

The Impact of iPad-Based Translation Apps on English Language Proficiency: The Mediating Role of Learning Engagement among Saudi Learners

Elham Alzain¹, Faiz Algobaei²

¹ Applied College, King Faisal University, Al Ahsa, Saudi Arabia. E-mail: ealzain@kfu.edu.sa, elhamalzain@gmail.com

² Sciences and General Studies Department, Al-Fayha Private College, Jubail, Saudi Arabia. E-mail: faiz.a@fayha.edu.sa, realfaiz@gmail.com

Correspondence: Elham Alzain, King Faisal University, Al Ahsa, Saudi Arabia. E-mail: elhamalzain@gmail.com

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Abstract

This study examines the impact of iPad-based translation apps on English language proficiency among Saudi learners, focusing on factors such as attitudes toward the use of translation apps (ATU), perceived ease of use (PEU), perceived helpfulness (PH), and learning engagement (LE). The study employs a mixed-methods approach integrating quantitative and quasi-experimental design with a pre-test and post-test. The sample comprises a purposively selected group of first-year students enrolled in an English proficiency (EP) course among iPad-using students at four public universities in Saudi Arabia. The study employs Partial Least Squares Structural Equation Modelling (PLS-SEM) for analysing the direct and mediating relationships between these factors and EP. The results indicate that ATU, PEU, and PH influence learning engagement, enhancing English proficiency. The mediation analysis confirms LE is crucial in linking translation apps to EP. The analysis revealed statistical significances in mediating effects for all constructs: PEU ($\beta = 0.125, p < 0.001$), PH ($\beta = 0.215, p < 0.001$), and ATU ($\beta = 0.121, p < 0.001$). These effects were evident in reading proficiency gains ($Z = -5.221, p < 0.001$). The results of the pre-tests and post-tests reveal a significant improvement in language proficiency. Reading and vocabulary achieved the highest positive ranks (Mean Rank = 18.00, $N = 35$, Sum of Ranks = 630.00), while grammar followed (Mean Rank = 17.50, $N = 34$, Sum of Ranks = 595.00). All Z-values were highly significant ($p = 0.000$). The study highlights the effectiveness of iPad translation apps in improving language learning and underscores the importance of engagement in mobile-assisted language learning. This study offers valuable insights and recommendations to assist English language practitioners and learners, particularly within the growing domain of iPad usage in language learning.

Keywords: translation apps, technology, iPads, English proficiency, engagement, attitude

1. Introduction

Technology has changed traditional pedagogical methodology since its rapid integration into education, offering opportunities for our learners to utilise innovative tools to cater to evolving needs. Media are a regular part of today's environment for students; in fact, their attention is so fully fixed on multimedia that they could be less interested in traditional forms of teaching (Al-Bogami & Elyas, 2020). Mobile technologies have shown great potential in language learning, especially in English as a Foreign Language (EFL), to enhance learners' engagement and motivation and expand their proficiency. The potential of mobile-assisted tools like tablets and translation apps to overcome long-standing hurdles in language acquisition has continually emerged in research (Chun & Plass, 1996; Hassan Taj et al., 2017). These tools supply a multimodal form of language input, which is essential in countering traditional teaching methods. For this reason, Chung and Ahn (2022) state that technological advancements have changed language classes, replacing conventional teaching methods with technology. Today, learners arrive at class with iPads and other mobile devices, giving them instant access to information and materials to support their learning.

This increased reliance on mobile technologies, particularly iPads, has significantly changed traditional language teaching methods. Technology has been an essential part of the learning experiences for "digital natives" or the "Net generation" (Prensky, 2001; Tapscott, 2009). Unlike traditional methods, today's learners have become accustomed to accessing information. This enhances their motivation and engagement (Bryant et al., 2015; Heiberger & Harper, 2008). Moreover, these devices allow students and teachers to access and interact with study materials anytime and anywhere (Alzain, 2022; Loewen et al., 2019). This removes the need to sit in a classroom or at a computer (Miangah, 2012), making learning more flexible and accessible. However, Grigoryan (2022) notes that such innovations require continuous examination to identify their advantages and challenges, particularly in language education contexts.

Translation apps provide a promising solution in the Saudi EFL, where students constantly struggle with motivation and engagement in English learning (Fareh, 2010; Mahboob & Elyas, 2014). Studies have shown that mobile applications, including translation tools like Google Translate, are widely used for language learning, such as understanding vocabulary, translating text, and improving writing (Alhaisoni & Alhaysony, 2017; Hassan Taj et al., 2017). While their potential is well-documented, the effectiveness of these tools,

especially in improving overall English language proficiency, remains underexplored.

Learner engagement is crucial in language proficiency, particularly in technology-enhanced learning environments. Therefore, fostering learner engagement is one of the critical factors in attaining language proficiency. The relationship between technological interventions and learning outcomes is mediated through engagement, encouraging active and sustained interaction with language content (Stockwell, 2012). Although iPad translation apps on iPads do influence English language proficiency, there is limited empirical research regarding how this happens in the EFL context.

Therefore, this study aims to test the effect of iPad-based translation apps on English language proficiency among Saudi EFL learners. It focuses on key dimensions, including learner engagement, to determine how translation apps affect vocabulary retention, grammar understanding, and reading comprehension. In addition, it investigates whether engagement is a mediating variable that explains how the use of translation apps is related to language proficiency.

