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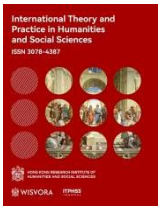

A Study of Generative Artificial Intelligence on Empowering English Reading Instruction

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Abstract

This empirical study tests the efficacy of generative artificial intelligence (GAI) in enhancing English reading pedagogy, utilizing DeepSeek as the representative GAI platform. Through an eight-week intervention involving 96 Chinese senior high school students, the research employed the English reading test and the Foreign Language Reading Anxiety Scale. Results demonstrated that GAI integration significantly reduced reading anxiety in the experimental group, contrasting with minimal reduction in the control group. Concurrently, the experimental group achieved markedly higher reading performance. Analysis attributes these outcomes to GAI's capacity for generating contextualized background knowledge, providing vocabulary support through authentic examples, enabling personalized material creation, and fostering immersive learning environments. Future research should examine GAI applications across diverse language skills and alternative GAI technologies emphasizing judicious implementation to maximize pedagogical benefits.

1. Introduction

The rapid iteration and advancement of artificial intelligence technology are reshaping the development landscape of human society. Generative artificial intelligence (GAI) technology, represented by ChatGPT, is not only driving transformation in industrial sectors but also creating significant developmental opportunities in the field of education.

GAI is a branch of artificial intelligence technology that creates text, images, sounds, videos, code, and other content based on algorithms, models, and rules. The capabilities of GAI are remarkably powerful. In education: it can generate personalized exercises, teaching materials, and simulate dialogues for language practice. In entertainment: it can assist in creating game content, generating movie script concepts, and composing music. In design: it can produce product design concepts, architectural sketches, and fashion designs. In marketing and advertising: it can quickly generate ad copy, social media content, and personalized marketing emails. GAI demonstrates exceptional abilities in multimodal information comprehension, knowledge reasoning, and content generation, providing robust technological support and opportunities for transformation in

educational innovation. The deep integration of GAI into classroom teaching represents both an inevitable trend in technological evolution and an intrinsic requirement for the high-quality development of education.

As one of the key language skills for mastering English, the importance of reading is self-evident. Serving as the primary channel for language knowledge input, English reading instruction plays a central role in cultivating students' comprehensive language abilities. It not only helps students consolidate foundational language knowledge, enhance linguistic skills, and develop critical thinking, but also effectively expands vocabulary, deepens understanding of grammatical structures, strengthens reading comprehension, and fosters understanding and tolerance of diverse cultures. Furthermore, reading significantly broadens students' cultural horizons and elevates their cultural literacy.

However, English reading instruction in many high schools currently remains predominantly traditional, struggling to adequately meet students' individualized learning needs. This conventional approach often leads to a lack of student interest in English reading, resulting in declining academic performance and heightened reading anxiety, ultimately creating a vicious cycle.

To address this issue, this study explores the integration of a GAI assisted reading teaching model into English reading instruction. This model aims to leverage GAI to empower teachers, optimize teaching methodologies, and enhance instructional efficiency. Its core functionalities include providing teachers with personalized teaching resources and support tools, automatically generating teaching materials, designing learning tasks, and evaluating learner performance. For instance, teachers can utilize these tools to create authentic conversational scenarios, reading comprehension exercises, and articles tailored to student needs(Chaudhry & Kazim, 2022). The primary advantages of applying GAI to reading learning lie in its ability to provide personalized learning experiences, offer real-time feedback and assessment, and create highly interactive learning environments(Winaitham, 2022). By offering customized learning pathways through GAI, this approach helps students acquire language knowledge and skills more effectively, such as improving language proficiency through immediate feedback and simulated authentic conversational situations.

2. Literature review

2.1 Related studies of English reading teaching

Reading instruction holds a pivotal position within English language teaching. It serves not only as a crucial pathway for students to effectively acquire knowledge, deepen conceptual understanding, and master diverse perspectives, but also as the core component for developing comprehensive English proficiency. This enables students to utilize vocabulary, grammar, and syntactic structures with greater precision. Simultaneously, extensive reading lays a solid foundation for the development of writing skills; exposure to diverse genres and subjects effectively enhances students' writing capabilities. As reading proficiency strengthens, students' enthusiasm for English learning typically increases, subsequently boosting learning efficiency and academic performance. Therefore, English reading plays an indispensable role in enhancing learning efficiency, cultivating language competence, enriching knowledge reserves, and broadening horizons. Consequently, English reading instruction must be accorded high priority.

