

AI and Digital Learning Interventions in EFL Academic Performance

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Abstract

This study examines AI and digital learning interventions in an English as a Foreign Language (EFL) course at the College of Arts and Sciences in Wadi Addawasir. A quasi-experimental pretest-posttest design included 132 first-year female students in two existing course sections: 65 controls and 67 experimental participants. Over two months, tests, questionnaires and teacher logs documented performance and perceptions. Mean scores increased from 35.54 to 41.37 in the control group and from 40.24 to 72.79 in the experimental group. The groups differed significantly before the intervention ($p = .001$) as well as afterwards ($p < .001$). Consequently, the unadjusted posttest difference cannot isolate an intervention effect. Survey responses recorded perceived benefits alongside concerns about dependence on technology and reduced human interaction. Teacher logs described increasing familiarity with the tools. The findings support further evaluation of a mixed package of AI and digital resources, with attention to baseline differences, explicit outcome measures and the continuing role of teachers; they do not establish separate effects of individual tools or improvements in every academic skill.

Introduction

The success and reputation of Higher Education Institutions (HEIs) as well as the personal development of students depend greatly on their academic performance in the higher education setting (Johnson & Stage, 2018). A multitude of metrics are employed to gauge this performance, and one metric that warrants particular attention is dropout rates. These rates, when high, signal potential issues in a student's academic journey and often herald unfavorable outcomes, both financially and professionally (Bolsoni-Silva et al., 2018.). Shockingly, figures from various regions reveal disturbing statistics: in Australia, one-fifth of first-year undergraduates fail to complete their degrees each year, while in Brazil, only 62.4% of university enrolments culminate in an undergraduate degree (Gómez Gallego et al., 2021). These statistics not only pose significant concerns for a nation's development but also cast shadows over the lives of the students themselves.

Higher education researchers have investigated ways to identify students at risk of dropping out. Screening instruments and machine-learning approaches are among the methods discussed in the

literature (Casanova et al., 2021; Mduma, 2023). [AI adoption](#) also requires an institutional framework for implementation, resources and educational objectives (Ahmad et al., 2023). Curriculum research addresses a different part of this problem: the relationship between program design and retention (Vergel et al., 2018). Research on training and development in higher education provides additional organizational context (Othayman et al., 2021), rather than evidence of an AI dropout-prediction model.

Curriculum design is relevant to student performance and retention, and research has examined how different designs relate to dropout (Vergel et al., 2018). In Saudi EFL education, attitudes towards learning English also require attention (Massri, 2017). These perspectives provide context for the present classroom study without establishing that any single curriculum feature determines achievement.

Colleges of arts and sciences in Saudi Arabia face a complex collection of challenges that affect EFL instruction and have a significant negative influence on students' academic performance and overall educational success. These issues are rooted in linguistic, cultural, and educational aspects unique to the Saudi setting and are exacerbated by gender-specific dynamics (BaSaeed, 2013.). The primary problem is succinctly outlined as follows:

Despite the vital relevance of English language ability in a globalized society, a sizeable proportion of students in Saudi Arabia's arts and science colleges for girls experience significant problems in becoming proficient in the language. Low academic performance as a result of these issues impedes not just students' particular educational paths but also the nation's larger objectives of competitiveness and involvement abroad. This broad problem description gives rise to the following significant problems and complexities:

For female students who speak Arabic, studying English involves substantial linguistic problems because Arabic is the dominant language of instruction and daily life. Disparities in pronunciation as well as certain phonetic and grammatical patterns may impede language acquisition (Jung, 2013). Female students' perceptions of learning the English language may be influenced by Saudi Arabia's education system, which is significantly influenced by Islamic beliefs and gender-specific factors. It may be common to encounter cultural resistance or worries about cultural dilution brought on by English proficiency (Anwar, 2017). There might be a lack of contemporary teaching techniques, useful pedagogical resources, and EFL teacher preparation in the current educational framework. [Effective language instruction](#) and student engagement are hampered by these gaps. Accessing educational resources, participating in class, and having opportunities to practice their language may present gender-specific challenges for female students both inside and outside of the classroom. Female students who study the arts and sciences might not have their specific needs and aspirations taken into account in the curriculum or syllabus, which would further undermine their motivation and performance in EFL.

