

Article

Exploring Student Beliefs: Does Interaction with AI Language Tools Correlate with Perceived English Learning Improvements?

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Abstract: The development of artificial intelligence has revolutionized language learning approaches with AI-assisted language applications (AiLAs) like Grammarly, Siri, and ChatGPT 3.5, offering self-paced learning, tailored feedback, and increased engagement. There is, however, not much understanding about AI's precise effects on perceived English learning improvements among students, as the majority of current research concentrates on the fact that AI is generally regarded as a language support tool. This study investigates the relation between students' beliefs of using AiLA in terms of duration, frequency, familiarity, and user satisfaction to improve their learning of English. Fifty-five (55) undergraduate students between the ages of 21 and 24 participated in the survey. The results showed that the duration of use and perceived English learning improvements had a moderate positive relationship, indicating that extensive use of AiLA aids in language acquisition. Frequency of use, however, had little effect, suggesting that frequent use of AiLA may not be enough. There was a small and statistically insignificant correlation between students' perceived English learning improvement and their familiarity with AiLA. Additionally, there was a minimal to no significant correlation between user pleasure and perceived improvements in English learning, indicating that enjoyment of AiLA is not closely related to the use of the tools. These findings demonstrate that AiLA needs to be systematically incorporated into instruction, with a focus on interactive and adaptable features rather than passive engagement. To maximize language acquisition, developers should improve AI-driven feedback and adaptive learning pathways, while educators should integrate AiLA into collaborative learning.



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Keywords: AI-assisted language applications (AiLAs); English learning outcomes; language learning; language acquisition

1. Introduction

Language learning has undergone substantial transformation due to the rapid development of artificial intelligence (AI), which has made AI-assisted language applications (hereafter AiLA) effective tools for improving English and other language proficiencies. AiLA includes a range of digital platforms, such as online teaching platforms, translation services, speech recognition software, writing aids, and language learning applications. These technologies use real-time analysis, feedback, and AI-driven customization to adjust to the needs of learners and offer focused assistance (Chiu et al., 2023; Crompton &

Burke, 2023). Even though AI has significantly transformed educational settings, questions remain regarding its effectiveness—particularly of whether the duration of use, familiarity, satisfaction, and frequency of engagement with AiLA contribute to improved English learning outcomes.

According to earlier research, technology by itself cannot ensure learning success; rather, user engagement, cognitive processing, and meaningful pedagogical integration are necessary for its efficacy (Bax, 2003). The Zone of Proximal Development (ZPD) (Vygotsky, 1979) and constructivism (Piaget & Cook, 1952) are helpful theories for comprehending ways AiLA might scaffold learning through tailored exercises, adaptive feedback, and real-world language engagement (Chapelle, 2009; Godwin-Jones, 2018). However, learning results might not alter if students engage with AiLA passively without receiving systematic guidance (Stockwell, 2012). This begs this important question: does students' exposure to AiLA affect their learning outcomes when learning English?

According to a recent study on AI in education, harnessing the advantages of technology requires user motivation, engagement, and digital literacy (H. Lee, 2024). Therefore, a lack of structured learning strategies or digital abilities may cause some students to suffer, while others may find AiLA to be very helpful (Pérez-Paredes & Zhang, 2022; Uzun, 2024). Moreover, students' preference for particular features does not always translate into improved language skills. This is because tangible learning gains are not usually the result of using AI-based tools with satisfaction (Bernacki et al., 2020; Hubbard, 2021). As such, the need for more research into whether AiLA usage, familiarity, and satisfaction predict English learning outcomes is highlighted by these conflicting results.

Such implies that there are still gaps in understanding how students in tertiary education utilize AiLA. Existing literature provides insights into AI-driven language learning; however, many studies explore general perceptions of AI-based learning (Y.-J. Lee et al., 2024; Losi et al., 2024; Ma & Wang, 2020; Qiao & Zhao, 2023; Yunina, 2023). This study fills these research gaps by investigating the relationship between students' use of AiLA and their self-reported beliefs about their perceived improvements in English learning. Nevertheless, it is important to note that this study uses Likert-scale survey responses to measure students' self-perceived learning improvement rather than direct evaluations of English language skills. It means that subjective perceptions rather than objectively measured language gains are represented in these data. This differentiation is essential for analyzing the results because self-reported results could not match actual competency improvement. Hence, four (4) research questions are formulated in this study.

1. Is there a significant correlation between the duration of AiLA usage and English learning outcomes?
2. Is there a significant correlation between satisfaction with AiLA and improvements in English learning outcomes?
3. What is the impact of familiarity with AiLA on measurable learning outcomes in English proficiency?
4. To what extent does the frequency of using AiLA affect students' English learning outcomes?

This study supports pedagogical paradigms including constructivism and the Zone of Proximal Development (ZPD) and adds to the expanding debate on AI's role in education. The results offer educators significant details relating to how AiLA affects English language acquisition, empowering them to decide the most effective way to incorporate it into the curriculum. By being aware of its impacts, educators may create more engaging lessons that encourage participation and scaffolded support, which will improve language learning in the long run.