2. Literature Review

2.1 Mobile Technology in Language Learning

Mobile technology has revolutionised the language learning landscape over the past two decades. The change began with desktop computers and expanded to smartphones, tablets, and mobile apps. This has led to the emergence of Mobile-Assisted Language Learning (MALL) (Kukulska-Hulme, 2020). Mobile devices help users gain access to learning materials anytime and anywhere, which makes it easier for language learners to access mobile devices. Tablets, such as iPads, have been found to enhance collaborative learning in EFL courses, offer interesting possibilities for language practice, and stimulate student interaction (Albadry, 2017). Tarazi and Arafat (2021) found that using iPads in English education boosts students' motivation and performance and fosters positive attitudes toward learning English from both parents and teachers.

Similarly, Grigoryan (2022) found that students who spent time on iPad-based language learning programs had better English language achievement, and students' positive attitudes predicted their success in language learning. Language learning apps like Duolingo, Google Translate, and others have become increasingly popular, and learners can participate in language learning in various ways: reading, listening, writing, practising vocabulary, and translating complex texts. According to the literature, mobile devices in language learning have been getting significant attention. Chen et al. (2020), Lai and Zheng (2018), Ok and Ratliffe (2018), Pellerin (2018), and Stockwell (2012) have investigated how mobile devices contribute to improving learning, self-efficacy, and engagement.

2.2 Translation Apps in Language Learning

Apps like Google Translate have become popular tools in the language learner's toolkit. Alotaibi and Salamah (2023), Clifford et al. (2013), Karsenti and Collin (2013), Lake and Beisly (2019), and Senior (2019) reported that translation apps have a powerful influence on language learning. Karsenti and Collin (2013), for example, found that translation apps help elementary learners understand unfamiliar words and phrases. Similarly, Clifford et al. (2013) stated that translation apps are helpful tools for beginning learners because they provide instant feedback and allow their users to read complex texts. Alotaibi and Salamah (2023) highlighted that translation apps improve students' learning performance and learning experience. Lake and Beisly (2019) and Senior (2019) also emphasise that translation apps enhance understanding, engagement, motivation, and communication for language learners. They highlighted the role of mobile translation in facilitating practical language learning.

While some studies on translation apps in language learning highlight the levels of user benefit, the drawbacks of translation apps are also well-documented. One of these drawbacks is an over-reliance on translation apps and potential issues with accuracy (Algobaei et al., 2024; Alzain et al., 2024; Groves & Mundt, 2015). Their findings highlight that translation apps can produce grammatically incorrect or contextually inappropriate translations. Garcia and Pena (2011) explained that students using machine translation bypass opportunities to engage with the language and develop critical thinking skills related to grammar and syntax. Niño (2009) found that language learners often use translation apps in writing and reading tasks as a support mechanism rather than a learning tool. Murtisari et al. (2019) noticed that using Google Translate potentially reduces students' exposure to English.

2.3 iPad Translation Apps

iPad translation apps in language learning have emerged as a dynamic resource in language learning. These apps provide immediate access to translations and contextual explanations, and interactive features (Tarazi & Arafat, 2021; Wang et al., 2015; Xin & Affrunti, 2019). Apps like Google Translate, iTranslate, and Microsoft Translator allow learners to quickly translate unfamiliar words and phrases, enabling them to engage more effectively with challenging texts and instructions (Ammade et al., 2023; Xin & Affrunti, 2019). iPad-compatible translation apps are suitable for everyday conversations, offering preset phrases for translating common topics, which is especially beneficial for practical language use (Panayiotou et al., 2019). By integrating built-in translation features and digital dictionaries, iPads support learners in expanding their vocabulary and comprehending complex linguistic structures, contributing to improving second-language acquisition (Auquilla & Urgilés, 2017). Additionally, iPad applications have been found to bolster student engagement and active learning, making them valuable tools in EFL/ESL classrooms (Al-Bogami & Elyas, 2020).

iPad translation apps' personalised and interactive nature promotes autonomous learning, allowing independent learners to practice language skills, consistent with the self-regulated learning principles (Al-Bogami & Elyas, 2020; Grigoryan, 2022; Pellerin, 2018). Moreover, these tools are particularly valuable for students in the early stages of language acquisition, providing real-time support without a

heavy reliance on teachers—a significant benefit for shy learners or those with limited confidence (Albadry, 2015; Wang et al., 2015; Xin & Affrunti, 2019). These apps' user-friendly interfaces and multifunctionality facilitate easier comprehension and cognitive engagement (Al-Bogami & Elyas, 2020; Kukulska-Hulme, 2020; Pellerin, 2018).

iPad translation apps foster collaborative learning in the classroom by encouraging peer discussions and activities that deepen understanding and engagement (Hur, 2019). This aligns with the MALL trends, emphasising integrating technology to enhance educational practices. Thus, these apps create active and engaging language acquisition opportunities.

2.4 Students' Attitudes and Perceived Helpfulness and Ease of Use of iPad Translation Apps for Learning

Students' attitudes toward iPad translation apps are essential in determining their effectiveness in language learning. Alzaidiyeen (2017) highlighted that most participants had favourable perceptions of iPads in language learning. These attitudes are shaped by the interactive features of translation apps, which encourage learners to invest time and effort in language tasks (Ahmed & Nasser, 2015; Al-Bogami & Elyas, 2020), thereby enhancing engagement and cognitive involvement.

Students also perceive iPad translation apps as helpful for supporting specific language skills. This immediate feedback and reward system sustains and improves proficiency (Grigoryan, 2022). Additionally, preset phrases for everyday communication and support for grammar understanding make the apps practical and targeted to learner needs (Panayiotou et al., 2019; Xin & Affrunti, 2019).

