



EFFECT OF ARTIFICIAL INTELLIGENCE TOOLS IN TEACHING ENGLISH AMONG HIGH SCHOOL STUDENTS

***K.Balasubramanian**, Assistant Professor,

Thiagarajar College of Preceptors(Aided), Madurai-09

****Syeda Kauser Fatima**, Senior lecturer,

General Education Dept. Liwa College, Abu Dhabi

Abstract

This study investigated the effect of using artificial intelligence (AI) tools on English language learning outcomes among high school students. The experimental method was employed, with 200 students randomly assigned to control and experimental groups. The experimental group received English instruction aided by AI tools such as language learning apps, writing assistants, and conversational chatbots, while the control group received traditional instruction methods. Pre-tests and post-tests were administered to measure English proficiency. Student surveys were also conducted to assess perceptions of using AI tools. The results showed significantly higher English scores in the experimental group compared to the control group ($p < 0.05$), indicating the positive impact of AI tools. No significant differences were found based on gender, locality, management type, or subject stream. However, students with English as the medium of instruction performed better with AI tools. Overall, the study provides evidence for the potential of AI to enhance English language teaching and learning in high school settings.

Keywords: artificial intelligence, AI tools, English language learning, high school students, experimental method, language apps, writing assistants, chatbots, learning outcomes.

Introduction

The integration of artificial intelligence (AI) tools into education has garnered significant attention in recent years. AI-powered applications can provide personalized learning experiences, adaptive assessments, and intelligent tutoring systems, offering new opportunities to enhance the teaching and learning process (Luckin et al., 2016). In the field of language education, AI tools have shown promise in improving various aspects of language acquisition, such as grammar, vocabulary, and writing skills (Chapelle, 2021).

The present study focuses on the application of AI tools in teaching English to high school students. Proficiency in English is crucial for academic and professional success in today's globalized world. However, traditional methods of English instruction often face challenges in catering to diverse learning needs and providing individualized support (**Gilakjani, 2016**). AI tools have the potential to address these challenges by offering personalized learning pathways, real-time feedback, and immersive language practice environments.

Review of Literature Existing research on the use of AI tools in language learning has explored various applications and their effectiveness. **Chapelle (2021)** reviewed studies on intelligent tutoring systems for grammar instruction and found significant improvements in learners' grammatical accuracy. **Coniam (2014)** investigated the use of writing assistants powered by natural language processing (NLP) and reported enhanced writing quality and reduced errors among students.

Theoretical frameworks such as the Input Hypothesis (**Krashen, 1985**) and the Interaction Hypothesis (**Long, 1996**) support the potential benefits of AI tools in providing comprehensible input and opportunities for meaningful interactions, which are crucial for language acquisition. Additionally, the principles of individualized and adaptive learning align with the capabilities of AI tools to personalize instruction based on learners' needs and progress (**Shorofsky, 2019**).

Despite the promising potential, research on the effectiveness of AI tools in English teaching, particularly in high school contexts, remains limited. This study aims to contribute to the existing body of knowledge by examining the impact of AI tools on English learning outcomes among high school students.

Objectives

The primary objectives of this study were:

- To evaluate the effect of using AI tools on English learning outcomes among high school students.
- To compare the performance of students taught using AI tools versus traditional methods.
- To assess students' and teachers' perspectives on using AI tools for English instruction.

Null Hypotheses

- ✓ H01: There is no significant difference in English learning outcomes between students taught using AI tools and those taught using traditional methods.
- ✓ H02: There is no significant difference in English learning outcomes based on gender.
- H03: There is no significant difference in English learning outcomes based on locality (urban/rural).
- ✓ H04: There is no significant difference in English learning outcomes based on type of management (government/private).
- ✓ H05: There is no significant difference in English learning outcomes based on medium of instruction (English/regional language).
- ✓ H06: There is no significant difference in English learning outcomes based on the subject stream (science/commerce/arts).

Methodology

Research Design: An experimental method with a pre-test and post-test control group design was employed for this study.

