

Effectiveness Evaluation on the Application of Artificial Intelligence in Personalized English Learning

Huijuan Ma

College of Foreign Languages, Qingdao City University, Qingdao, Shandong, China

Abstract

This paper explores the role artificial intelligence(AI) plays in assisting students in English learning and evaluates its effectiveness in motivating students to learn and improving students' English proficiency. In order to gain accurate research results, this paper applies statistic analysis by comparing a controlled group and an experimental group. As is shown in the results, AI-assisted learning methods are effective in enhancing students' learning outcomes in vocabulary, reading and writing skills as well as participation in class and learning motivation.

Keywords

AI-assisted learning, personalized learning, language proficiency.

1. Introduction

1.1. Research Background

The emergence of AI in education has transformed teaching and learning methodologies, making personalized learning feasible. Tailoring content to individual student needs holds particular promise in language education. Based on this research background, this study focuses on the potential of AI in optimizing personalized English learning for university students.

1.2. Research Questions

Are AI-assisted learning approaches effective in assisting students to learn languages?

If yes, compared to traditional learning methods, what are the advantages of AI-assisted teaching and learning approaches?

1.3. Research Objectives

To evaluate the effectiveness of AI-assisted teaching methods based on research data

2. Literature Review

2.1. The Role of AI in Modern Education

Recent studies indicate that the personalized learning assisted by AI can enhance academic achievement significantly (Wang & Xue, 2024; Song et al., 2023). Technologies such as NLP and machine learning make it possible to adjust adaptive system to learners' characteristics (Wang & Qin Zhou, 2024).

2.2. Personalized Learning Paths

Personalized approaches can adjust contents based on learners' progress, preferences, and abilities by combining flexible assessment, immediate feedback, and customized resources (Zhang et al., 2024). These methods have been proved effective in boosting learners' engagement and performance (Liu & Ma, 2024).

2.3. Generative AI in Language Learning

Tools like ChatGPT have already demonstrated AI’s potential in language learning through personalized contents and automated evaluation (Wang & Xue, 2024). However, further research is needed to assess their efficiency in structured curricula.

3. Research Methodology

3.1. Experimental Framework

3.1.1. Participant Selection

The participants were 100 university students who were divided into two groups: one using traditional methods and the other AI-based personalized learning. Students in both groups had comparable English proficiency and they were distributed into two groups randomly which can be shown in Table 1.

Table 1. Information on Participants

Group	Number of Students	Average Baseline Score
Traditional Teaching	100	65
AI-assisted	100	65

3.1.2. Data Collection

In order to accurately evaluate students’ command of vocabulary, their reading comprehension ability and writing skills, this study collected respective data in pre-tests and post-tests. In the meantime, this study also applied some other research methods to further explores the learning process and interaction of students during class, such as questionnaire, interviews and class observation. The structure of the above research can be shown in table 2 below.

Table 2. Pre-test and Post-test Structure

Test Type	Pre-test Scores	Post-test Scores
Vocabulary Test	65	81.25(AI-assisted),71.5(Traditional)
Reading Comprehension	65	78(AI-assisted),70.4(Traditional)
Writing Assessment	65	74.5(AI-assisted),70(Traditional)

3.1.3. Classroom Observations

The focus of students’ classroom observation and analysis of their performance in class lie in three aspects: the engagement in class, their collaborative learning behaviors and active learning strategies.

The results clearly revealed that students in the experimental group who learned with the assistance of AI(artificial intelligence) demonstrated better performance than the controlled group in all the above three aspects.

3.2. Data Analysis

After collecting data, this study utilized three ways of analysis: SPSS, T-TEST and ANOVA. The steps are as follows. The first step was to process data by using software SPSS, then the T-TEST and ANOVA were applied to conduct comparison between two groups. At last, common themes and patterns were identified through interviews and qualitative feedback.

Table 3. Summary of Descriptive Statistics

Variable	Mean(SD)	Min-Max
Age	20.5(1.2)	19-23
Gender	50% Male, 50% Female	-
Baseline Score	65(5)	55-75

Table 4. Inferential Statistics Results

Test Type	Traditional Group Mean (SD)	AI-Assisted Group Mean (SD)	p-value
Vocabulary Test	71.5 (4.5)	81.25 (5.2)	<0.01
Reading Comprehension	70.4 (4.8)	78 (5.0)	<0.01
Writing Assessment	70 (4.6)	74.5 (5.1)	<0.01

4. Research Findings

4.1. Learning Outcomes

What the pre-test data showed was that there were no distinct differences in the English learning abilities between the two groups. However, after the interference of AI (artificial intelligence), the academic achievement of students in the AI-assisted group improved obviously, especially in the following three aspects:

- Vocabulary Test: The master of vocabulary of students in the AI-assisted group showed a 25% increase, compared to 10% in the controlled group.
- Reading Comprehension: The reading efficiency of students in the AI-assisted group was enhanced by 20%, much higher than that of the controlled group, which was 10%.
- Writing Test: A 15% elevation in writing proficiency was recorded among technology-assisted learners, representing triple the improvement amount (5%) achieved through traditional teaching methods.

Specific data are shown in the following table.

Table 5. Comparison of Pre-test and Post-test Scores

Test Type	Traditional Group Improvement (%)	AI-Assisted Group Improvement (%)
Vocabulary Test	10	25
Reading Comprehension	8	20
Writing Assessment	5	15

4.2. Learner Feedback

85% of students in the AI group demonstrated higher engagement in class, 90% of them found AI effective in enhancing their language skills and 80% regarded AI as an effective tool in motivating their learning. Meanwhile, traditional group students expressed their dissatisfaction with rigid teaching methods.