In the exploration of English reading pedagogy, three primary instructional models exist: the bottom-up model, the top-down model, and the interactive model.

Goodman's "top-down" model emphasizes the student's holistic comprehension and grasp of the text's meaning (Goodman, 2014). This model conceptualizes reading as a process progressing

from the whole to the parts, requiring students to prioritize understanding the main ideas of a passage. However, this approach may lead to insufficient attention to foundational elements like grammar and vocabulary. In contrast, Gough's "bottom-up" model views reading as a sequential decoding process involving the identification and parsing of characters, words, and sentences individually. According to this model, comprehension builds progressively, starting from individual word recognition, extending to sentences and paragraphs, and ultimately culminating in a comprehensive understanding of the entire text. Readers deepen their understanding through the gradual accumulation and integration of information. However, over-reliance on this theory-driven method can cause students to become overly focused on linguistic details at the expense of grasping the text as a whole.

Recognizing the limitations inherent in both aforementioned models, Rumelhart proposed the "interactive" reading model. This model stresses the organic integration of both top-down and bottom-up approaches during the reading process. It encourages students to actively integrate their prior knowledge with the text content to facilitate comprehension. The interactive model focuses not only on the acquisition of linguistic knowledge but also on guiding students to discern deeper meanings within the text and actively construct meaning. With the deepening of research, the interactive model has gained prominence due to its inherent rationality. Employing this model in instruction not only helps students solidify their grasp of fundamental language knowledge but also enables them to effectively activate their background knowledge, leading to a more comprehensive and in-depth analysis and understanding of the text.

2.2 Related studies of GAI on English reading teaching

With the increasing maturity of GAI technology, its application in reading instruction continues to expand. Scholars have conducted multifaceted research validating GAI's potential to empower English reading teaching.

In terms of reading strategy optimization: Mateo-Girona et al. demonstrated that GAI-based tools can generate inferential reading strategies, effectively aiding students in understanding and analyzing academic texts. Thaqi et al. designed SARA system which integrated eye-tracking technology with large language models to provide personalized assistance, significantly enhancing reading experience and comprehension skills. Watkins explored how GAI-driven reading assistants like Explainpaper and SciSpace help students complete reading tasks efficiently while reducing the burden of intensive reading.

In terms of enhancing classroom engagement: Liu et al. found that chatbots significantly boosted students' reading interest and participation(Liu et al., 2024). Akhlaghi et al. designed LARA system that increased interactivity and engagement by enabling students to generate personalized textual materials.

In terms of reading material generation: Xiao et al. utilized a generative system to provide high-quality personalized materials for Chinese middle school students. The system-generated materials not only suited student needs but also surpassed the quality of existing human-authored exercises. Schmidt and Strasser highlighted the role of GAI in enabling adaptive language learning, dynamically adjusting content while supplying teachers with rich resources. Hellesnes et al. emphasized the effectiveness of GAI in meeting diverse learner needs through text adaptation, particularly excelling in reading comprehension(Hidayat, 2024).

In terms of reading proficiency development: Kim et al. proved that GAI translation tools markedly improved university students' comprehension of complex texts(Kim & Cha, 2023). Kim revealed that ChatGPT activated background knowledge in Korean EFL learners, optimizing their reading approaches and comprehension processes. Hidayat demonstrated that GAI systems could automatically assess reading comprehension and provide instant feedback, alleviating teachers workload while boosting student engagement and learning outcomes(Hidayat, 2024). Srinivasan

and Murthy conducted large-scale intervention in Indian schools and further validated its efficacy in enhancing reading comprehension skills(Srinivasan & Murthy, 2021).