The goal of this study is to examine and put into practice learning interventions through AI that were

built expressly to enhance the academic performance of EFL students at Wadi Addawasir Arts and Science College in Saudi Arabia in light of these complicated issues.

Assess the impact of AI-based learning interventions on EFL students' academic performance, with a focus on factors such as language proficiency, subject-specific knowledge, critical thinking skills, and overall academic achievement.

Investigate the attitudes and perceptions of EFL students regarding the integration of AI-powered educational technologies into their learning process.

Examine the effectiveness of specific AI-based learning tools, such as language learning apps, augmented reality (AR), AI-powered chatbots, and other relevant technologies, in improving EFL students' academic performance and language proficiency.

Explore the balance between AI technologies and traditional human teaching methods in the context of EFL education.

The article presents the background, literature review, research methodology, results, discussion, conclusion and references in that order.

Literature Review

Academic Performance

In the field of education, there has been a great deal of interest in and research into how well EFL students perform academically. Numerous studies have looked into a wide range of variables that are crucial in affecting EFL students' motivation, engagement, and ultimately, academic success.

According to research, how motivated and involved EFL students are can be significantly impacted by teacher praise. When teachers encourage and commend their students for their efforts and successes, students are more likely to perform well in class. This demonstrates how crucial it is for teachers to influence EFL students' classroom experiences (Peng, 2021). There is a significant link between academic achievement and English language proficiency among EFL students.

Understanding the course materials is made simpler by language proficiency, which also enhances communication skills and enables students to actively participate in discussions and assignments (Al-Busaidi, 2021).

Academic EFL performance is intricately related to different individual differences. Examined for their effect on students' academic success are variables like self-concept, self-esteem, autonomy, emotional intelligence, and motivation. The attitudes of students toward learning and their tenacity in the face of academic difficulties can be greatly influenced by these personal qualities (Wang et al., 2022). For EFL students, reading comprehension and critical thinking skills are essential to academic performance. For a student to complete academic assignments and assessments, they must have the

ability to analyze, evaluate, and synthesize data from texts written in English. For EFL students, challenges can come from both opportunities and psychological factors. The following elements such as shyness, peer pressure, anxiety, fear of making mistakes, limited vocabulary, and little exposure to the target language can impair academic performance. Outside of the classroom, speaking opportunities can significantly improve language learning. An EFL student's motivation, both internal and external, is key in determining how dedicated they will be to their studies (Terasne et al., 2022.).

Academic performance can be significantly improved by having a strong desire to learn and succeed in the language. Another critical element is the caliber of the interactions between teachers and students. Engagement is cultivated and complex language concepts are easier to understand in a welcoming and engaging learning environment (Alrasheedi, 2020). Families' participation in their children's language acquisition can significantly impact their performance. Families that are encouraging can create a setting where English can be practiced at home and can inspire students to do well in school. Peer learning activities like study groups and group projects can improve the academic performance of EFL students. Interaction with peers who have comparable objectives can present chances for language practice and information exchange (Nguyen et al., 2022.).

Internal motivation, which is commonly impacted by family and teachers, is one of the most crucial aspects. These sources' encouragement and support can help students become more motivated to succeed in their EFL studies (Mauliya et al., 2020). The way that EFL students interact with and absorb information can be influenced by their learning preferences, such as their visual, auditory, and kinesthetic preferences. Learning styles can be taken into account while improving academic achievement. Several connected, internal, and external factors have an impact on students who learn EFL. The importance of an all-encompassing approach to teaching English as a foreign language, where peers, families, and teachers work together to create an environment that promotes academic success, motivation, and engagement, is highlighted by these intricate connections (Ali et al., 2022.).

AI and Digital Learning Interventions

AI and other digital technologies have been considered as resources for EFL teaching. FORVO, YouGlish and OALD are pronunciation and dictionary resources, and their inclusion here does not establish that each is an AI system. For instance, educational speaking technology tools such as FORVO, YouGlish, and OALD 8th ed. have been used to improve students' speaking performance. These tools have helped students become more fluent, coherent, and accurate in their speech, while also expanding their lexical resources and grammatical range (Asratie et al., 2023).

