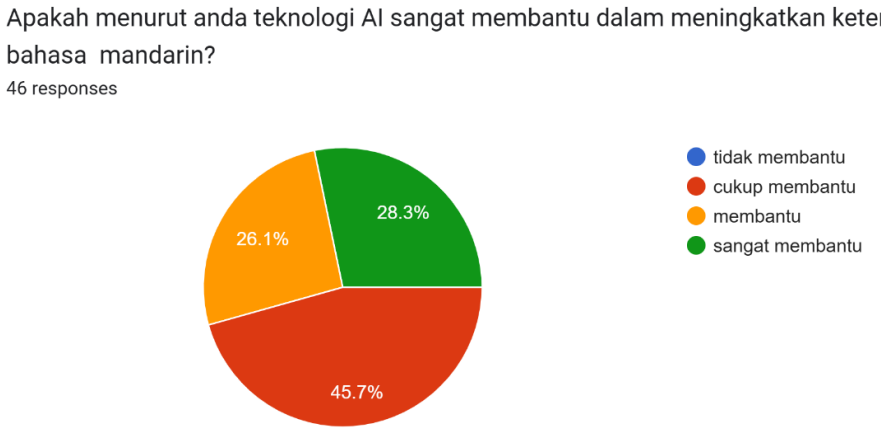
The observation results showed a difference in students' writing skill levels between daily assignments and the midterm exam. In daily assignments, only one student scored below 65. However, during the midterm exam, this number increased to seven. On average, there was a slight decrease in the overall

score—from 83.7 on daily assignments to 83 on the midterm exam. Nevertheless, individual data revealed that 27 out of 46 students (58.7%) actually showed an improvement in their midterm scores. This indicates a variation in student performance. One possible factor influencing this outcome is the policy on AI usage: students were allowed to use AI assistance for daily assignments, but not during the midterm exam.

The difference in results between daily assignments and the midterm exam indicates that although 58.7% of students showed an improvement in their scores and the overall average decreased only slightly, there was a significant increase in the number of students scoring below 65 in the midterm exam. This suggests that some students (19 students whose scores declined) were still highly dependent on AI assistance when completing their daily assignments. When facing the midterm exam without AI support, their performance dropped, reflecting a lack of independent mastery of the material. The policy allowing AI use in daily assignments but prohibiting it in the midterm exam also highlights the variation in students' autonomy and readiness to complete tasks independently. Therefore, it is necessary to guide students in using AI as a learning aid rather than as the primary tool for completing assignments.

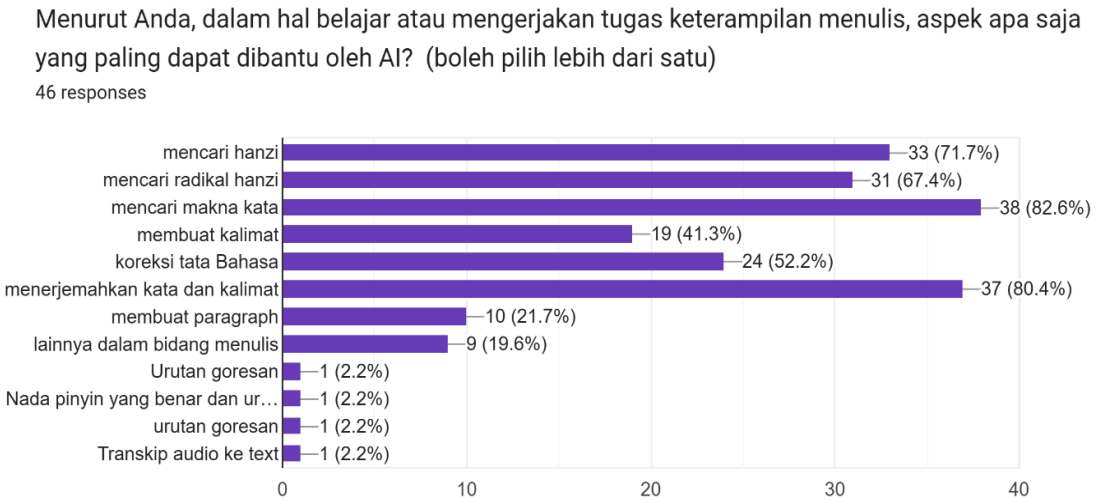
The following are the results of the questionnaire on the impact of AI use on Mandarin writing skills, which was distributed to the students.

Chart 1 Result of question no. 8 from the questionnaire



Based on the diagram for question number 8 above, 28.3% of students stated that AI greatly helps improve writing skills, 26.1% stated that AI helps improve writing skills, and 45.7% stated that AI somewhat helps improve writing skills. Therefore, it can be concluded that the majority of students perceive AI as having a positive influence and experience tangible benefits from using AI to enhance their Mandarin writing skills.