Collectively, these studies illustrate how GAI is revolutionizing reading pedagogy, propelling it toward greater personalization, efficiency, and interactivity. However, the problems existing in the traditional English reading teaching mode have not been properly solved: students' English reading performance is poor and they have a large degree of English reading anxiety. Although many researchers have discussed that GAI can improve students' reading performance, most of the existing studies focus on the development and application at the technical level, and pay less attention to the implementation effect of GAI in the real classroom environment. Many studies have also suggested that GAI can enhance students' reading interest, but the improvement of reading interest does not mean that reading anxiety will decrease. Therefore, this study adopts an empirical research approach, focusing on the high school English reading classroom to explore whether GAI can solve the problems existing in traditional reading teaching. The study attempts to answer the following two questions:

(1)What is the effect of GAI on learners' English reading anxiety?

(2)What is the effect of GAI on learners' English reading performance?

3. Methods

3.1 Participants

This study involved two randomly selected Grade 1 classes from a senior high school in Yantai City, Shandong Province, China. Class 10 served as the control group, consisting of 48 students (23 boys and 25 girls). Class 15 served as the experimental group, also with 48 students (24 boys and 24 girls). The participants averaged 16 years of age. Mid-term exam reading scores indicated no significant difference in reading proficiency between the two groups($p=0.422>0.05$). Throughout the experiment, the researcher taught English to both classes using identical materials. The sole difference in instruction was that the control group received traditional reading instruction, while the experimental group received GAI-assisted reading instruction.

3.2 Research instruments

The research instruments employed in this study comprised the GAI-assisted teaching tool (DeepSeek), a reading anxiety scale, and a reading test.

DeepSeek, a representative GAI platform in China known for its functional and technological innovations, served as the auxiliary teaching aid. Its capabilities in areas such as natural language processing were leveraged for the experimental intervention.

To measure participants' reading anxiety, this study adopted the Foreign Language Reading Anxiety Scale (FLRAS) developed by Saito et al.(Saito et al., 1999). This 20-item instrument uses a 5-point Likert scale ranging from "Strongly agree" (1 point) to "Strongly disagree" (5 points). Lower total scores indicate lower anxiety levels, while higher scores indicate higher anxiety levels. The theoretical score range is 20 to 100. The scale demonstrated high reliability, with an internal consistency coefficient of 0.86 ($n = 383$).

Students' reading performance was assessed using a reading test derived from the final English exam of the semester. Participants were required to read five daily life-related passages within 30 minutes and answer 30 multiple-choice questions (each offering four options). Each correct answer scored 2 points, with no points awarded for incorrect answers, resulting in a maximum possible score of 60 points.

3.3 Research procedures

The study spanned eight weeks, structured into three phases: pre-experiment, experiment, and post-experiment. Specific procedures and timelines are detailed in Table 1.

Table 1 Research procedures

Stage	Week	Plan
Pre-experiment	Week 1	Participant selection; Pre-test (reading); Pre-survey (reading anxiety); Selection of reading topics
Experiment	Week 2-6	Implementation of reading lessons
Post experiment	Week 7-8	Post-survey (reading anxiety); Post-test (English reading); Data analysis

Pre-experiment Stage (Week 1): Two Grade 1 classes were randomly selected as participants. Class 10 was designated the control group, while Class 15 served as the experimental group. A pre-test, utilizing the reading section of the mid-term English exam, confirmed no significant difference in reading proficiency between the groups. And the FLRAS was used to test the reading anxiety of the participants. Finally, in consultation with other school teachers, the reading content for the study was selected from five units of Compulsory English II (People's Education Press). The specific teaching schedule is presented in Table 2.

Table 2 Teaching schedule of the research

Time	Teaching Content	Reading skill Focus
Week 2	Unit 1 From problems to solutions	Make a timeline
Week 3	Unit 2 A day in the clouds	Identify literal and implied meaning
Week 4	Unit3 Stronger together: how we have been changed by the internet	Read headlines
Week 5	Unit 4 What's in a name?	Read a map
Week 6	Unit5 The virtual choir	Scan

Experiment Stage (Weeks 2-6): This five-week phase focused on implementing reading instruction for both groups. Both the control and experimental classes followed the PWP (Pre-reading, While-reading, Post-reading) teaching model, with the key difference being the integration of GAI technology (DeepSeek) in the experimental class.