Additionally, Augmented Reality (AR) has been proposed as a means to support situational classroom learning and improve English learning effectiveness (Chang et al., 2020.). The use of AR can create an immersive learning environment that enhances students' language acquisition. AR has been proposed as a means to support situational classroom learning and improve the effectiveness of English learning. Traditional language teaching techniques sometimes fail to engage students and provide

real-world applications, resulting in boredom and slow development (Suhaizal et al., 2023.). AR technology offers the ability to superimpose digital content in the real world, creating an immersive and engaging learning environment. This technology can be used to teach vocabulary, pronunciation, grammar, reading, and writing in English (Azimova et al., 2023.). By adding English labels, grammatical rules, and text to real-world items using AR, students can practice what they have learned in a useful and fun way (Alqahtani & AlNajdi, 2023). Additionally, AR allows learners to practice their language abilities in simulated real-world settings, providing a more enjoyable and productive learning experience for non-native speakers of English.

Furthermore, AI-based chatbots are effective in improving students' academic performance, self-efficacy, learning attitude, and motivation. By integrating AI chatbots into the review process of public health courses, students have become more active participants in their learning journey (Lee et al., 2022). Research studies have shown that the use of chatbot-based micro-learning systems can positively impact students' learning motivation and performance (Yin et al., 2021). Additionally, the use of AI technologies like ChatGPT in programming education has been found to significantly improve students' computational thinking skills, programming self-efficacy, and motivation towards the lesson (Yilmaz et al., 2023.). Chatbots have also been found to be beneficial in the educational sector, particularly in conducting online surveys, as they engage students and provide a platform for feedback without getting bored (Belhaj et al., 2021.). Furthermore, chatbots have the potential to enhance learning effectiveness by supporting behavioral change and promoting study habits and skills among college students (Malik et al., 2021.). These studies illustrate potential educational applications of AI; results from programming, public health or mathematics courses are contextual evidence, not direct validation of an EFL intervention. However, it is important to note that the effectiveness of these interventions may vary based on the specific context and implementation. Further research and exploration are needed to fully understand the impact of AI on EFL education.

Student Perceptions

Students' perceptions of the integration of AI technologies in classrooms tend to be optimistic. Many students view [AI as a valuable tool](#) capable of enhancing their overall learning experience by making lectures more engaging and interesting (Soesanto et al., 2022). This positive view stems from their belief that AI can personalize their learning journeys and enhance communication between students and instructors, ultimately leading to improved educational outcomes (Joshi et al., 2021). These perceptions highlight the potential benefits of AI in education, particularly in creating dynamic and responsive learning environments. While students generally have a favorable outlook on AI in education, there are concerns about its appropriateness in certain contexts. One of the primary concerns pertains to the use of AI as a teacher, particularly for younger students. Some students question the effectiveness and suitability of AI for teaching younger learners, raising doubts about its ability to provide the necessary guidance and support. Additionally, concerns are voiced regarding the application of AI in aspects of language learning, specifically in developing language output and interaction skills (Yoon, 2019.). These concerns underscore the need for a nuanced approach to AI

integration in education that takes into account the age and specific learning objectives of students. In contrast to some student reservations, teachers tend to be more receptive to incorporating innovative technologies, including AI, into their classrooms. They believe that AI has the potential to engage students effectively and make lectures more captivating and interactive (Ashfaq et al., 2023.). This perspective highlights teachers' recognition of the role AI can play in enhancing pedagogical practices and optimizing the learning experience. Both students and teachers acknowledge the potential benefits of AI in education while also emphasizing the importance of responsible implementation. They recognize that as AI technologies become more integrated into educational settings, concerns related to agency, surveillance, and social boundaries must be carefully addressed (Seo et al., 2021). This acknowledgment reflects a balanced view of AI as a powerful tool that should be leveraged thoughtfully to maximize its educational benefits while mitigating potential risks.

In the context of English as a Foreign Language (EFL) classrooms, students' perceptions of AI technologies are more mixed. While they find AI to be useful and convenient, a degree of apprehension is prevalent (AbdAlgane et al., 2023.). Their concerns center around the appropriateness of AI, especially when it comes to teaching younger students, providing counseling, and fostering language output and interaction skills (Yoon, 2019). Regardless of these reservations, students express a strong preference for human teachers in their own EFL classrooms (Kokku et al., 2018). This nuanced perspective reflects the complex interplay between AI and traditional teaching methods in the context of language learning.