Chart 2 Result of question no. 9 from the questionnaire

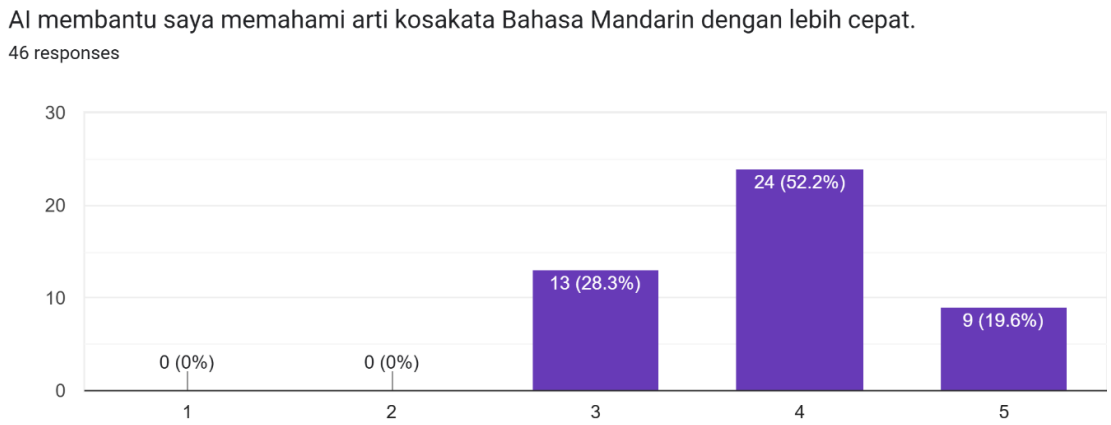


Based on the data above, 38 students (82.6%) used AI to find word meanings, 37 students (80.4%) used AI to translate words and sentences, 33 students (71.7%) used AI to search for Hanzi characters, 31 students (67.4%) used AI to look for Hanzi radicals, 24 students (52.2%) used AI for grammar correction, 19 students (41.3%) used AI to create sentences, 10 students (21.7%) used AI to write paragraphs, 9 students (19.6%) used AI for other writing-related purposes, and 1 student (2.2%) used AI to find stroke order, tones, pinyin, and to transcribe audio into text. Based on these findings, it can be concluded that the majority of students utilize AI for fundamental language learning purposes, particularly for searching word meanings and translating words and sentences. This indicates that the primary function of AI for students is as a tool to support understanding of vocabulary and language structures.

Chart 3 Result of question no. 12 from the questionnaire

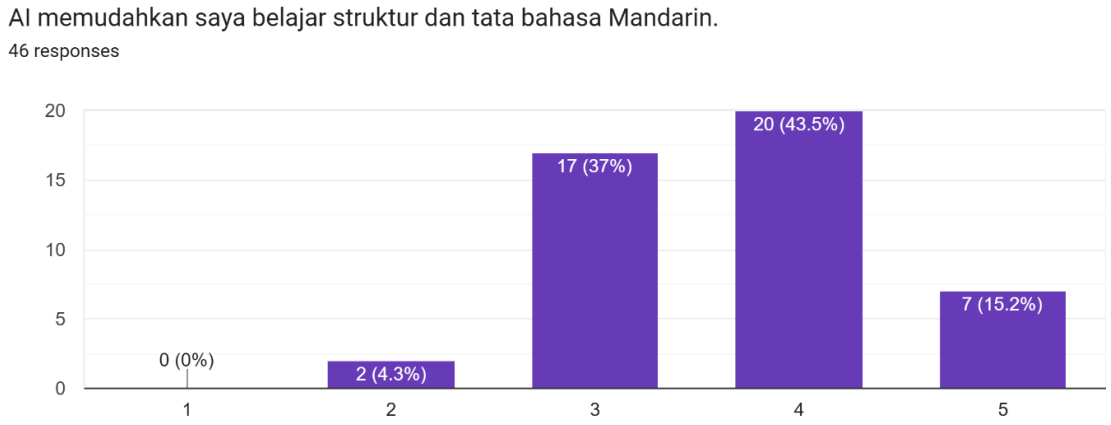
Based on the bar chart for the statement "AI makes it easier for me to find Hanzi with specific radicals," 20 students (43.5%) strongly agreed with the statement, 19 students (41.3%) agreed, and 7 students (15.2%) were neutral. Therefore, it can be concluded that the majority of students (84.8%) agreed that AI makes it easier to find Hanzi based on specific radicals. This indicates that AI is perceived as an effective tool in assisting students to search for Hanzi according to their radicals.