Control Class Procedure:

Pre-reading: Students predicted passage content based on the title. The teacher introduced relevant background knowledge based on personal expertise. The teacher explained key vocabulary, focusing on pronunciation and usage, to reduce comprehension barriers.

While-reading: Students skimmed paragraphs to summarize main ideas. Students reread the passage to answer short-answer questions. Students completed a fill-in-the-blank task based on a third reading.

Post-reading: Students practiced using exercise books to consolidate knowledge and skills.

Experimental Class Procedure (GAI-Assisted):

Pre-reading: Students predicted passage content based on the title. The teacher used DeepSeek to generate comprehensive background knowledge related to the topic. The teacher explained key vocabulary and used DeepSeek to generate contextualized example sentences for the words, aiding mastery in authentic contexts.

While-reading: Students skimmed paragraphs to summarize main ideas. Simultaneously, the teacher prompted DeepSeek to generate its own paragraph summaries. The teacher then provided comparative feedback on both the students' and DeepSeek's summaries. Students reread the passage to answer short-answer questions. Simultaneously, the teacher prompted DeepSeek to answer the same questions. The teacher then provided feedback on both sets of answers. Students completed a fill-in-the-blank task based on a third reading.

Post-reading: The teacher used DeepSeek to generate personalized reading exercises, tailored to learning objectives and student levels, for targeted practice and consolidation of skills/knowledge within authentic scenarios.

Case Illustration: To elaborate on how GAI empowers English reading instruction, the following section details a case demonstration using the Unit 3 reading lesson: Stronger together: How we have been changed by the internet. The specific lesson plan is presented in Table 3.

Table 3 The teaching plan of unit 3 reading lesson

Element	Details
Teaching content	Unit3 Stronger together: how we have been changed by the internet
Students	Class 15, Grade 1
Type of the lesson	Reading
Teaching objectives	Knowledge: Acquire expressions related to the Internet. Ability: Enhance reading skills (e.g., headline analysis). Emotional: Foster awareness of online safety and positive attitudes towards network technology.
Teaching key and difficult points	Teaching key point: Develop reading skills (headline analysis, skimming, scanning). Teaching difficult point: Deepen understanding of online safety and proactive embrace of network technology.
Teaching aids	PPT, blackboard, DeepSeek
Teaching method	GAI assisted with PWP teaching method
Time duration	45 minutes
Teaching procedures	Step 1 Lead-in (5 minutes) Activities: The teacher firstly asks the students to read the title and guess the main content of the passage based on the title. Justification: This step can help students improve their reading skills: reading headlines. Step 2 Pre-reading (10 minutes) Activities: **The teacher uses DeepSeek to generate background knowledge related to the topic of the article**, then the teacher explains the background knowledge to the students. Justification: This step enables students to have a more comprehensive understanding of the relevant content. Activities: The teacher explains the new and difficult words in the reading materials, guides students to learn the pronunciation and usage of these words, and **uses DeepSeek to generate example sentences containing key and**

	difficult words. Justification: This step enables students to master the meanings of the words in real situations. Step 3 While-Reading (20 minutes) Activities: The teacher firstly asks students to quickly summarize the main idea of each paragraph. **At the same time, the teacher asks DeepSeek to generate the main idea of each paragraph.** The teacher then commented on the students' and DeepSeek's answers respectively. Justification: This step is to make students understand the main idea of this passage and improve their reading skills, such as fast reading. Activity: The teacher asks the students to read the passage for the second time and complete the short-answer questions. **At the same time, the teacher asks DeepSeek to finish the task too.** The teacher then commented on the students' and DeepSeek's answers respectively. The short-answer questions are shown as follows: 1. Why did Jan quit her job? 2. How did the people in the online community help her? 3. Why did she start the IT club? 4. What is the "digital devide"? 5. What's Jan's next goal? 6. What can we learn from her experience? Justification: This step helps students improve their reading skills, such as skimming and deepen students' understanding of this passage. Activities: The teacher asks the students to read for the third time and finish the fill-in-the-blank task. The task is shown as follows: There are countless articles telling us how the Internet has made our lives more _____. We no longer have to _____ or _____ when we go shopping. We can get the most _____ information from large _____. We can download _____ whenever we need them. But the Internet has done much more for people than simply _____. People's lives have been changed by _____ and _____. Justification: This step helps students improve their reading skills, such as scanning and grasp some expressions about the Internet. Step 4 Post-reading (8 minutes) Activities: Students work in groups to discuss do you think there are any disadvantages of using the Internet. If so, what are they? Justification: This step can help students improve the awareness of online safety. **At the same time, the teacher asks DeepSeek to think about the question.** The teacher