2. Literature Review

2.1. Categorizing AiLAs for Language Learning

The term AiLAs is used in this study to refer to AI tools, independent of their initial aim, that facilitate language acquisition through adaptive features. Table 1 shows the surveyed AiLAs in the current study as they feature real-time feedback (Grammarly) or voice interaction (Siri), to name a few, to connect with the primary design aim of specific tools and their language learning value to shed light on their pedagogical repurposing. These are in contrast with conventional digital board games (Ali et al., 2018), web-based platforms (Ali et al., 2022a), or standalone devices (Ali et al., 2020) since AiLAs provide intelligent, dynamic, and responsive support, going beyond static learning tools. With AI-driven scaffolding and feedback, even typical technology-based tasks, like student-made movies (Ali et al., 2022b), can be greatly improved. Table 1 shows the AI language learning tools evaluated by students in the current study.

Table 1. Overview of Selected AI-Assisted Language Applications (AiLAs) and Their Language Learning Functions.

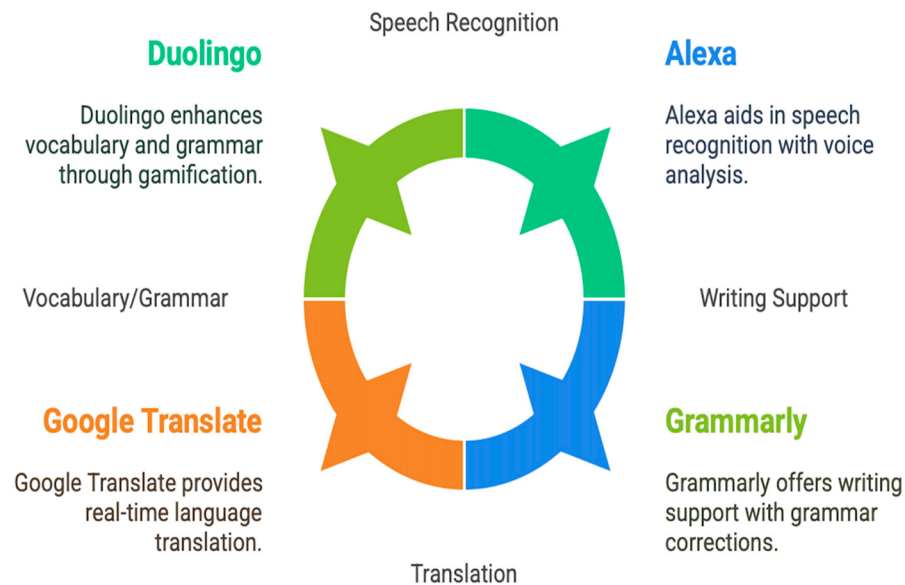
Tool	Original Design Purpose	Descriptions of Use
Duolingo	Language learning	Teaches vocabulary/grammar via gamification
Google Translate	General-purpose translation	Provides real-time text/audio translation for L2 input
Siri/Alexa	Voice assistant	Pronunciation practice via conversational AI
Grammarly	Writing enhancement	Models grammatical correctness implicitly
ChatGPT	Conversational agent	Generates contextual dialogues for practice

2.1.1. AI-Assisted Language Applications (AiLAs)

In this work, we coined the term AI-assisted language applications, or AiLAs, to describe AI-driven applications intended to improve language acquisition. These apps use AI’s capacity to customize learning experiences to help users build both receptive (reading and listening) and productive (speaking and writing) abilities. AiLA maximizes language acquisition and engagement by analyzing individual needs in real time and creating adaptive learning paths (Chiu et al., 2023; Crompton & Burke, 2023). In contrast with conventional digital board games (Ali et al., 2018), web-based platforms (Ali et al., 2022a), or standalone devices (Ali et al., 2020), AiLA provides intelligent, dynamic, and responsive support, going beyond static learning tools. With AI-driven scaffolding and feedback, even typical technology-based tasks, like student-made movies (Ali et al., 2022b), can be greatly improved.

Scheme 1 divides AiLAs into five main categories, all of which improve language acquisition by utilizing AI-powered interaction, feedback, and personalization. They are the following:

- Language Learning Apps (e.g., Duolingo, Babbel, and Rosetta Stone): Enhance vocabulary and grammar with gamification and adaptive instruction.
- Speech Recognition Software (e.g., Siri and Alexa): AI-powered voice analysis can assist with conversational skills and pronunciation.
- Language Translation Tools (e.g., Google Translate and others): Offer real-time audio and text translation for language comprehension.
- Writing Support Tools (e.g., Grammarly, Quillbot, and ChatGPT): Provide sentence rewording, grammar corrections, and writing improvements.



Scheme 1. AiLAs' five main categories.

2.1.2. The Roles of AI in Language Learning

The roles AI play in language learning involve technological advancement. It ensures that the language learning process is personalized, efficient, and engaging, making it vital to comprehend its impact to fully grasp its potential in promoting language learning (Arani, 2024; Zakaria et al., 2024).