Chart 4 Result of question no. 13 from the questionnaire



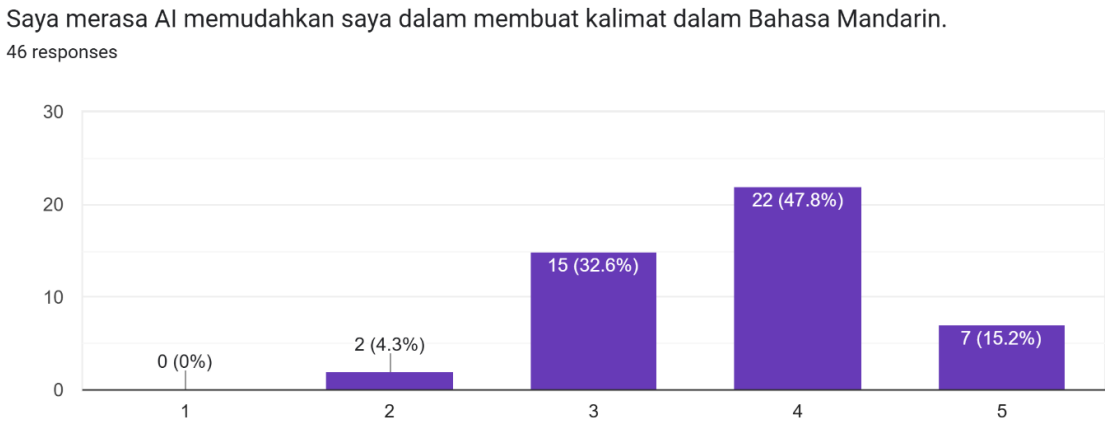
Based on the results of questionnaire item number 13, which stated, "AI helps me understand the meaning of Mandarin vocabulary more quickly," 9 students (19.6%) strongly agreed with the statement, 24 students (52.2%) agreed, and 13 students (28.3%) were neutral. Therefore, it can be concluded that the majority of students (71.8%) agreed that AI helps them understand the meaning of Mandarin vocabulary more quickly. This indicates that AI is considered quite effective in accelerating vocabulary comprehension.

Chart 5 Result of question no. 14 from the questionnaire



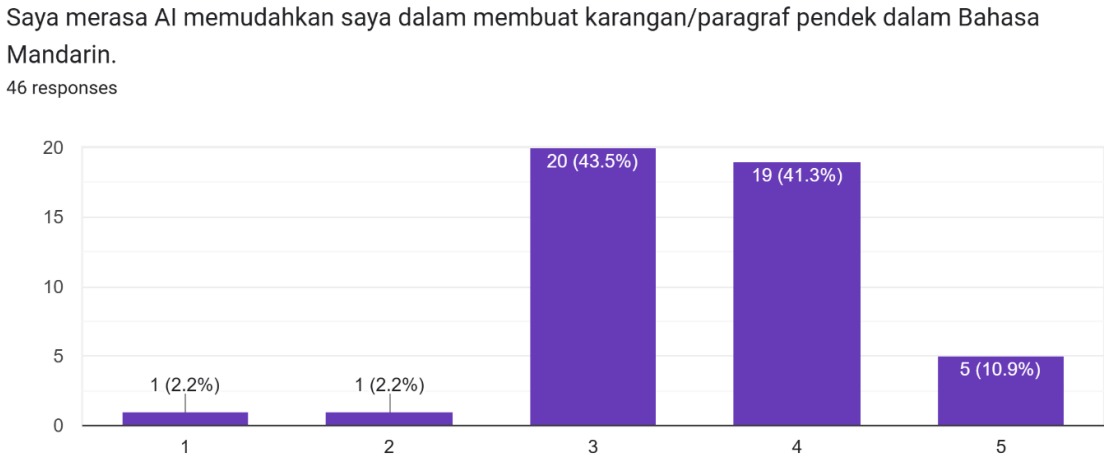
Based on the bar chart for the statement "AI makes it easier for me to learn Mandarin structure and grammar," 7 students (15.2%) strongly agreed, 20 students (43.5%) agreed, 17 students (37%) were neutral, and 2 students (4.3%) disagreed with the statement. Therefore, it can be concluded that the majority of students (58.7%) agreed that AI makes it easier for them to learn Mandarin structure and grammar. This indicates that AI is considered quite helpful in learning Mandarin grammar, although some students have not yet fully experienced its direct benefits.