Perceived ease of use is another key factor influencing students' engagement. A user-friendly interface and accessible features allow students to integrate these apps into their learning practices (Hur, 2019; Ross et al., 2021). These features minimise cognitive load and enhance learning efficiency (Sweller, 2011). Students appreciate the simplicity of translating vocabulary, grasping grammar concepts, and engaging with reading tasks, which minimises cognitive load and maximises learning efficiency (Ross et al., 2021). The design and compatibility of iPads also contribute to their ease of use by students at different proficiency levels (Tai & Wei, 2024). Grigoryan (2022) emphasised that the digital design of iPads, offering immediate feedback and rewards, enhances usability and supports sustained motivation.

2.5 Learning Engagement

Learning engagement is a critical mediator between iPad translation apps and improvements in English language proficiency. Engagement facilitates the development of essential language skills through motivation, active participation, and cognitive investment (Ammade et al., 2023; Hilton & Canciello, 2013; Wang et al., 2015; Xin & Affrunti, 2019). iPad translation apps provide an engaging nature that supports bilingual learners by creating a sense of value and belonging (Lake & Beisly, 2019; Ross et al., 2021). Increased engagement correlates with higher classroom participation, enabling students to form deeper connections with language-learning activities (Ammade et al., 2023). By actively interacting with iPad translation apps, students enhance their ability to process and retain new vocabulary and grammar rules. These tools also cultivate autonomy, enabling them to take charge of their learning and focus on mastering complex linguistic structures in practical contexts (Alotaibi & Salamah, 2023).

Empirical evidence further highlights the strong link between engagement and language proficiency (Ammade et al., 2023; Hur, 2019). Additionally, some research underscores how these apps create personalised learning environments that motivate students to remain focused and active participants in their language acquisition journey (Ahmed & Nasser, 2015; Al-Bogami & Elyas, 2020).

2.6 The Study Model and Hypotheses

2.6.1 The Study Model

The present study investigates the impact of iPad translation apps on the English language proficiency of first-year Saudi university students, employing a mixed-methods approach. The study adopts a conceptual model in which students' attitudes toward using iPad translation apps (ATU), their perception of the ease of use of iPad translation apps (PEU), and their perception of the helpfulness of iPad translation apps (PH) are independent variables, and English proficiency (EP) is the dependent variable. Learning engagement (LE) is examined as a mediating factor, proposing that increased engagement enhances the effectiveness of translation apps in facilitating language learning. This comprehensive framework aims to elucidate the mechanisms through which translation apps contribute to vocabulary retention, grammar comprehension, and reading proficiency. It also explores learners' attitudes and engagement as pivotal factors in learning. Figure 1 is a visual representation of the study's conceptual framework. It comprises five constructs. ATU, PEU, and PH are independent variables, EP is the dependent variable, and LE is the mediating variable.

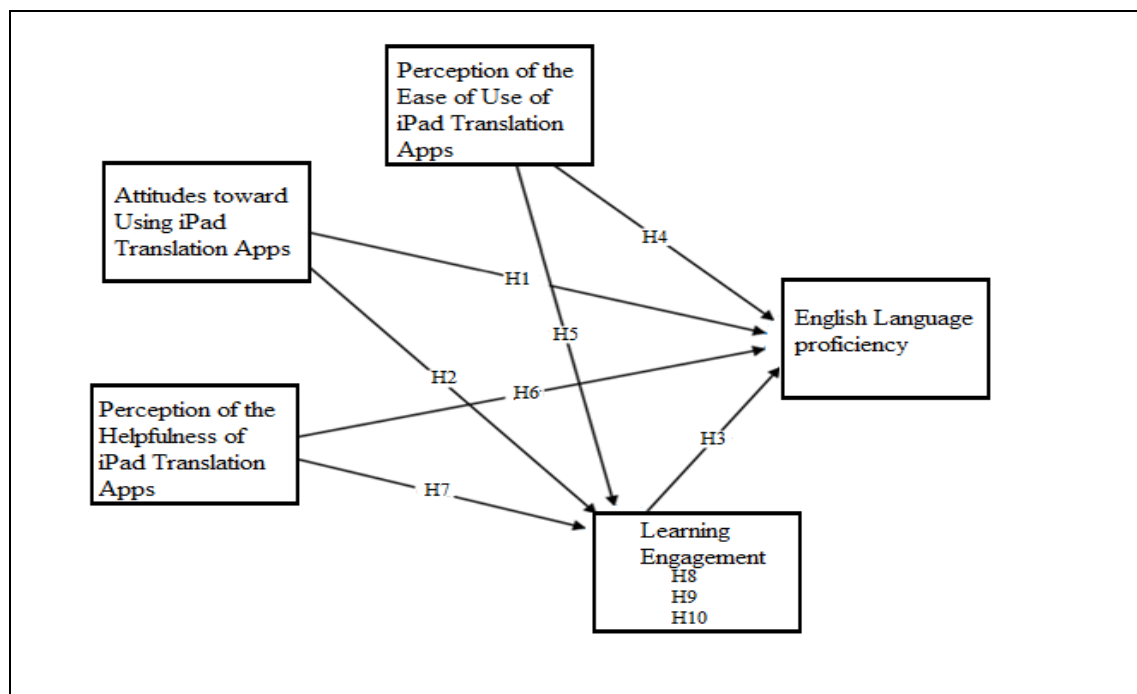


Figure 1. The study conceptual model-Conceptual framework.