Moreover, the ability of AI to promote self-regulated learning, which contributes to its effectiveness as a learning assistant, essentially defines its role in language learning. Qiao and Zhao (2023) emphasize that the effectiveness of AI in language learning is due to its capacity for self-regulated learning, allowing learners to set their own goals and adapt their learning strategies. AiLA has the capacity to analyze learners' strengths and weaknesses, which permit for a personalized learning experience. It also provides recommendation on what and how to improve the underdeveloped skills, which helps learners to adjust learning strategies accordingly. With this AI support, learners have greater control over their learning process, and it sets as the primary motivator to achieve better learning outcomes (Moybeka et al., 2023).

Another role of AI in language learning is that it assists collaboration among learners. Avsheniuk et al. (2024) highlight that this collaboration exposes learners to real-world language use and encourages meaningful interactions among them. He further argues that AiLA can connect learners from all around the world based on learners' preferences and level, as well as promote opportunities to engage in authentic language exchange. Some AiLAs integrate collaborative tools such as group activity and multiplayer games to encourage learners to work in a team, share their ideas, and eventually improve their communication skills (Ng et al., 2021).

Additionally, AI-assisted language learning serves the role of being a learner's virtual assistant. The AI advancement, especially with AiLAs being conversational agents, has altered the English language teaching atmosphere. A study by Zuhdy Idham et al. (2024) revealed that AI chatbots provided platforms for learners to practice their language by preparing interactive conversations. For instance, learners engage in interactive conversations related to actual scenarios such as ordering food for lunch, helping them utilize language skills in a real-world context. Fitria (2021), in her study, found that AI-powered applications such as Grammarly assisted and significantly improved learners' writing skills. The success of this application in improving learners' writing skills lay in the advanced AI

algorithms to analyze text and provide real-time feedback on various aspects of writing, including grammar, punctuation, style, and tone. This immediate feedback helped learners identify and correct errors as they wrote, leading to improved writing quality over time.

2.1.3. Understanding Learning Outcomes in Learning

Learning language involves basic to higher-order thinking skills; hence, a well-structured learning framework should be integrated to optimize learning outcomes. Bloom's Taxonomy by Bloom (1956) is a relevant guide in structuring a learning framework. This taxonomy structuring learning aims into the six levels of remembering, understanding, applying, analyzing, evaluating, and creating. The levels progress from basic to higher-order thinking skills. This progression allows learners to grow gradually by learning from the most basic to complex language skills. This is because language learning involves not just mastering vocabulary and grammar but also developing the ability to analyze, evaluate, and create with the language. Bloom's Taxonomy, which emphasizes a spectrum of cognitive processes from lower-order thinking skills (LOTS), such as recall and understanding, to higher-order thinking skills (HOTS), including analysis, evaluation, and creation, provides a framework that can aid learners in optimizing their language learning outcomes.

The understanding of learning outcomes in learning could also be discussed under the context of evaluating educational effectiveness. Douglass et al. (2012) created a framework to evaluate educational effectiveness and claimed that learning that follows this framework may elevate learning outcomes. The framework emphasizes three (3) aspects.

1. Rigorous categorization of learning outcomes

This categorization is essential for defining clear educational objectives and ensuring that assessments align with these objectives.

2. Learner self-evaluation of educational effectiveness

Self-assessment encourages students to reflect on their own learning, identify their strengths and weaknesses, and set personal goals for improvement.

3. Input–process–outcome model

The model delineates three critical stages in the educational process: inputs (the resources, curriculum, and instructional strategies), processes (the methods of teaching and learner engagement), and outcomes (the results of teaching and learning).

2.1.4. The Importance of Learning Outcomes in Learning English

Mahajan and Singh (2017) argued that identifying learning outcomes can enhance English language learning by structuring a well-organized approach to teaching and learning. They added that a well-ordered approach must have clear objectives since they serve as guidance for effective instruction. Moreover, clear objectives provide educators with a roadmap for their instructions (Habók & Magyar, 2018). By defining what students should know and be able to perform by the end of a lesson or course, educators can plan their teaching more effectively. This clarity helps in selecting relevant materials and activities that align with the intended learning outcomes, making the learning process more focused and effective.

The importance of learning outcomes in learning English should also be seen from the learners' perspective. Their perspective is a pivotal aspect to ensure that learners are aware of how to achieve the targeted learning outcomes. One significant perspective is their motivation towards reaching the targeted learning outcomes. A study by Peng (2021) supported the idea that a motivated learner shows deep engagement with the language, leading to improved learning outcomes. Moreover, it is argued that motivated students who actively use the language produce greater learning results (Masruddin & Al Hamdany,

2023). Such is due to the fact that motivation is a powerful catalyst in the English language learning process, significantly enhancing learners' ability to acquire and master new skills. Therefore, when learners are motivated, they learn the language with enthusiasm and dedication, which facilitates the attainment of targeted learning outcomes.