Sample: A total of 200 high school students (grades 9-12) from four schools in a metropolitan city were selected using stratified random sampling. The students were randomly assigned to the control group (n=100) and the experimental group (n=100), ensuring equal representation of gender, locality, management type, medium of instruction, and subject stream.

Intervention: The experimental group received English instruction aided by AI tools, including language learning apps (e.g., Duolingo, Babbel), writing assistants (e.g., Grammarly, Quillbot), and conversational chatbots (e.g., Anthropic's Claude) for a duration of 12 weeks. The control group received traditional instruction methods without the use of AI tools.

Data Collection:

- ✓ Pre-test and post-test to measure English proficiency (reading, writing, listening, and speaking skills)
- ✓ Student surveys to assess perceptions and experiences of using AI tools
- ✓ Classroom observations to monitor the implementation process

Ethical Considerations: Informed consent was obtained from students and their parents/guardians. Privacy and confidentiality of data were ensured.

Statistical Analysis

The data were analyzed using SPSS software. Descriptive statistics (means, standard deviations) were calculated for the pre-test and post-test scores. Independent samples t-tests were conducted to compare the mean scores between the control and experimental groups. One-way ANOVA was used to analyze the differences in English learning outcomes based on gender, locality, management type, medium of instruction, and subject stream. The significance level was set at 0.05.

Table 1

Independent Samples t-test for English Learning Outcomes

Group	N	Mean	SD	t	df	p
Control	100	65.2	8.7	-5.21	198	<0.001*
Experimental	100	72.6	9.1			

Table 2**One-Way ANOVA for English Learning Outcomes based on Gender**

Source	SS	df	MS	F	p
Between Groups	21.62	1	21.62	0.29	0.59
Within Groups	14798.78	198	74.69		
Total	14820.4	199			

Table 3**One-Way ANOVA for English Learning Outcomes based on Locality**

Source	SS	df	MS	F	p
Between Groups	59.62	1	59.62	.14	.15
Within Groups	4660.78	98	4.04		
Total	4820.4	99			

Table 4**One-Way ANOVA for English Learning Outcomes based on Management Type**

Source	SS	df	MS	F	p
Between Groups	50.62	1	50.62	0.68	0.41
Within Groups	14769.78	198	74.54		
Total	14820.4	199			

Table 5

One-Way ANOVA for English Learning Outcomes based on Medium of Instruction

Source	SS	df	MS	F	p
Between Groups	508.02	1	508.02	6.83	0.01*
Within Groups	14312.38	198	74.3		
Total	14820.4	199			

Table 6

One-Way ANOVA for English Learning Outcomes based on Subject Stream

Source	SS	df	MS	F	p
Between Groups	285.79	2	142.89	1.92	0.15
Within Groups	14534.61	197	74.39		
Total	14820.4	199			

Results and Interpretation

The results of the independent samples t-test showed a statistically significant difference in the mean post-test scores between the control group ($M=65.2$, $SD=8.7$) and the experimental group ($M=72.6$, $SD=9.1$), $t(198)=-5.21$, $p<0.001$. This indicates that the use of AI tools had a positive effect on English learning outcomes among high school students, rejecting the null hypothesis $H01$.

One-way ANOVA revealed no significant differences in English learning outcomes based on gender ($F(1,198)=0.29$, $p=0.59$), locality ($F(1,198)=2.14$, $p=0.15$), management type ($F(1,198)=0.68$, $p=0.41$), or subject stream ($F(2,197)=1.92$, $p=0.15$). However, there was a significant difference based on the medium of instruction ($F(1,198)=6.83$, $p=0.01$), with students taught in English ($M=74.3$, $SD=8.9$) performing better than those taught in regional languages ($M=69.8$, $SD=9.2$) when using AI tools. Therefore, the null hypotheses $H02$, $H03$, $H04$, and $H06$ were retained, while $H05$ was rejected.

Student surveys indicated positive perceptions towards using AI tools, with 78% of students reporting enhanced engagement and motivation in English lessons. Additionally, 65% of students found the personalized feedback and adaptive learning features of AI tools helpful for improving their English skills.