Source: author development

2.6.2 The Hypotheses

Based on previous literature, the following hypotheses are developed:

H1: Attitudes toward using iPad translation apps positively influence English proficiency.

H2: Attitudes toward using iPad translation apps positively influence learning engagement.

H3: Learning engagement positively influences English proficiency.

H4: Perceived ease of use of iPad translation apps positively influences English proficiency.

H5: Perceived ease of use of iPad translation apps positively influences learning engagement.

H6: Perceived helpfulness of iPad translation apps positively influences English proficiency.

H7: Perceived helpfulness of iPad translation apps positively influences learning engagement.

H8: Learning engagement mediates the relationship between the perceived ease of use of iPad translation apps and English proficiency.

H9: Learning engagement mediates the relationship between the perceived helpfulness of iPad translation apps and English proficiency.

H10: Learning engagement mediates the relationship between attitudes toward using iPad translation apps and English proficiency.

3. Research Methodology

This study employs a mixed-methods approach—quantitative and quasi-experimental methods. The study investigates iPad translation apps' impact on English language proficiency among first-year university students. The quantitative method uses a structured survey, as surveys are effectively used in studies on technology use in language learning (Creswell & Creswell, 2018; Dörnyei, 2007). The survey was administered to a broad sample of students ($N \approx 317$). The quasi-experimental component uses a pre-test and post-test design with a smaller group to assess specific language gains. This allows for both breadth and depth in understanding how translation apps support language learning (Creswell & Creswell, 2018).

3.1 Participants and Data Collection

The study includes two groups of participants. The first group comprises more than 317 first-year undergraduate students from four public universities in Saudi Arabia—King Faisal University, Northern Border University, Tabuk University, and Albaha University. The researchers employ non-probability purposive sampling, as the study targets participants with specific characteristics—namely, first-year undergraduate students enrolled in English proficiency courses, a mandatory subject for all first-year students, and willing to participate. This group completes a survey on their use of iPad translation apps in English courses. While this method allows for focused data collection from a relevant population, it may limit the generalizability of the findings due to potential self-selection bias. Participants who chose to participate may have had more favourable attitudes toward technology or greater exposure to translation apps than those who did not. Future studies may consider using random or stratified sampling to improve representativeness and strengthen the applicability of results across

broader student populations.

The second group, drawn from the survey participants in a single university's English 101 course at Northern Border University ($n \approx 35$), participates in a pre-test and post-test design to measure concrete language gains associated with app usage. All participants are elementary-level English learners, providing a consistent proficiency baseline across both groups (Mackey & Gass, 2015).

The research took about 15 weeks in the first semester of the 2024–2025 academic year. The pre-test was administered during the second week of the semester. This test established a baseline measure of their English language proficiency, focusing on vocabulary retention, grammar understanding, and reading comprehension. The intervention involved regular use of iPad translation apps integrated into the classroom and self-study activities. At the end of the semester, the post-test was conducted to measure any changes in proficiency levels after 14 weeks of app usage. The consistent administration of the pre-test and post-test ensured reliability and allowed for direct comparison of results to evaluate the apps' effectiveness. All participants voluntarily agreed to take part in the study, and their responses were kept confidential. Statistical analysis of pre- and post-test results is presented in Section 4.2. Qualitative Analysis.

3.2 Measures of the Study

This study employed measurement items for its constructs from authentic, validated sources, ensuring high reliability and validity. The conceptual model comprises five constructs: ATU, PEU, PH, LE, and EP. The measurement items for the ATU construct were adapted from Alluhaydan (2024) and Metruk (2021). Items for the PEU and PH constructs were sourced from Al-Bogami and Elyas (2020), Darsih and Asikin (2020), and Grigoryan (2022). The LE construct was measured using items derived from Al-Bogami and Elyas (2020). Finally, the EP construct utilised items adapted from Alluhaydan (2024) and Maharani et al. (2024). The survey used a Likert scale to measure various constructs, allowing for quantifiable and comparable responses. A pilot test with a small group ($n \approx 40$) helped refine the survey. The survey serves to examine the relationship between the variables (attitudes, perceived helpfulness, ease of use), the mediating variable (engagement), and the dependent variable (English language proficiency).

The pre-test and post-test for this study were carefully designed to assess changes in English language proficiency among participants, providing a reliable measure of the impact of iPad-based translation apps. The researchers prepared the pre-test and post-test in collaboration with three faculty members from the English Department at Northern Border University. These tests evaluated three key aspects of language learning: vocabulary retention, grammar understanding, and reading comprehension. The test items were developed in alignment with the curriculum objectives for first-year university students and reviewed to ensure consistency with language proficiency standards. The test content was designed based on the CEFR framework to ensure validity and relevance.

4. Analysis and Results

4.1 Quantitative Analysis

4.1.1 PLS-SEM Results

This study employed the PLS-SEM for data analysis, using bootstrapping techniques to test the proposed hypotheses. The analysis involved two steps: evaluating the measurement model to ensure construct reliability and validity and analysing the structural model to test the hypothesised relationships. This approach confirms robust insights regarding the mediating effect of engagement and the influence of iPad translation apps on English language proficiency.

The initial stage in evaluating the reflective measurement model involved analysing indicator loadings. A loading value of 0.70 or higher suggests that the construct accounts for over half of the indicator's variance, ensuring good reliability (Hair & Alamer, 2022; Sarstedt et al., 2017). As illustrated in Table 1, the study's results met this criterion, confirming that the indicators are reliably measured.