2.1.5. The Role of AI in Addressing Challenges in Language Learning

One significant challenge in achieving learning outcomes is poor instructional design in language learning classrooms. The traditional pedagogical approaches may not be suitable to diverse learners and digital natives. It is because outdated teaching methods fail to engage learners effectively, leading to suboptimal learning outcomes (Gautam & Gautam, 2021). When lessons are not structured effectively to accommodate these diverse learners, learners are not engaged in the classroom. Consequently, their motivation wanes and teachers have difficulties achieving desired learning outcomes. For tertiary learners, creative and purposeful instructional strategies are required to motivate them to achieve learning outcomes (Khanshan & Yousefi, 2020). Incorporating technology through differentiated instructional strategies has shown to increase students' motivation and students' attention (Krishan & Al-Rsa'i, 2023). Nevertheless, AI has the potential to address these challenges through tailored pedagogical approaches and the provision of interactive platforms, which helps to increase students' engagement in learning activities (Wei, 2023; Yang & Kyun, 2022). When learners feel that they belong in the learning experience, there is a high possibility for learners to achieve targeted learning outcomes.

Another significant challenge in the tertiary level is the limited infrastructure to cater to current technological needs. Tadesse and Muluje (2020) argue that this issue was made worse particularly after the pandemic, when many learners were unable to access learning materials due to a lack of infrastructure. Additionally, many educators were not equipped with this technology and the knowledge and skills on how to use technology for language learning. This rapid transition forced unprepared educators to deliver online pedagogies, which resulted in ineffective instructional delivery and poor learning outcomes (Liu, 2023). Due to this challenge, educational institutions and internet service providers can collaborate to subsidize internet cost, and thus, online learning resources can be accessed by all.

2.1.6. Theories of AiLA in Learning Outcomes of English Language Learning

The integration of AiLA in language learning has led to the emergence of various theoretical frameworks that clarify the learning mechanisms in enhancing learning outcomes. Constructivism is a theory developed by Jean Piaget that holds that students actively construct knowledge through experiences (Vygotsky & Cole, 1978), and AiLAs support this idea. In particular, the use of speech recognition software (Alexa, Siri) and language applications (Duolingo, Babbel) allows for interactive and self-paced learning. The ZPD and interaction with others are essential elements of learning, according to Lev Vygotsky's social constructivism (Vygotsky & Cole, 1978). This can be found in the scaffolding and adaptive learning offered by writing support tools such as Grammarly, Quillbot, and ChatGPT, as well as translation systems in Google Translate.

Moreover, it is described that AI is able to act as a personal assistant that provides autonomous practice and immediate feedback, and as a result, learning is more engaging and personalized (De la Vall & Araya, 2023; Dizon & Tang, 2020). It should also be mentioned that the effectiveness of AiLAs in language learning is factorized by collaborative learning, which is grounded by social constructivism. This means that AI platforms can serve as collaborative learning assistants to scaffold learners based on their current progress or known as ZPD (Huang et al., 2023). By providing adaptive scaffolding that aligns

with learners' ZPD, AiLAs facilitate deeper learning and engagement, which promise that learning outcomes are achieved.

The theoretical framework shown in Figure 1 demonstrates that AiLA enhances learning outcomes by promoting language acquisition through constructivism and social constructivism. AiLA functions as a personal assistant that facilitates knowledge production consistent with Jean Piaget's constructivist theory, which emphasizes that learners actively develop knowledge through engagement. Conversely, Lev Vygotsky's social constructivism emphasizes the value of collaboration and scaffolding using the ZPD.

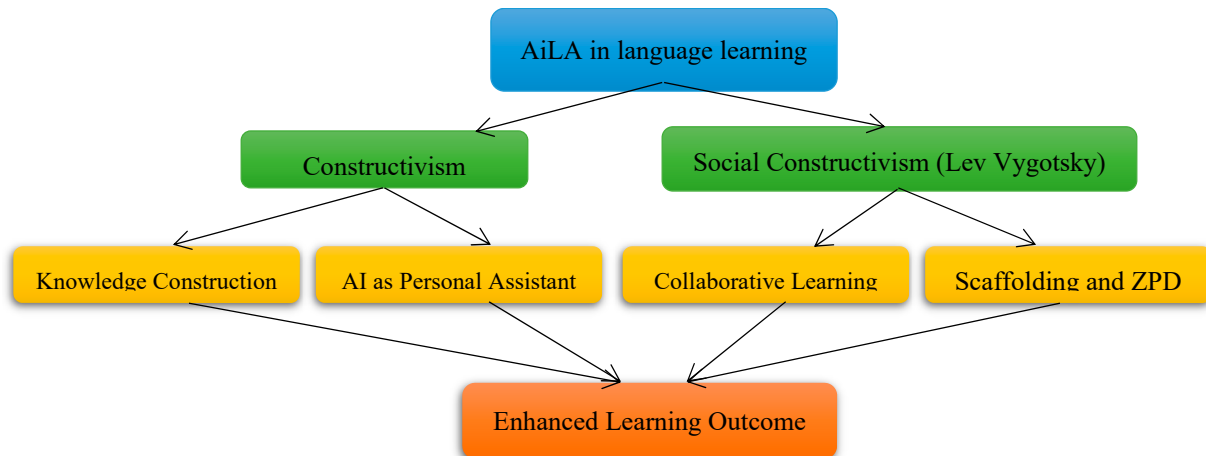


Figure 1. Theoretical framework of AiLA for English language learning outcomes (Source: Researcher-made visual).