Research Methodology

Research Design

The main objective of this research is to evaluate how AI-based learning interventions affected EFL student's academic performance. To evaluate this, mixed method strategy, two different participant groups, and a quasi-experimental methodology has been used. This process included evaluations both before and after the test. In the quasi-experimental research design, two participant groups the control group and the experimental group were frequently used. Pre and post-test were given to both of these student groups to assess their academic development and performance. This technique was used to extensively assess the impact of AI based learning interventions on the academic performance of EFL students. The research design enables a comparison between the experimental group, which got the AI based learning interventions, and the control group, which didn't. By giving both groups' pretests and posttests, the researchers can track how these interventions alter EFL students' academic performance over time.

Participants

The participants were 132 first-year female students enrolled in an English course in two existing

sections at the College of Arts and Sciences in Wadi Addawasir. The source describes comprehensive inclusion of eligible students in sections A and B. Table 1 records 65 control students and 67 experimental students. Inclusion of the whole eligible pool within these sections provides coverage of those classes; it does not establish random assignment, unbiased recruitment from the wider institution or generalizability to all EFL students. Differences between the sections before the intervention must be considered in the interpretation.

Data Collection Instruments

A designed survey has been created to understand how English, as a Foreign Language (EFL) students feel about using AI-based learning tools. The survey includes Likert scale questions that explore aspects of their opinions, benefits, and concerns regarding the integration of AI technology in their journey. By using this survey researchers can gauge whether students are open to these interventions their comfort level with technologies and any worries they may have about how it affects their learning process. The questionnaire focuses on EFL students' perspectives on AI-based learning tools that are relevant to their education. It goes beyond attitudes by delving into their thoughts on language learning apps like FORVO, YouGlish, OALD 8th ed, AR, and AI chatbots in relation, to their experiences. Researchers can gather insights into the perceived benefits and drawbacks of these technologies, among students by using a set of questions. This approach helps in understanding how students perceive these tools and their potential to enhance learning and any concerns they may have about the role of these technologies, in education. The teacher log serves as a means of collecting data. It serves as a detailed record of the teacher's observations, insights, and reflections concerning how students interact with and respond to the educational AI technologies throughout the intervention phase. This log not only documents students' engagement but also provides context for understanding the impact of AI tools on the learning environment. It can include anecdotal evidence, noteworthy student reactions, and any challenges or successes observed during the implementation of AI-based interventions. By maintaining this log, researchers gain a deeper understanding of the practical implications of AI in the classroom and its influence on the teaching and learning dynamics.

Data Collection Procedures

Potential study participants were found to be female students at Wadi Addawasir's College of Arts and Sciences. The female students who were identified were divided into two groups: the experimental group and the control group. Section 'B' students were the experimental group, and section 'A' students were the control group. Both the control and experimental groups took a thorough pre-test to gauge their general academic performance. Several facets of academic proficiency were covered in this pre-test, including language proficiency, subject-specific knowledge, critical thinking, and problem-solving. The pre-test evaluated students' performance using a variety of assessment tools, including multiple-choice questions, essay writing, and problem-solving activities, to give a comprehensive view of their academic abilities. The pre-test results were documented to create a

baseline for the participants' general academic performance. The intervention phase started after the pre-tests were finished. Female students who made up the control group (section A) were taught using customary resources and techniques. These consisted of traditional classroom procedures, lecture-based instruction, and common textbooks. For two months, the control group participated in weekly tutoring sessions designed to enhance their general learning. Technical tools and resources are introduced for experimental students (Section B) to support their learning. This includes AI systems and programs ideal for a range of subjects, such as virtual labs, interactive simulations, and language learning programs. The use of these AI technologies to enhance student's overall learning across a range of disciplines and abilities was explored by groups under the direction of teachers. Both the experimental and control groups-maintained teacher records throughout the intervention. Teachers noted any notable advancements or difficulties in general learning as well as their views, experiences, and understanding of the intervention's effectiveness.

Data Analysis

Pretest and posttest scores were analysed using independent-samples t-tests and [descriptive statistics](#) in SPSS version 23. These tests compare the groups separately at each time point; they do not test the difference in individual changes or adjust the posttest comparison for baseline scores. Because Levene's tests indicate unequal variances at both time points, the unequal-variance results provide the relevant reported comparisons. Questionnaire responses were summarized using means and standard deviations. The supplied tables contain overall scores, not separate outcomes for fluency, grammar, pronunciation, subject knowledge and critical thinking.