Table 1. Outer Loadings

Outer Loadings	ATU	EP	LE	PEU	PH	VIF
ATU1	0.823					2.353
ATU2	0.833					2.330
ATU3	0.823					2.205
ATU4	0.870					2.893
ATU5	0.863					2.714
EP1		0.806				2.733
EP2		0.774				2.728
EP3		0.792				2.870
EP4		0.829				3.574
EP5		0.860				4.075
EP6		0.758				3.681
EP7		0.754				2.430
EP8		0.788				3.180
EP9		0.812				4.175
EP10		0.797				3.647

EP11	0.787	2.883
EP12	0.789	2.892
EP13	0.759	2.568
EP14	0.814	3.130
EP15	0.795	2.642
LE1	0.867	2.683
LE2	0.917	4.128
LE3	0.914	4.011
LE4	0.884	2.987
LE5	0.841	2.387
PEU1	0.853	2.462
PEU2	0.858	2.628
PEU3	0.891	2.982
PEU4	0.740	1.697
PEU5	0.772	1.713
PH1	0.828	2.394
PH2	0.859	2.692
PH3	0.867	2.736
PH4	0.895	3.333
PH5	0.884	3.085

The assessment of the outer loadings and collinearity statistics for the constructs—ATU, EP, LE, PEU, and PH—confirmed indicator reliability and the absence of collinearity issues. Indicator reliability was established, as all loadings exceeded the 0.70 threshold. Additionally, variance inflation factors (VIF) for all constructs were well below the threshold of 5, ranging from 1.697 to 4.175. This confirms the absence of multicollinearity. The ATU items have loadings ranging from 0.823 to 0.870, with corresponding VIF values ranging from 2.205 to 2.893. This range indicates low collinearity. EP shows slightly higher VIF values, up to 4.175, but maintains strong loadings ranging from 0.754 to 0.860. LE exhibits excellent loadings ranging from 0.841 to 0.917, and its moderate VIF values range from 2.387 to 4.128, suggesting strong validity. PEU and PH also present low VIF values and high loadings, with ranges of 0.740 to 0.895 and 0.828 to 0.895, respectively, indicating construct reliability. These findings validate that the constructs are well-specified, reliable, and free from indicator redundancy or overlap.

The next step in analysing the constructs was to evaluate them for reliability and validity. Table 2 presents the findings of this analysis.

Table 2. Constructs reliability and validity

	Cronbach's alpha	Composite Reliability	AVE
ATU	0.898	0.924	0.710
EP	0.958	0.963	0.632
LE	0.930	0.947	0.783
PEU	0.881	0.914	0.680
PH	0.917	0.938	0.751

Source: Compiled by Author.

The validity and reliability metrics suggest that the constructs meet the necessary thresholds in the study, confirming the measurement model's robustness. ATU's alpha value is 0.898, whereas EP, LE, PEU, and PH have even higher values—0.881 to 0.958. Similarly, for all constructs, CR values exceed the recommended threshold of 0.914 (PEU) to 0.963 (EP), ensuring the reliability of the constructs. The AVE values are above 0.5, ranging from 0.632 (EP) to 0.783 (LE), which confirms convergent validity. These findings confirm the measurement model's validity and reliability.

The discriminant validity was also assessed to ensure that the study constructs were distinct from one another. This was achieved using the Fornell-Larcker criterion.

Table 3. Discriminant Validity: Farnell-Larcker Criterion

	ATU	EP	LE	PEU	PH
ATU	0.843				
EP	0.767	0.795			
LE	0.741	0.887	0.885		
PEU	0.644	0.776	0.709	0.825	
PH	0.830	0.844	0.798	0.747	0.867

Source: Compiled by Author.

Table 3 confirms that the findings met the required thresholds, indicating that the constructs in the study demonstrate adequate discriminant validity. For instance, ATU has a value of 0.843, which is higher than its correlations with PH (0.830) and EP (0.767), validating the distinctiveness of each construct.

4.1.2 Testing Hypothesis

The findings of the hypotheses (H1 to H10) are summarised in Table 4.

Table 4. Hypotheses Testing

Hypotheses	Std. Beta	Std. Error	t-statistic	P values	95% CI LL	95% CI UL	Inference
ATU -> EP	0.190	0.062	3.070**	0.002	0.088	0.291	Supported
ATU -> LE	0.237	0.068	3.488**	0.000	0.132	0.354	Supported
LE -> EP	0.513	0.054	9.565**	0.000	0.421	0.596	Supported
PEU -> EP	0.319	0.063	5.045**	0.000	0.211	0.418	Supported
PEU -> LE	0.243	0.062	3.941**	0.000	0.135	0.339	Supported
PH -> EP	0.448	0.068	6.585**	0.000	0.340	0.562	Supported
PH -> LE	0.420	0.082	5.108**	0.000	0.279	0.552	Supported
PEU -> LE -> EP	0.125	0.034	3.628**	0.000	0.067	0.179	Supported
PH -> LE -> EP	0.215	0.046	4.707**	0.000	0.140	0.290	Supported
ATU -> LE -> EP	0.121	0.038	3.193**	0.001	0.065	0.190	Supported

The results show that all the proposed hypotheses have been tested and supported, including the mediation hypotheses (H8, H9, and H10). The result suggests that all hypothesised relationships are significant and supported at the 0.01 level. Figure 2 visually illustrates these relationships. This finding indicates that ATU positively influences LE and EP. LE influences EP, whereas PH and PEU positively influence both EP and LE. The mediating effects are also relevant: ATU, PH, and PEU indirectly influence EP through LE. The narrow confidence and intense t-statistic intervals validate these relationships' robustness, suggesting their significance in the model.