3. Methodology

The research technique employed in this study is described in this section, including the essential components required to guarantee a thorough and organized investigation. The validity and reliability of the research instrument, study sample, and research design are all addressed. Furthermore, the techniques for data collection and analysis are provided in detail, providing a clear knowledge of how the study was carried out and the findings arrived at.

3.1. Research Design

This study used a quantitative research approach, gathering information on learning outcomes when students utilize AiLA to learn English through a survey method. The efficacy of AiLA in language acquisition can be evaluated using quantitative research since it enables objective measurement of variables and systematic data collection (Creswell, 2014). Due to its effectiveness in collecting data from a large number of participants in a very short amount of time, the survey approach was selected (Dörnyei, 2003). Furthermore, surveys provide uniformity and consistency in collecting data while allowing researchers to identify trends and patterns in student learning experiences (Bryman, 2016). This method adds to our understanding of technology-enhanced language learning by offering insightful information on how AiLA affects learning outcomes.

3.2. The Context of the Study

In terms of the linguistic context, English was used as the participants' second language, while they spoke Malay as their first language. Based on the institutional assessments, their English proficiency levels (grades B to A) fell between the Common European Framework of Reference for Languages (CEFR) scale's Independent User (B1) and Proficient User (C1) levels. Therefore, they were in their intermediate-to-advanced band, which

ensured relative homogeneity in baseline proficiency even though there were some slight discrepancies within this range. This relatively consistent proficiency background allowed for a more focused exploration of their experiences with AI-assisted language applications. They used a variety of AiLAs on their own to aid in their learning, such as Google Translate for vocabulary help, Grammarly for writing correction, Quillbot for paraphrasing, and ChatGPT for conversation practice. This means that these resources were not formally included in the course curriculum. On the other hand, the study's emphasis on perceived learning improvements rather than actual course outcomes is indicative of its goal of documenting students' varying subjective experiences with AiLA. This study conceptualized learning improvements through four key dimensions: (1) overall self-evaluated proficiency growth, (2) applied linguistic skill development, (3) increased communication confidence, and (4) progress toward self-identified language goals. Different from institutional curricular aims, these features arose from learners' autonomous or directed interactions with AiLA in and outside the classroom. This method demonstrates the mutually beneficial role of AI in both formal and informal learning settings by emphasizing learner viewpoints.

3.3. Research Instrument

This study employs a questionnaire as a research tool, which includes five domains to investigate AiLA use from multiple perspectives. Demographic data, learning outcomes, attitudes, self-efficacy, and test anxiety are the variables that are formulated in the questionnaire. However, only the learning outcomes variable is utilized to ascertain if AiLA predicts students' learning outcomes in English learning for a more focused study. To measure this characteristic, a 5-point Likert scale from "Strongly Agree" to "Strongly Disagree" is used. To evaluate this aspect, ten (10) items in total are included. The construct "perceived English learning improvement" includes nine items that measure four important facets: (1) Goal Attainment, in which participants assess if the AI tools assist them in reaching their own goals; (2) Skill Proficiency, which records self-reported improvements in vocabulary retention, grammar/syntax mastery, and overall comprehension; (3) Communication Confidence, which assesses improved self-assurance in the use of English; and (4) Proficiency self-assessment, which reflects overall assessments of progress. The four important facets and the nine items are as follows:

I. Goal Attainment

- a. Item 1: "Using AI-powered language tools this semester has helped me achieve my English language learning goals".
- b. Item 3: "The AI-powered language tools I've utilized this semester have helped me achieve specific language learning goals I set for myself".

II. Skill Proficiency

- a. Item 2: "I believe that the AI-powered language tools I've used this semester have positively impacted my English language skills development".
- b. Item 6: "Reflecting on my experience, AI-powered language tools have helped me understand English better".
- c. Item 7: "I believe that AI-powered language tools have helped me retain and recall English vocabulary more effectively".
- d. Item 8: "I perceive that AI-powered language tools have positively influenced my ability to understand and use English grammar and syntax".

III. Communication Confidence

- a. Item 4: "I feel confident in my ability to communicate in English after regularly using AI-powered language tools this semester".

- b. Item 9: “Using AI-powered language tools this semester has increased my confidence in communicating effectively in English”.
- IV. Proficiency Self-Assessment
- a. Item 5: “Based on my experience with AI-powered language tools this semester, I believe my English language skills have become more proficient”.

3.4. Validity and Reliability of Research Instrument

To guarantee the questionnaire’s appropriateness, relevance, and clarity, content and face validity were carried out (Fraenkel et al., 2012; Yagmale, 2003). Face validity evaluates how well items subjectively reflect the desired constructs (Fraenkel et al., 2012), whereas content validity guarantees an accurate representation of constructs (Checkoway, 2004; Chiwaridzo et al., 2017). Before being distributed, the questionnaire was checked for technical flaws, accuracy, and clarity. The principal author requested three (3) of her colleagues to confirm content validity and checked face validity. The reliability of the measured items is shown in Table 2, where Cronbach’s alpha value is 0.947. Pallant (2005) states that while values of 0.80 or higher are advised, those above 0.70 are deemed acceptable. The questionnaire’s strong reliability score attests to its suitability for gathering data.