The qualitative data recorded in the teacher's log were analyzed using qualitative data analysis methods. This involved reviewing the log entries to identify key observations, strengths, weaknesses, and impacts of both conventional teaching materials and AI-based [educational tools](#). Qualitative coding and content analysis were employed to extract valuable insights from the teacher's perspective regarding the effectiveness of the interventions. The analysis aimed to provide a holistic view of the teaching and learning process during the intervention phase. This multifaceted approach allowed for a thorough assessment of both quantitative outcomes and qualitative insights, enhancing the robustness of the study's findings.

Results

In this part, the results the study on the students' academic performance and them perception towards using AI based learning intervention is presented. The results of this study are based on the data gained through tests, teacher log, and questionnaire.

Academic Performance

Tests were used to gauge how much the students' academic performance had improved, and the data was then analyzed using independent samples t-test and descriptive statistics. Additionally, qualitative data collected through teacher logs was used to support the quantitative data on students' improvement in academic performance.

Table 1: Descriptive Data Analysis for Control and Experimental Groups

Group		N	Mean	Std. Deviation	Std. Error Mean
Pre	Control	65	35.54	5.903	.732
	Experimental	67	40.24	9.012	1.101
Post	Control	65	41.37	7.586	.941
	Experimental	67	72.79	9.848	1.203

Table 1 presents the original descriptive statistics. Before the intervention, the control group scored 35.54 (SD 5.903; SEM .732), while the experimental group scored 40.24 (SD 9.012; SEM 1.101). Table 2 shows that this pretest difference was statistically significant ($p = .001$); the groups were therefore not comparable on the measured baseline score. After the intervention, the means were 41.37 (SD 7.586; SEM .941) and 72.79 (SD 9.848; SEM 1.203), respectively. These descriptive changes and the posttest comparison are reported without replacing or recalculating the supplied measurements.

Table 2: Independent Samples Test

		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
Pre	Equal variances assumed	8.875	.003	-3.533	130	.001	-4.700	1.330	-7.332	-2.068

	Equal variances not assumed			-3.555	114.244	.001	-4.700	1.322	-7.320	-2.081
Post	Equal variances assumed	4.013	.047	-20.492	130	.000	-31.422	1.533	-34.455	-28.388
	Equal variances not assumed			-20.572	123.703	.000	-31.422	1.527	-34.445	-28.399

Table 2 reports independent-samples comparisons at the two time points. At pretest, Levene's test was significant ($F = 8.875$, $p = .003$). The unequal-variance comparison was $t = -3.555$, $df = 114.244$, $p = .001$, with a control-minus-experimental mean difference of -4.700 . The equal-variance row also indicates a significant difference ($t = -3.533$, $df = 130$, $p = .001$). At posttest, Levene's test was again significant ($F = 4.013$, $p = .047$). The unequal-variance comparison was $t = -20.572$, $df = 123.703$, $p < .001$; the supplied mean difference was -31.422 . The equal-variance row reports $t = -20.492$, $df = 130$, $p < .001$. Values displayed as .000 by SPSS signify $p < .001$, not a probability of zero. Both time-point comparisons are significant, but the posttest result is unadjusted for the baseline imbalance and cannot by itself establish the size or causality of an intervention effect.

On the initial day of implementing AI-driven learning interventions to enhance academic performance, it became evident that students were relatively unfamiliar with these technology tools. As I introduced the names and functionalities of these AI-based educational tools, it became apparent that the majority of the students were novices in this domain. This lack of awareness underscored the need for comprehensive guidance and support in utilizing these tools effectively. As I attempted to demonstrate the practical applications of these AI technologies, it became evident that many students encountered challenges in navigating and operating these tools. Their initial difficulties hinted at a learning curve that needed to be addressed to ensure that the integration of AI into their educational journey would be seamless and beneficial.

These early observations highlighted the importance of comprehensive and structured support in introducing AI-based learning interventions to enhance overall academic performance. It was evident that students required guidance not only on the existence of these tools but also on their optimal utilization to leverage their potential for academic improvement.