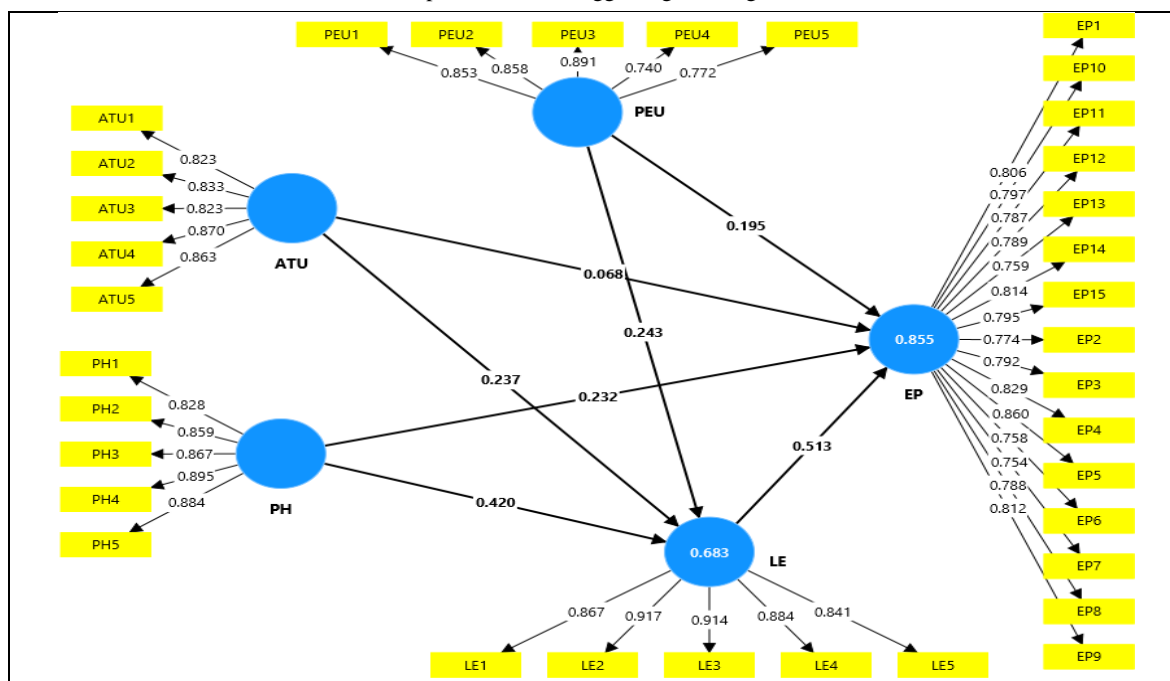


Figure 2. The different path coefficients of the study model

After the hypothesis testing, the coefficient of determination (R^2) and effect size (F^2) were examined to assess the model's explanatory and predictive power. Table 5 presents the R^2 values that meet established benchmarks for evaluating model strength.

Table 5. R-square and Adjusted R-square

	R-square	R-square adjusted
English Proficiency (EP)	0.855	0.853
Learning Engagement (LE)	0.683	0.680

The results demonstrate that the model explains 68.3% of the variance in LE and 85.5% in EP. Additionally, the adjusted R^2 values are high at 68.0% for LE and 85.3% for EP, indicating a strong model fit. These findings indicate that the model has strong explanatory power and is reliable for the investigated constructs.

The effect size (F^2) was analysed to evaluate the strength of the relationships between the independent and dependent variables in the study. F^2 provides insight into the degree to which an independent variable contributes to the R^2 of a dependent variable. The F^2 results for the tested hypotheses are in Table 6.

Table 6. Effect Size (f-square)

Hypotheses	f-square
ATU → EP	0.009
ATU → LE	0.055
LE → EP	0.574
PEU → EP	0.106
PEU → LE	0.082
PH → EP	0.077
PH → LE	0.130

Table 6 highlights the F-square values of the hypotheses. The f-square values measure each predictor's effect size on the dependent variable. The results indicate that LE → EP has the most significant effect size, $f^2 = 0.574$, suggesting a remarkable influence. PH → LE ($f^2 = 0.130$) and PEU → EP ($f^2 = 0.106$) illustrate moderate effects. Other relationships, such as ATU on LE ($f^2 = 0.055$) and EP ($f^2 = 0.009$), demonstrate small effect sizes. However, this suggests that PH and LE are significant contributors, whereas ATU has less influence.

4.2 Qualitative Analysis

This analysis was conducted to evaluate the effectiveness of the iPad translation app intervention by comparing participants' performance in reading, grammar, and vocabulary, based on pre- and post-test scores. The Wilcoxon Signed-Rank Test, a nonparametric test appropriate for paired data (Gerald & Patson, 2021), was employed for this comparison. This test determines whether significant differences exist between two related samples by analysing the ranks of score differences. The results are presented in Tables 7 and 8.