Table 2. Reliability statistics of the instrument.

Cronbach’s Alpha	Cronbach’s Alpha Based on Standardized Items	N of Items
0.947	0.947	10

3.5. Data Collection Procedures

Five (5) essential steps made up the structured approach to data collection, which ensured methodical data collection and analysis. They included data recording, data transfer, distribution of the survey, response gathering, and statistical analysis. Table 3 shows the data collection procedures used in this study.

Table 3. Data Collection Procedures.

Steps	Tasks	Activities
1	Survey Distribution	The invitations were sent via WhatsApp, and participation indicated agreement.
2	Response Collection	The Google Forms survey was made available for participants to respond within 2 weeks.
3	Data Recording	Google Sheets was used to capture responses for preliminary analysis.
4	Data Transfer	SPSS 21 was used to import data for statistical analysis.
5	Statistical Analysis	The results were analyzed and interpreted using appropriate statistical analysis from SPSS.

3.6. Data Analysis Procedures

The data in the study were examined using appropriate statistical techniques. For Research Questions 1 and 2, Pearson correlation was utilized; meanwhile, for Research Questions 3 and 4, multiple regression analysis and ANOVA were employed. Furthermore, the direction and magnitude of the connections were identified using Cohen et al.’s (2007) effect size. The interpretation of the correlation values utilized in the data analysis is shown in Table 4.

Table 4. Correlation values (Source: [Cohen et al., 2007](#)).

r Value	Relationship Interpretation
r = 0.10 to 0.29 or r = −0.10 to −0.29	Small
r = 0.30 to 0.49 or r = −0.30 to −0.49	Medium
r = 0.50 to 1.0 or r = −0.50 to −1.0	Large

4. Findings and Discussion

4.1. Research Question 1: The Relationship Between the Duration of AiLA Usage and English Learning Outcomes

Using the Pearson product-moment correlation coefficient, the relationship between the length of time spent using AiLA and gains in English learning outcomes was examined. To make sure that there were no infractions of the assumptions of normality, linearity, and homoscedasticity, preliminary studies were performed. The findings showed a medium positive correlation ($r = 0.402$, $n = 55$, $p = 0.002$) between the two variables, suggesting that higher levels of learning outcomes are linked to longer AiLA use durations. Table 5 shows the results of the Pearson correlation between duration and learning outcomes of using AiLA.

Table 5. Pearson correlation between duration and learning outcomes of using AiLA.

		Duration of Using AiLA	Mean LO
Duration of Using AiLA	Pearson Correlation	1	0.402 **
	Sig. (2-Tailed)		0.002
	N	55	55
Mean of Learning Outcomes (LO)	Pearson Correlation	0.402 **	1
	Sig. (2-Tailed)	0.002	
	N	55	55

** Correlation is significant at the 0.01 level (2-tailed).

There are many positive impacts of AiLA on language acquisition, highlighting their potential effectiveness in enhancing learners’ proficiency over time ([Vadivel et al., 2023](#)). While no specific study explicitly defines an optimal duration of usage required to maximize learning outcomes, a study by [Chaudhary et al. \(2024\)](#) suggests that increased engagement of AI tools significantly contributes to better learning outcomes. According to [Chaudhary et al. \(2024\)](#), there is a strong correlation between frequent usage of this tool and enhancing learning outcomes. The ability to practice language in context improves retention and contributes to the development of language skills ([Kolegova & Levina, 2024](#)).

These studies strongly support the idea that when there are increased exposure and more practices using AiLA, it fosters long-term language acquisition and students can achieve better learning outcomes. For tertiary-level students who have easy access to these AiLA tools, using them helps them to significantly improve their language skills and have better learning experiences. Additionally, constructivism theory is supported by the effectiveness of AiLA tools since they facilitate active, context-rich engagement, which enables students to build knowledge through exposure and practice. [Piaget and Cook \(1952\)](#) believe that experience and interaction are the foundations of learning, and this validates their theory. Nevertheless, to properly embody constructivist concepts, AiLA tools might need to include more social and collaborative components.

4.2. Research Question 2: The Relationship Between Satisfaction with AiLA and Improvements in English Learning Outcomes

The results showed a very low (0.037) Pearson connection between learning outcomes and satisfaction with AiLA. This implies that the two variables have very little in common with one another. Further evidence that shows that this link is not statistically significant is provided by the significance value ($p = 0.787$), which suggests that learning results are not strongly predicted by satisfaction with AiLA. The findings of this study, which involved 55 participants, imply that factors other than participant satisfaction with the AiLA tool itself might be affecting the learning outcomes as depicted in Table 6.

Table 6. Correlation of learning outcomes and satisfaction with using AiLA.