Chart 6 Result of question no. 16 from the questionnaire



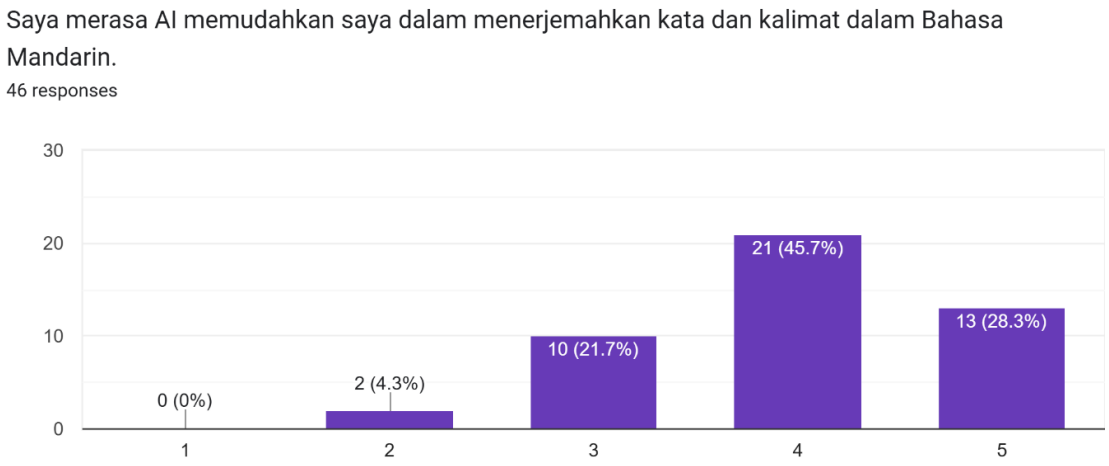
Based on the bar chart for the statement "I feel that AI makes it easier for me to construct sentences in Mandarin," 7 students (15.2%) strongly agreed, 22 students (47.8%) agreed, 15 students (32.6%) were neutral, and 2 students (4.3%) disagreed with the statement. It can therefore be concluded that the majority of students (63%) agreed that AI makes it easier for them to construct sentences in Mandarin. Thus, it can be said that AI is quite helpful for students in composing Mandarin sentences, although some students have not yet fully experienced this ease.

Chart 7 Result of question no. 17 from the questionnaire



Based on the bar chart for the statement "I feel that AI makes it easier for me to write short essays or paragraphs in Mandarin," 5 students (10.9%) strongly agreed, 19 students (41.3%) agreed, 20 students (43.5%) were neutral, 1 student (2.2%) disagreed, and 1 student (2.2%) strongly disagreed with the statement. Therefore, it can be concluded that the majority of students (52.2%) agreed that AI makes it easier for them to write short essays or paragraphs in Mandarin. This indicates that AI is considered quite helpful in the process of writing short Mandarin paragraphs, although some students have not yet felt a significant impact from its use.

Chart 8 Result of question no. 18 from the questionnaire



Based on the bar chart for the statement "I feel that AI makes it easier for me to translate words and sentences in Mandarin," 13 students (28.3%) strongly agreed, 21 students (45.7%) agreed, 10 students (21.7%) were neutral, and 2 students (4.3%) disagreed with the statement. Therefore, it can be concluded that the majority of students (74%) agreed that AI makes it easier for them to translate Mandarin words and sentences. This indicates that AI is highly helpful in the process of Mandarin translation, as evidenced by the fact that most students have experienced tangible benefits from using it to understand and translate texts.

Based on the overall questionnaire results, it can be concluded that the use of AI technology has a positive impact on students' Mandarin writing skills. Most students consider AI to be an effective learning tool for understanding vocabulary, translating words and sentences, and learning the structure and grammar of the Mandarin language.

The majority of respondents use AI to find word meanings, translate texts, and search for Hanzi characters and their radicals. This indicates that AI is primarily utilized to strengthen basic language comprehension. In addition, students also find it easier to compose sentences and short paragraphs with the help of AI, although its overall impact on improving writing proficiency has not yet been

strongly felt by all students.

In general, it can be concluded that AI technology plays an important role as a supporting medium in Mandarin language learning, particularly in enhancing efficiency and effectiveness, vocabulary comprehension, and basic writing skills. Moreover, it holds great potential to be further developed as a more comprehensive learning tool in the future.

CONCLUSION

Based on the research results, all students have utilized AI technologies such as ChatGPT, Pleco, and Google Translate in learning basic-level Mandarin writing skills, both in class and independently. AI is widely used to search for hanzi, meanings, pinyin, tones, radicals, and stroke order, as well as to assist in vocabulary, grammar, and sentence composition practice. The use of AI has been proven to have a positive impact on writing skills, as indicated by 58.7% of students showing improvement in their midterm exam scores. However, there are still differences in students' levels of independence, as some remain dependent on AI to complete assignments. Overall, AI plays an important role in enhancing understanding and learning efficiency. Nevertheless, its use should be directed not only as a learning aid but also as a means to strengthen conceptual mastery and improve independent writing skills.

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