Table 7. Rank Summary for Pre- and Post-Test Comparisons

	Ranks	N	Mean Rank	Sum of Ranks
Vocabulary (Post-test) Vocabulary (Pre-test)	Negative Ranks	0	0.00	0.00
	Positive Ranks	35	18.00	630.00
	Ties	0		
	Total	35		
Grammar (Post-test) Grammar (Pre-test)	Negative Ranks	0	0.00	0.00
	Positive Ranks	34	17.50	595.00
	Ties	1		
	Total	35		
Reading (Post-test) - Reading (Pre-test)	Negative Ranks	0	0.00	0.00
	Positive Ranks	35	18.00	630.00
	Ties	0		
	Total	35		
Total (Post-test) - Total (Pre-test)	Negative Ranks	0	0.00	0.00
	Positive Ranks	35	18.00	630.00
	Ties	0		
	Total	35		

Table 8. Pre- and Post-Test Comparison Results

Test Statistics	Vocabulary (Post-test) (Pre-test)	Grammar (Post-test) - (Pre-test)	Reading (Post-test) - (Pre-test)	Total (Post-test) - Total (Pre-test)
Z	-5.224	-5.140	-5.221	-5.180
Asymp. Sig. (2-tailed)	0.000	0.000	0.000	0.000

Significantly, the analysis results suggest a remarkable improvement in reading skills, grammar, and vocabulary among students after using different translator apps, as highlighted by positive ranks, as there are no negative ranks. Additionally, reading and vocabulary exhibited the highest positive ranks (Mean Rank= 18.00, N= 35, Sum of Ranks= 630.00). Meanwhile, grammar had slightly lower ranks (Mean Rank=17.50, N=34, Sum of Ranks=595.00). However, for all categories, the Z-values were highly relevant ($p=0.000$), suggesting a statistically relevant development in English language proficiency. So, these findings highlight the positive influence of translation apps on language learning.

5. Discussion

This study examined the relationships among ATU, PEU, PH, LE, and EP, using a structural equation modelling framework supported by pre- and post-test data. The results reveal important insights into how translation apps affect language proficiency within a Mobile-Assisted Language Learning (MALL) context.

Hypothesis 1 (ATU → EP)

The findings show that ATU has a significant positive effect on EP ($\beta = 0.190, p < 0.001$), indicating that learners' attitudes toward translation apps influence their language gains. This aligns with studies by Ahmed and Nasser (2015), Al-Bogami and Elyas (2020) and Grigoryan (2022), which emphasise the impact of positive perceptions on technology-assisted language learning. The Wilcoxon test confirmed significant gains across vocabulary, grammar, and reading ($p = 0.001$), supporting the conclusion that cultivating favourable attitudes can lead to measurable proficiency improvements.

Hypothesis 2 (ATU \rightarrow LE)

ATU also significantly predicted LE ($\beta = 0.237, p < 0.001$), consistent with Al-Bogami and Elyas (2020), who reported that positive learner attitudes foster greater engagement. The improvements in reading scores ($Z = -5.221, p = 0.001$) particularly highlight how sustained engagement with translation apps supports reading comprehension development, suggesting that students with favourable views of translation apps participated more actively in learning tasks, reinforcing the MALL framework's emphasis on motivational factors.

Hypothesis 3 (LE \rightarrow EP)

LE emerged as a strong predictor of EP ($\beta = 0.513, p < 0.001, f^2 = 0.574$), underscoring the central role of engagement in language learning. This finding echoes previous research (Ammade et al., 2023; Hilton & Canciello, 2013; Wang et al., 2015; Xin & Affrunti, 2019), which links digital engagement with improved proficiency. No negative ranks were observed in the test analysis. The mean rank for proficiency gains was 18.00, confirming the essential role of active participation in language development.

Hypothesis 4 (PEU \rightarrow EP)

The relationship between PEU and EP was also significant ($\beta = 0.319, p < 0.001$), indicating that translation apps promote better learning outcomes. These results mirror the findings of Ahmed and Nasser (2015), Grigoryan (2022), Hur (2019), and others. The most notable improvements were in vocabulary acquisition ($Z = -5.224, p < 0.001$). This means using translation apps supports engagement and retention.

Hypothesis 5 (PEU \rightarrow LE)

PEU significantly affects LE ($\beta = 0.243, p < 0.001$), highlighting that ease of use encourages students to participate more actively. This is consistent with prior studies (e.g., Lake & Beisly, 2019), emphasising the need for intuitive app design to support learner motivation and engagement.

Hypothesis 6 (PH \rightarrow EP)

PH significantly predicted EP ($\beta = 0.448, p < 0.001$), suggesting that when learners perceive apps as helpful, their proficiency improves accordingly. This confirms the findings by Alotaibi and Salamah (2023) and Panayiotou et al. (2019). Grammar scores, in particular, showed substantial gains ($Z = -5.140, p = 0.001$), confirming the importance of learners perceiving translation apps as beneficial to their language development.

Hypothesis 7 (PH \rightarrow LE)

PH also had a strong positive effect on LE ($\beta = 0.420, p < 0.001$), aligning with research by Grigoryan (2022) and Xin and Affrunti (2019), when learners recognise the practical value of translation tools, their engagement increases, which in turn contributes to improved outcomes.

Mediation Hypotheses

Across the mediation analyses, LE consistently served as a link between PEU, PH, and ATU to EP. This confirms the theoretical premise of the MALL model, which posits engagement as a mediating factor between technological perceptions and learning outcomes.

Hypothesis 8 (PEU \rightarrow LE \rightarrow EP)

LE mediated the relationship between PEU and EP ($\beta = 0.125, p < 0.001$). Particularly evident in reading gains ($Z = -5.221, p < 0.001$), indicating that engagement serves as a critical pathway for proficiency gains. This confirms the findings of Ahmed and Nasser (2015) and Lake and Beisly (2019).