	then commented on the students' and DeepSeek's answers respectively. Step 5: Homework (2 minutes) Review the knowledge and reading skills what we have learned today and **finish the personalized exercise designed by GAI.** Justification: This step can help students grasp the knowledge and reading skills.

Post-Experiment Stage (Weeks 7-8): This two-week phase involved administering the English reading post-test and the post-survey of reading anxiety, followed by data analysis. Sequentially, the post-survey was first administered to participants. Next, the English reading post-test was conducted. Finally, the collected data were analyzed using SPSS 27.0.

4. Research results

4.1 The effect of GAI on learners' English reading anxiety

The pre-survey of reading anxiety data were collected from all 96 participants (48 per class). The Foreign Language Reading Anxiety Scale (FLRAS) has a maximum score of 100, with higher scores indicating higher anxiety levels. Descriptive statistics and an independent samples t-test were conducted using SPSS 27.0 to compare baseline anxiety between the control and experimental classes.

Table 4 Descriptive statistics of pre-survey of the reading anxiety

	Class	N	Maximum	Minimum	Mean	Std.Deviation	Std.Error Mean
Scores	Control class	48	92	19	39.54	11.37	1.64
	Experimental class	48	63	22	40.02	10.03	1.45

As shown in Table 4, the mean anxiety scores were highly similar between the control class (M = 39.54) and the experimental class (M = 40.02) prior to the experiment.

Table 5 The independent samples T-test of pre-survey of the reading anxiety

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig.(2 tailed)	Mean Difference	Std.Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Scores	Equal variances assumed	.568	.453	-.219	94	.827	-.479	2.188	-4.823	3.865

	Equal variances not assumed	-.219	92.556	.827	-.479	2.188	-4.824	3.866

The independent samples t-test results (Table 5) confirmed no statistically significant difference in baseline anxiety levels between the two classes ($t(94) = -0.219$, $p = .827 > 0.05$), supporting their equivalence as research participants.

After the experiment, reading anxiety data were again collected from all 96 participants. Descriptive statistics and an independent samples t-test were performed on the post-survey scores.

Table 6 The descriptive statistics of the post-survey of reading anxiety

	Class	N	Maximum	Minimum	Mean	Std.Deviation	Std.Error Mean
Scores	Control class	48	55	25	37.92	7.37	1.06
	Experimental class	48	50	12	29.67	7.53	1.09

Descriptive statistics (Table 6) revealed that the experimental class exhibited a lower mean anxiety score ($M = 29.67$) than the control class ($M = 37.92$) after the intervention. Furthermore, both classes showed reduced anxiety compared to baseline: a decrease of 10.35 points for the experimental class and 1.62 points for the control class.

Table 7 The independent sample T-test of the post-survey of reading anxiety

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig.(2 tailed)	Mean Difference	Std.Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Scores	Equal variances assumed	.005	.943	5.423	94	<.001	8.25	1.521	5.230	11.270
	Equal variances not assumed			5.423	93.959	<.001	8.25	1.521	5.230	11.270

The independent samples t-test (Table 7) indicated a statistically significant difference in post-survey anxiety levels between the experimental and control classes ($t(94) = 5.423$, $p < .001$). This suggests that the GAI-assisted reading teaching model was more effective than the traditional model in alleviating learners' English reading anxiety.