The teacher's log, recorded midway through the intervention, indicated that students had become increasingly acquainted with various AI-based tools. While their initial interactions might not have yielded highly effective outcomes, there was a notable shift in their engagement with these technologies. This transition was reflected in the teacher's observations, as exemplified by the following excerpt:

“At the midpoint of the intervention, it was evident that students had grown familiar with and had started to actively utilize a range of AI-powered educational tools. These tools encompassed not only those related to speaking skills but also others designed to enhance overall academic performance. Specifically, students engaged with FORVO, YouGlish, OALD 8th ed, AR, AI-based chatbots, and AI technologies like ChatGPT.”

It was noteworthy that on the most recent day of instruction, students harnessed these educational speaking technologies as part of their broader academic learning experience. They actively practiced various academic skills, which extended beyond speaking proficiency, by leveraging the potential of tools such as FORVO, YouGlish, OALD 8th ed, AR, AI-based chatbots, and AI technologies like ChatGPT. This shift in student behavior signified an evolving and more comprehensive integration of AI-driven learning interventions into their academic journey, with the aim of enhancing their overall academic performance.

Furthermore, as the intervention neared its conclusion, the teacher’s log entries revealed notable developments

“In the latter stages of the intervention, it was observed that students had actively engaged with AI-powered tools, with a notable focus on enhancing their language skills and overall academic performance. Their practice sessions, particularly with AI-based chatbots, and AI technologies like ChatGPT, showcased significant improvement. Many students had notably enhanced their pronunciation skills compared to their initial performance during the introduction of these AI technologies. This progress underscored the potential of AI-driven interventions in facilitating language development.”

In addition to honing their pronunciation, students also utilized various AI-based resources to expand their vocabulary and gain a deeper understanding of academic content. These observations indicated a positive shift in students’ academic performance, as they harnessed AI technologies to augment their language skills and knowledge acquisition.

These observations describe the teacher’s assessment of engagement, pronunciation practice and growing familiarity with educational tools. They provide qualitative context for the test scores, while remaining observations rather than controlled evidence of the separate effects of chatbots, ChatGPT or other resources.

Perceptions of AI Technology

Table 3: Students’ interest in using Learning interventions through AI

Items	Mean	Std. Deviation	Std. Error Mean
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I believe that incorporating educational AI technologies in our learning process would enhance my academic experience	4.06	.939	.082
I am open to the idea of using AI-powered tools and applications to support my studies	4.25	.714	.062
I think that educational AI technologies could help me better understand and grasp complex subjects in my courses	4.16	.770	.067
I am concerned that relying too heavily on AI in education might negatively impact the quality of my learning experience	4.23	.672	.059
I believe that a balanced integration of AI technologies and human teaching in my courses	4.20	.696	.061
I believe that educational AI technologies can adapt to my individual learning needs and provide personalized support to help me succeed in my courses	4.22	.765	.067
I feel confident in my ability to effectively use educational AI tools and platforms if they were introduced into my curriculum	4.11	.844	.073
I am concerned that the use of AI technologies might lead to a reduced level of interaction and communication with my instructors and peers, impacting the social aspects of my education	4.20	.725	.063

Table 3 presents students' attitudes and perceptions regarding the integration of AI-based learning interventions into their educational experience. Students, on average, believe that incorporating educational AI technologies into their learning process would enhance their academic experience, with a mean score of 4.06 (SD = 0.939). They are generally open to the idea of using AI-powered tools and applications to support their studies, as indicated by a mean score of 4.25 (SD = 0.714). Students' express optimism that educational AI technologies could help them better understand and grasp complex subjects in their courses, with an average rating of 4.16 (SD = 0.770). Concerns about an overreliance on AI in education negatively impacting the quality of the learning experience received a mean score of 4.23 (SD = 0.672). There is a belief in the importance of a balanced integration of AI technologies and human teaching in courses, as reflected by a mean score of 4.20 (SD = 0.696). Students have confidence in their ability to effectively use educational AI tools and platforms if introduced into their curriculum, with a mean score of 4.11 (SD = 0.844). While there is

some concern about AI technologies potentially reducing interaction and communication with instructors and peers, impacting the social aspects of education, these concerns received a mean score of 4.20 (SD = 0.725). students display a positive disposition towards the incorporation of AI-based learning interventions into their educational journey, with a general belief in the potential benefits while maintaining some awareness of potential challenges and concerns.