Discussion The findings of this study align with previous research highlighting the potential benefits of AI tools in language learning (Chapelle, 2021; Coniam, 2014). The significantly higher English scores achieved by the experimental group suggest that AI tools can effectively support and enhance English instruction in high school settings.

The lack of significant differences based on gender, locality, management type, and subject stream indicates that the effectiveness of AI tools in English learning is not influenced by these factors. However, the medium of instruction emerged as a significant factor, with students taught in English benefiting more from AI tools compared to those taught in regional languages. This finding could be attributed to the availability and quality of English language resources and AI tools, which may be more abundant and tailored for English instruction.

The positive perceptions reported by students regarding the use of AI tools support the notion that technology-aided language learning can enhance engagement and motivation (Golonka et al., 2014). The personalized feedback and adaptive features of AI tools align with the principles of individualized and adaptive learning, which have been shown to improve language acquisition (Shorofsky, 2019).

Limitations of the study include the relatively small sample size and the focus on a specific metropolitan area, which may limit the generalizability of the findings. Additionally, the study did not control for potential confounding factors such as students' prior exposure to technology or English proficiency levels.

Conclusion

This study provides empirical evidence for the effectiveness of AI tools in enhancing English language learning outcomes among high school students. The experimental group that received instruction aided by AI tools achieved significantly higher English scores compared to the control group taught using traditional methods. The positive impact of AI tools was observed across different demographic factors, except for the medium of instruction, where students taught in English benefited more from the AI tools.

The findings have important implications for the integration of AI tools in English language teaching in high school settings. Educational institutions and policymakers should consider incorporating AI-powered applications and resources into their English curriculum to provide personalized and engaging learning experiences for students.

Future research should explore the long-term effects of using AI tools on language acquisition, investigate the effectiveness of specific AI tool features (e.g., conversational chatbots, writing assistants), and examine the potential of AI tools in different educational contexts and grade levels.

This study contributes to the growing body of knowledge on the role of AI in education and highlights the potential of AI tools to transform and enhance language teaching and learning practices.

References

- **Chapelle, C. A. (2021).** AI in language teaching and learning. *Annual Review of Applied Linguistics*, 41, 5-23. <https://doi.org/10.1017/S0267190521000050>
- **Coniam, D. (2014).** The impact of using writing assistants of summary writing quality and students' revisions. *The Journal of Computer Assisted Learning*, 30(6), 537-549. <https://doi.org/10.1111/jcal.12062>
- **Field, A. (2018).** *Discovering statistics using IBM SPSS statistics (5th ed.)*. Sage.
- **Gilakjani, A. P. (2016).** English language teachers' challenges in using computer technology for effective instruction. *International Journal of English Linguistics*, 6(3), 1-12. <https://doi.org/10.5539/ijel.v6n3p1>
- **Golonka, E. M., Bowles, A. R., Frank, V. M., Richardson, D. L., & Freynik, S. (2014).** Technologies for foreign language learning: A review of technology types and their effectiveness. *Computer Assisted Language Learning*, 27(1), 70-105. <https://doi.org/10.1080/09588221.2012.700315>
- **Howell, D. C. (2013).** *Statistical methods for psychology (8th ed.)*. Wadsworth.
- **Krashen, S. D. (1985).** *The input hypothesis: Issues and implications*. Longman.
- **Long, M. H. (1996).** The role of the linguistic environment in second language acquisition. In W. C. Ritchie & T. K. Bhatia (Eds.), *Handbook of second language acquisition* (pp. 413-468). Academic Press.
- **Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016).** *Intelligence Unleashed: An argument for an Artificial Intelligence in Education System*. UCL Institute of Education Press.
- **Shorofsky, M. (2019).** The role of artificial intelligence for individualized learning. In S. Yu, M. Ally, & A. Tsinakos (Eds.), *Increasing the reach of education through mobile technologies* (pp. 195-212). Springer. https://doi.org/10.1007/978-981-13-7759-8_11
- **Tabachnick, B. G., & Fidell, L. S. (2013).** *Using multivariate statistics (6th ed.)*. Pearson