		Learning Outcomes	Satisfaction with Using AiLA
Learning Outcomes	Pearson Correlation	1	0.037
	Sig. (2-Tailed)		0.787
	N	55	55
Satisfaction with Using AiLA	Pearson Correlation	0.037	1
	Sig. (2-Tailed)	0.787	
	N	55	55

Although this study showed a low correlation between satisfaction with using AiLA and learning outcomes, there are studies indicating that factors such as reliability of the AI tools (Fakhri et al., 2024), perceived ease of use (Kashive et al., 2021), and versatility and multifaceted utility of AI tools (Pavlenko & Syzenko, 2024) contribute to high learners' satisfaction and eventually contribute to learning outcomes. Students may express satisfaction with the immediate feedback and level of engagement by AiLA, but this does not equate to actual learning outcomes. In this study, satisfaction is not a strong predictor of improved learning outcomes, but other factors like reliability, ease of use, and versatility offer more significant roles in achieving learning outcomes.

Constructivism provides a useful framework for comprehending the weak relationship between learning outcomes and satisfaction using AiLA tools. Constructivism holds that knowledge is constructed through meaningful engagement and interaction with tools and environments, making learning an active process. Constructivism points out that deep learning outcomes rely on the extent to which students interact with and internalize the content, not the degree to which they are with the tool itself, even though satisfaction with AiLA tools may represent favorable user experiences similar to simplicity of use or instant feedback. The weak relationship may also be explained by the fact that constructivism emphasizes the value of social interaction and individual differences in learning, which AiLA tools might not adequately address. Therefore, although AiLA tools can encourage active learning, their potential to provide meaningful learning outcomes may rely more on their ability to enable deeper cognitive engagement and flexibility to meet the demands of a wide range of learners than on how well they elicit satisfaction.

4.3. Research Question 3: The Impact of Familiarity with AiLA on Measurable Learning Outcomes in English Proficiency

Generally, the analysis of the findings for this research question shows that the use of multiple regression analysis, measuring learning outcomes in English proficiency, is not statistically affected by the students' familiarity with AiLA. With a score of -0.068 , the Pearson correlation between learning outcomes (Mean LO) and AiLA familiarity is very weak, indicating a minimal negative connection. Additionally, a p -value of 0.312,

which is higher than the generally accepted cutoff of 0.05, indicates that the relationship is not statistically significant. With a p -value of 0.623 and an unstandardized coefficient for learning outcomes (Mean LO) of -0.062 , the regression analysis shows a lack of predictive connection. Only 0.5% of the variance in AI familiarity can be accounted for by learning outcomes, according to the model's R^2 value of 0.005. Additionally, the adjusted R^2 value is negative (-0.014), indicating that the model does not fit the data well. The conclusion that the regression model is not statistically significant is further supported by the ANOVA findings, which display an F -statistic of 0.244 with a significance value of 0.623. Overall, the results imply that students' English proficiency results are not substantially impacted by their experience with AiLA. All these results are shown in Tables 7–10.

Table 7. Correlation of familiarity with AI and learning outcomes.

		Familiarity with AI	Mean LO
Pearson Correlation	Familiarity with AI	1.000	-0.068
	Mean LO	-0.068	1.000
Sig. (1-Tailed)	Familiarity with AI		0.312
	Mean LO	0.312	
N	Familiarity with AI	55	55
	Mean LO	55	55

Table 8. Coefficients and statistics for familiarity with AI.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	Statistics
	B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-Order	Partial	Part	Tolerance	VIF
1 (Constant)	2.213	0.478		4.634	<0.001		3.171					
Mean LO	-0.062	0.126	-0.068	-0.494	0.623	-0.315	0.191	-0.068	-0.068	-0.068	1.000	1.000

Table 9. Model summary for familiarity with AI regression analysis.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.068 ^a	0.005	-0.014	0.68498

^a Predictors: (Constant), Mean LO.

Table 10. ANOVA table for familiarity with AI regression model.

Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.114	1	0.114	0.244
	Residual	24.867	53	0.469	0.623 ^b
	Total	24.982	54		

^b Predictors: (Constant), Mean LO.

According to the findings, including AiLAs into language instruction requires a pedagogically sound strategy. Instructors should create planned activities that encourage participation and active learning rather than merely getting students more accustomed to the artificial intelligence tools (Reinders & Benson, 2017). According to Bax (2003), technology by itself cannot ensure better learning results; rather, its efficacy is dependent on its capacity to promote cognitive engagement and meaningful pedagogical integration. When AiLAs are in line with constructivist learning principles, which prioritize learner

autonomy, cooperation, and active participation, they can be especially advantageous (Chapelle, 2009; Godwin-Jones, 2018). According to studies, AiLAs work best when they offer interactive learning opportunities, scaffolding, and adaptive feedback (Chen et al., 2020; Warschauer, 2011). However, students may use the technology passively if they lack the right instructional support, which would limit their ability to improve their language skills (Garrett, 2009; Stockwell, 2012).