Hypothesis 9 (PH \rightarrow LE \rightarrow EP)

The mediation effect of LE was significant between PH and EP ($\beta = 0.215, p < 0.001$), suggesting that perceived usefulness enhances engagement, which subsequently boosts proficiency ($Z = -5.180, p < 0.001$), as supported by Panayiotou et al. (2019) and Xin and Affrunti (2019).

Hypothesis 10 (ATU \rightarrow LE \rightarrow EP)

Finally, LE mediated the relationship between ATU and EP ($\beta = 0.121, p < 0.001$). This demonstrates that while attitudes are important, their impact is primarily transmitted through engagement. The overall proficiency gains reinforce the argument made by Ahmed and Nasser (2015), Ammade et al. (2023), and Hur (2019) that engagement is the bridge between learner perceptions and outcomes.

In sum, the results emphasise that usability, helpfulness, and learner attitudes significantly shape engagement, which drives proficiency gains. Integrating translation apps into EFL instruction can significantly enhance vocabulary, grammar, and reading skills when paired with positive perceptions and intuitive design. The consistent pattern of pre- and post-test improvement across all hypotheses highlights the

practical value of iPad-based translation tools in EFL contexts, especially when viewed through the learner engagement.

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6. Implications

6.1 Theoretical Implications

This study contributes to the growing body of research on MALL. The findings support theories on technology acceptance and engagement in language learning. It demonstrates that LE mediates the effects of PEU, PH, and ATU on English Proficiency. This research highlights engagement as a central component for successful language acquisition. The study also validates the Technology Acceptance Model by confirming that PEU and PH influence learners' engagement and proficiency levels. This supports the idea that user-friendly and beneficial technological tools are more readily adopted and effectively utilised in language learning.

The results indicate that positive attitudes toward translation apps impact language proficiency through engagement, suggesting that attitude alone is insufficient without active participation. This study provides evidence that engagement is a critical intermediary in digital language learning contexts by highlighting the indirect effects—specifically the pathways from PEU, PH, and ATU through learner engagement to English proficiency. The significant indirect effects observed in the hypotheses $PEU \rightarrow LE \rightarrow EP$, $PH \rightarrow LE \rightarrow EP$, and $ATU \rightarrow LE \rightarrow EP$ suggest that engagement should be a focal point in MALL research.

6.2 Practical Implications

The results have practical implications for educators, language learners, app designers, and policymakers aiming to incorporate translation applications into language instruction. As PEU has a marked influence on both LE and EP, developers should focus on creating intuitive and accessible app interfaces. Reducing cognitive load and simplifying navigation can enhance engagement and learning outcomes. For educators, the central role of engagement in fostering language proficiency suggests that translation apps should be embedded into interactive learning. Strategies like gamification, real-world application tasks, and collaborative learning can enhance engagement.

ATU influences both LE and EP. Educators and policymakers should implement awareness campaigns and training. These help learners understand the value of translation apps in improving language skills. PH also predicts both LE and EP. Therefore, it is essential to ensure that learners perceive translation apps as active learning tools. Providing clear guidelines on app usage, incorporating feedback, and demonstrating real-life benefits can enhance their PEU. Language programs should include translation apps in structured activities. Use them for vocabulary building, grammar drills, and reading comprehension tasks. This helps students benefit fully from mobile-assisted learning. Policymakers should invest in digital infrastructure and teacher training. They should also promote the best practices for using educational technology. Schools and universities should encourage responsible and effective use of translation apps.

7. Conclusion

This study examined translation apps' impact on iPad-using learners' EP, focusing on the role of ATU, PE, PH, and LE. The findings revealed that positive attitudes, ease of use, and perceived helpfulness towards translation apps significantly and directly influence proficiency and indirectly through engagement. Learning engagement emerged as a crucial mediator, reinforcing that technology alone is insufficient for language acquisition unless learners actively engage with it. The results suggest that educators and app developers should prioritise ease of use, promote positive attitudes toward technology, and create engaging learning experiences to maximise language-learning outcomes. Policymakers should also support effectively incorporating mobile translation apps in language education. This study highlights the transformative potential of translation apps in enhancing English proficiency. However, their success depends on technological features and learners' engagement and attitudes, which must be actively fostered in digital learning environments.

Despite the significant findings, the study has several limitations. It employed a quasi-experimental design with pre- and post-tests and a survey to assess short-term outcomes and learner attitudes but did not include long-term tracking. The use of non-probability sampling further limits the generalizability of the findings, and the voluntary participation may have introduced self-selection bias. Future research should consider longitudinal designs and different sampling methods, such as random or stratified sampling methods, to enhance external validity. Although the study integrated both quantitative and qualitative elements, it did not include methods such as interviews, classroom observations, or open-ended survey questions. Future studies are encouraged to incorporate such approaches. Additionally, since the focus was limited to regional context and receptive skills, follow-up studies should explore productive skills such as speaking and writing, or compare different translation tools to expand the scope of MALL research.

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Authors' contributions

Dr. Elham Alzain and Dr. Faiz Algobaei were responsible for conceptualization, methodology, and writing. Dr. Faiz Algobaei was

responsible for data collection, Formal analysis, Writing—original draft, Visualization. Dr. Elham Alzain was responsible for supervision writing—review & editing, validation, Project administration. All authors have read and agreed to the final manuscript.

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Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Data sharing statement

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