Table 4: Students' viewpoints on the roles of various AI-based learning interventions

Items	Mean	Std. Deviation	Std. Error Mean
I strongly believe that AI-powered tools like FORVO, YouGlish, and OALD 8th ed can significantly enhance my language learning experience	4.12	.731	.064
I think that augmented reality AR can make the learning process more engaging and interactive in my courses	4.27	.818	.071
I believe AI-based chatbots have the potential to provide timely and helpful support to answer my questions and assist me in my studies	4.20	.826	.072
I am open to using AI technologies like ChatGPT to access additional learning resources and receive explanations for complex topics in my courses	4.20	.769	.067
I am concerned that an overreliance on AI-based learning interventions might replace the need for traditional human instruction and interaction, potentially diminishing the quality of my education	4.24	.722	.063

Table 4 summarizes students' perspectives regarding the roles of various AI-based learning interventions in their educational experience. Students strongly believe that digital learning tools like FORVO, YouGlish, and OALD 8th ed have the potential to significantly enhance their language learning experience, with a mean score of 4.12 (Std. Deviation = 0.731). They hold the view that augmented reality (AR) can make the learning process more engaging and interactive in their courses, as indicated by a mean score of 4.27 (Std. Deviation = 0.818). Students' express confidence in the ability of AI-based chatbots to provide timely and helpful support in answering their questions and assisting them in their studies, with an average rating of 4.20 (Std. Deviation = 0.826). They are open to utilizing AI technologies like ChatGPT to access additional learning resources and receive

explanations for complex topics in their courses, with a mean score of 4.20 (Std. Deviation = 0.769). While there is some concern about an overreliance on AI-based learning interventions potentially replacing the need for traditional human instruction and interaction, and consequently diminishing the quality of education, these concerns received a mean score of 4.24 (Std. Deviation = 0.722). Students hold positive views about the potential of AI-based learning interventions to enhance their educational experience, particularly in language learning and interactive engagement. However, they also maintain a balanced awareness of the need for a harmonious integration of AI technologies with traditional instruction to ensure the quality of education is not compromised.

Discussion

The experimental section had higher mean scores at both pretest and posttest, and the posttest gap was larger than the pretest gap. This pattern is consistent with a potential benefit from the intervention package, but the significant baseline difference limits causal interpretation. The supplied analysis compares the groups separately at each time point; it does not provide a baseline-adjusted model or an analysis of individual change scores. Existing sections also leave open explanations involving prior achievement, access to resources, teacher interaction or other differences. The tables therefore support a report of observed group differences, not a definitive estimate of the effect of AI.

Tables 3 and 4 record perceived educational benefits and concerns about dependence on technology and reduced interaction. The concerns should be reported alongside the positive responses rather than characterized as moderate without the questionnaire's scale anchors. FORVO, YouGlish and OALD are digital pronunciation and dictionary resources; their inclusion does not establish that every tool uses AI. AR, chatbots and ChatGPT were discussed within the broader intervention, but no separate tool-specific outcome analysis is supplied. The teacher logs add practical context about initial difficulties, guidance and increasing familiarity.

The reported overall scores do not establish separate improvements in critical thinking, subject knowledge, pronunciation or every dimension of language proficiency. A stronger evaluation would specify the intervention dosage and outcome scales, document comparable groups or adjust for baseline performance, and examine durability beyond the two-month period. The educational implication is to evaluate these resources as supplements to teaching while preserving opportunities for feedback, conversation and instructor support.

Conclusion

The two-month study documented higher posttest scores in the experimental section and student interest in AI and digital learning resources. However, the sections already differed significantly at pretest, and the unadjusted comparisons do not isolate a causal effect of the intervention. Survey responses and teacher logs suggest perceived usefulness, increasing familiarity and concerns about

reliance on technology. These findings justify further evaluation of the combined resource package alongside human teaching. They do not establish the effectiveness of every individual tool or improvements in separately unreported academic skills.

The study is limited to 132 students in two existing sections at one institution over two months. Nonrandom section assignment and the significant pretest imbalance constrain causal interpretation and generalizability. Prior familiarity with technology and access to resources may also influence the findings. Questionnaire responses are self-reported, and the scale anchors are not specified in the source. Teacher logs reflect classroom observations. Baseline-adjusted analysis, instrument details and separate skill outcomes are not supplied. Longer-term retention and engagement were not established by the reported results.

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