A paired samples t-test was conducted on the experimental class's pre-survey and post-survey anxiety scores to assess the impact of GAI specifically.

Table 8 The pair sample T-test of the reading anxiety of experimental class

		Mean	Std.Deviation	Std.Error Mean	95% Confidence Interval of the Difference Lower	Upper	t	df	Sig.(2 tailed)
	Pre-survey-Post-survey	10.354	11.725	1.692	6.950	13.759	6.118	47	<.001

The paired samples t-test (Table 8) revealed a highly significant reduction in reading anxiety within the experimental class from pre-survey to post-survey ($t(47) = 6.118$, $p < .001$).

In summary, the analysis demonstrates that the integration of GAI technology was beneficial in significantly alleviating learners' English reading anxiety.

4.2 The effect of GAI on learners' English reading performance

Following the English reading test, data from all 96 participants were collected and scored. Descriptive statistics and an independent samples t-test were conducted using SPSS 27.0 to analyze the reading scores and assess the impact of GAI on reading performance. Results are detailed in Tables 9 and 10.

Table 9 The descriptive statistics of English reading scores

	Class	N	Maximum	Minimum	Mean	Std.Deviation	Std.Error Mean
Scores	Control class	48	50	14	29.08	8.54	1.23
	Experimental class	48	48	16	34.16	6.76	.98

Descriptive statistics (Table 9) revealed that the experimental class achieved a significantly higher mean reading score ($M = 34.16$, $SD = 6.76$) compared to the control class ($M = 29.08$, $SD = 8.54$).

Table 10 The independent sample T-test of English reading scores

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig.(2 tailed)	Mean Difference	Std.Error Difference	95% Confidence Interval of the Difference Lower	Upper
Scores	Equal variances assumed	1.891	.172	-3.232	94	.002	-5.083	1.573	-8.207	-1.960

Equal variances not assumed	-3.232	89.298	.002	-5.083	1.573	-8.207	-1.958

The independent samples t-test (Table 10) indicated a statistically significant difference in reading performance between the groups ($t(94) = -3.232$, $p = .002$). This significant difference, combined with the higher mean score observed in the experimental class (Table 9), demonstrates that learners in the GAI-assisted group outperformed those in the control group. These results suggest that integrating GAI technology is beneficial for enhancing students' English reading performance.

5. Discussion

5.1 The effects of GAI on learners' English reading anxiety

By comparing and analyzing the English reading anxiety scores between the two classes, the following conclusions can be drawn:

At the outset of the experiment, the English reading anxiety levels in both classes were relatively similar. Their mean scores approached one-third of the total possible score, and an independent samples T-test (assuming equal variances) yielded a significance level (2-tailed) of 0.827 (> 0.05). This indicates that students in both classes initially exhibited high levels of English reading anxiety. This anxiety likely stemmed from factors such as the difficulty recognizing new or challenging vocabulary. Furthermore, the unfamiliar topics of some reading passages, combined with students' lack of relevant background knowledge, likely heightened concerns about comprehending the material within the allotted time, thereby contributing to reading anxiety. Consequently, under the traditional English reading teaching model, both classes demonstrated comparably high anxiety levels, which undoubtedly hindered their English reading development.

However, following two months of experimental teaching, a significant difference emerged. The mean anxiety score in the experimental class was markedly lower than that in the control class. An independent samples T-test (assuming equal variances) confirmed this difference, showing a significance level (2-tailed) of < 0.001. Additionally, a paired samples T-test comparing pre-survey and post-survey anxiety levels within the experimental class also yielded a significance level (2-tailed) of < 0.001. These results strongly suggest that the integration of GAI effectively alleviated learners' reading anxiety.

The reasons for this reduction are as follows: The experimental class utilized GAI technology, which generated relevant background knowledge for reading passages. Access to this background information facilitated comprehension of the main ideas, thereby reducing anxiety. Simultaneously, GAI provided learners with example sentences containing challenging vocabulary, enabling them to grasp word meanings within context and thus lowering vocabulary-related barriers to reading. Moreover, GAI offered contextualized reading training, helping students establish contextual relevance and mitigate anxiety arising from unfamiliar cultural backgrounds. In contrast, the control class did not employ the new technology. Consequently, the reduction in reading anxiety observed among these students was significantly more limited.