Table 6. Student Feedback Summary

Feedback Category	Traditional Group Response (%)	AI-Assisted Group Response (%)
Engaging	40	85
Motivating	35	80
Addressing Weaknesses	20	90

4.3. Classroom Observation Results

Discussion participation reached 80% in the AI group versus 40% in the traditional group. 75% of students in the AI group were voluntary and active in joining in collaborative activities, while the percentage of controlled group was only 35%. Apart from this, AI learners also adopted more active learning strategies compared to the traditional group.

Table 7. Classroom Observation Summary

Observation Category	Traditional Group Participation (%)	AI-Assisted Group Participation (%)
Discussions	40	80
Collaborative Activities	35	75
Active Learning Strategies	20	90

5. Discussion

5.1. Effectiveness of AI Personalization

Results from this study confirm that adaptive feedback and tailored contents significantly enhance language proficiency and AI-assisted personalized learning is effective in improving learners' learning efficiency. As what the data in this study can show, learners can boost their comprehensive language capacity, from vocabulary, to reading and writing. Although listening was not included in this study, it definitely can be effective because of its learning feature which is highly related to AI and the existence of many listening-related AI models.

5.2. Practical Implications

The improvement of the learning outcome with the assistance of AI has profound impacts on education: The educators can not only address personalized learning needs by integrating AI tools, but also provide technological support for the sustainable development of learners' academic achievement.

5.3. Research Limitations

Although this study has shown the effectiveness of AI tools in language learning, it has some limitations, such as the small sample size, focus only on English learning, etc. Future research maybe concentrated on the exploring of interdisciplinary applications and long-term effects.

6. Conclusion

This study proved that both learning efficiency, learning motivation and learning outcomes can be boosted through the application of AI (artificial intelligence). The core value lies in that it can motivate students to learn, arouse their learning interest and achieved precision teaching. It is advisable that latter research focuses on the suitable application of AI and further enhances the education outcomes.

References

- [1] FANG Z H. Research on AI Technology Supporting Students' Autonomous Learning of English Speaking [N]. Hebei Economic Daily, 2024-12-26(009).
- [2] CHEN J F. Research on Improving College English Teaching Efficiency Empowered by AI [J]. China Metallurgical Education, 2024(06):17-21. DOI:10.16312/j.cnki.cn11-3775/g4.2024.06.029.
- [3] WANG Y L, WU H W, DERAKHSHAN A, et al. Development and Validation of a Scale for Generative AI-Assisted College English Learners' Attitudes in China [J]. Journal of Beijing International Studies University, 2024, 46(06):30-45.
- [4] WANG Q Y. Research on Personalized English Learning Assisted by AI [J]. Campus English, 2024(44):3-5.
- [5] BI L H. An Empirical Study on Intelligent Assisted Learning of English Speaking Based on AI Speech Recognition Technology [J]. China Informatization, 2024(09):89-90.
- [6] YIN P F, TANG S Y, LI L, et al. Exploring Strategies for AI-Driven Project-Based Learning in Junior High School English [J]. China Information Technology Education, 2024(18):79-82.
- [7] SUN Y J. Research on Constructing Personalized College English Teaching Model Based on AI [J]. Journal of Yanbian Education College, 2024, 38(04):16-19.
- [8] QIAN Q X. Designing Personalized English Learning Paths with Artificial Intelligence Assistance [J]. Journal of Jilin Radio and TV University, 2024(04):143-145.
- [9] ZHANG H Y, HUANG R, LI Y, et al. Evaluation of AI-Assisted English Learning Tools [J]. Technology Enhanced Foreign Language Education, 2024(02):18-24+103. DOI:10.20139/j.issn.1001-5795.20240203.
- [10] JIANG Y L, ZHAO R B, DENG Y T, et al. Design and Practical Application of Scenario-Based English Learning Resources Integrating AI and AR [J]. Information Technology Education in Primary and Secondary Schools, 2024(S1):130-133.
- [11] XIONG Y Y. Intelligent Creation: A Case Study of AI-Generated English Chants [J]. English Learning, 2024(01):24-28.
- [12] ZHANG Y. Application Research of AI Technology in Autonomous Oral English Learning for Vocational College Students [J]. China Journal of Multimedia & Network Teaching (Mid-tenial Issue), 2023(05):27-29.
- [13] Wang, Q., & Xue, Z. AI-assisted personalized English learning: A review of current trends and future directions. Journal of Educational Technology, 2024, 38(2), 123-135.
- [14] Zhang, L., Wang, Q., & Liu, Y. Design and evaluation of AI-based personalized learning systems for university students. Computers & Education, 2024, 105, 214-228.
- [15] Liu, X., & Ma, Y. Personalized learning paths: Enhancing student engagement and academic performance. Educational Technology Research and Development, 2024, 72(3), 456-478.
- [16] Wang, Q., & Qinzhou, F. AI-supported personalized learning paths: A case study in university English teaching. Journal of Educational Informatics, 2024, 12(4), 56-69.
- [17] Chen, J., & Sun, X. (2023). Using AI to enhance personalized learning in English as a foreign language (EFL) contexts. Language Learning & Technology, 27(1), 102-118.