Additionally, the attitudes, motivation, and digital literacy of learners influence how effective AiLAs are. According to research, students who have more favorable attitudes toward technology and demonstrate a greater level of self-efficacy tend to benefit more from digital learning resources (Zheng & Warschauer, 2017). Additionally, those who lack digital literacy may find it difficult to use and navigate AiLAs, which could result in poorer learning results (Pérez-Paredes & Zhang, 2022; Uzun, 2024). The way that AiLAs are included into the curriculum is another important factor. Research highlights the need for clear instructional techniques to support students' effective use of technology-enhanced language learning (TELL) (Hubbard, 2021; Levy, 2017). Access to AiLA without organized instruction has the danger of fostering surface-level participation rather than deep learning (Bernacki et al., 2020). Therefore, instructors need to provide activities that promote deep language processing, for instance, through group projects, interactive debates, and real-world applications, to increase the effectiveness of integrating artificial intelligence in language classes (Dornyei & Ryan, 2015).

4.4. Research Question 4: The Impact of AiLA Usage Frequency on Students' English Outcomes

The results show that learning outcomes (Mean LO) are not significantly impacted by user satisfaction with AiLA. With a non-significant p -value of 0.393 and a Pearson correlation of 0.037, the two variables have little to no connection. With a p -value of 0.787 and an unstandardized coefficient for satisfaction of 0.035, the regression analysis similarly shows a weak effect, indicating no meaningful predictive value. The negative adjusted R^2 (−0.017) and the model's R^2 value of 0.001 show that satisfaction accounts for a relatively small portion of the variation in learning outcomes. Furthermore, the model's lack of statistical significance is confirmed by the ANOVA results (F -value = 0.074, p = 0.787). In summary, how satisfied students are with AiLA has little to no influence on the students' learning outcomes. Tables 11–15 display each of these findings accordingly.

Table 11. Descriptive statistics for learning outcomes and satisfaction.

	Mean	Std. Deviation	N
Learning Outcomes	3.7172	0.73945	55
Satisfaction	4.0909	0.79983	55

Table 12. Correlation analysis between learning outcomes and satisfaction.

		Mean LO	Satisfaction
Pearson Correlation	Mean LO	1.000	0.037
	Satisfaction	0.037	1.000
Sig. (1-Tailed)	Mean LO		0.393
	Satisfaction	0.393	
N	Mean LO	55	55
	Satisfaction	55	55

Table 13. Coefficients for mean learning outcomes regression model.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-Order	Partial	Part	Tolerance	VIF
1	Constant	3.576	0.529	6.763	<0.001	2.515	4.637					
	Satisfaction	0.035	0.127	0.037	0.272	−0.220	0.289	0.037	0.037	0.037	1.000	1.000

Table 14. Model summary for mean learning outcomes regression analysis.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.037 ^a	0.001	−0.017	0.74587

^a Predictors: (Constant), Satisfaction.**Table 15.** ANOVA table for mean learning outcomes regression model.

Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.041	1	0.041	0.074
	Residual	29.485	53	0.556	0.787 ^b
	Total	29.526	54		

^b Predictors: (Constant), Satisfaction.

The results show that user satisfaction with AiLA has no discernible impact on learning outcomes, indicating that merely being satisfied with the tool is not sufficient to improve language ability. This is consistent with research that highlights the need for AI-powered educational tools to be intentionally included in pedagogy to facilitate meaningful learning, going beyond improvements to the user experience (Shoeibi et al., 2023). The significance of directed learning, in which students are given the proper scaffolding to close the gap between their present abilities and prospective development, is highlighted by Vygotsky's ZPD. According to research on AI in education, successful engagement and information retention depend more on tailored learning experiences than merely technological convenience (Lye, 2021).

Furthermore, studies on e-learning systems indicate that although user satisfaction may affect the adoption of a tool, it does not always result in better learning results unless the technology offers organized and flexible support (Idkhan & Idris, 2023). Therefore, rather than only acting as a passive language tool, AiLA needs to be created to be in line with the ZPD principles by providing interactive learning opportunities, scaffolding, and adaptive feedback that actively include students in the learning process (Huang et al., 2023; Luckin & Cukurova, 2019).

5. Conclusions

The purpose of this study was to investigate how AiLA usage, familiarity, and satisfaction relate to the prediction of English learning outcomes. The results show that while longer AiLA usage is somewhat linked to better learning outcomes, language proficiency is not significantly impacted by familiarity or satisfaction with AiLA. In terms of pedagogical implications, the results indicate that rather than being used as passive supplements, AI tools should be carefully included in instruction in languages through interactive, organized forms (such as scaffolded group projects or guided practice sessions). An intentional lesson design that positions AI as an active learning partner is necessary for educators, and

developers must give pedagogically informed features such as collaborative interfaces and adaptive feedback systems the most importance to make these tools dynamic platforms for guided language development.

This study does, however, have certain drawbacks. The breadth of learners' experiences and cognitive engagement with AiLA may not be adequately captured by relying solely on quantitative statistics. Additionally, the study was restricted to a particular sample, which can have an impact on how broadly the findings can be applied to other language learning environments. Future studies should include qualitative methods, including case studies and interviews, to examine learners' perceptions, challenges, and interactions with AiLA in order to overcome these constraints. Longitudinal studies may also shed more light on the long-term effects of AiLA on language development, confirming its status as a powerful and dynamic teaching aid.

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