5.2 The effects of GAI on learners' English reading performance

A comparative analysis of English reading performance between the two classes yields the

following conclusions:

At the experiment's commencement, the English reading proficiency levels of both classes were relatively comparable. An independent samples t-test (assuming equal variances) indicated no statistically significant difference ($p= 0.422 > 0.05$). Students in both groups demonstrated difficulties in English reading performance. These difficulties may be attributable to several factors, including the previously noted high levels of English reading anxiety and a limited awareness of strategies for inferring the meaning of unfamiliar vocabulary. Furthermore, individual learners exhibit diverse reading weaknesses; traditional textbook exercises address only common issues and fail to provide specialized remediation for specific individual challenges. Consequently, under the traditional English reading instructional model, both classes exhibited similar reading proficiency levels. This observation underscores the stability of traditional methods in fostering reading skills, yet simultaneously reveals inherent limitations within such approaches.

Following two months of experimental instruction, a significant divergence emerged. The mean reading performance score for the experimental class was 34.16, compared to 29.08 for the control class. An independent samples t-test (assuming equal variances) confirmed this difference was statistically significant ($p= 0.002 < 0.05$). This result indicates a significant disparity in reading performance between the two classes, with the experimental class demonstrating superior proficiency.

The enhanced performance in the experimental class can be attributed to the integration of GAI technology. GAI facilitated this improvement through several mechanisms: GAI enabled the generation of tailored reading resources. Teachers utilized GAI to generate topic-specific background knowledge for students to review in advance, potentially mitigating anxiety associated with unfamiliar content. GAI contributed to the creation of immersive learning environments, fostering greater student engagement in reading activities. GAI addressed a key limitation of traditional methods by providing immediate access to the meanings of new vocabulary within appropriate contextual examples. GAI offers the advantage of generating extensive supplementary materials at minimal cost. Critically, GAI facilitated the generation of personalized exercises, enabling targeted remediation for individual learner needs.

Collectively, these factors demonstrate the efficacy of the GAI-assisted instructional approach in enhancing students' reading performance. In contrast, the control class, which did not utilize comparable innovative technology, exhibited more limited progress. This comparative outcome underscores the positive impact of GAI on reading performance and suggests potential advantages inherent in adopting such technologies within instructional settings.

6. Conclusion

The advent of generative artificial intelligence (GAI) not only transforms lifestyles but also exerts a profound influence on English education. This study employs DeepSeek as a representative GAI platform to investigate its potential for empowering English reading education. Empirical findings reveal that: (1)GAI implementation can effectively mitigate students' English reading anxiety. (2)GAI implementation can significantly enhance students' English reading performance.

These findings collectively demonstrate the beneficial impact of GAI technology on English reading education. Its application not only elevates the quality of reading instruction but also facilitates sustainable pedagogical development due to its inherent cost-effectiveness. Consequently, educators are encouraged to strategically integrate GAI into English reading

pedagogy. Prior to instruction, GAI can generate relevant background information to stimulate student engagement. Additionally, it facilitates the contextual elucidation of challenging vocabulary, promoting accurate lexical comprehension. During reading lessons, GAI-generated responses to comprehension questions serve as reference materials for both instructors and learners. Post-instruction, educators may leverage GAI to develop personalized reading materials for targeted practice.

Regarding study limitations, participant recruitment was constrained to two senior high school classes (N=96), limiting sample scope and generalizability. Furthermore, while GAI permeates diverse societal domains, this investigation exclusively examined DeepSeek, leaving unexplored the applicability of alternative GAI technologies, such as Large Language Models and PaLM in reading instruction.

Future research should extend to GAI applications in teaching other language skills (listening, speaking, writing) beyond reading, as well as examine the efficacy of diverse GAI platforms in reading pedagogy. GAI presents dual opportunities and challenges for English education, with its instructional potential fully realized only through judicious application.

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