

The Effectiveness of the Duolingo Platform in Vocabulary Retention and EFL Young Learners' Attitudes: Evidence from a Private English Center in Vietnam

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ABSTRACT: This article investigates the effectiveness of Duolingo in supporting vocabulary retention among young EFL learners and examines their attitudes toward its use. Employing a sequential explanatory mixed-methods design with a quasi-experimental pre-test/ post-test control group framework, the study was conducted over a 12-week intervention period with 60 learners aged 10 to 11 (CEFR Level A2) at a private English center in Ho Chi Minh City, Vietnam. The experimental group (n = 30) used Duolingo as a supplementary after-school vocabulary tool for approximately 30 minutes per day while the control group (n = 30) received conventional classroom-based instruction only. Quantitative data were collected through researcher-designed parallel-form vocabulary tests and a 25-item Likert-scale questionnaire grounded in the Affective-Behavioral-Cognitive (ABC) attitude model. Qualitative data were gathered through semi-structured interviews with ten selected participants. Paired-samples t-tests revealed that the experimental group achieved a statistically significant mean gain of 0.97 points ($t = -13.760, p < .001$), approximately double that of the control group (0.50 points; $t = -6.412, p < .001$), despite equivalent baselines. Questionnaire findings indicated strongly positive attitudes across all three ABC dimensions, with particularly high agreement on enjoyment (90%), motivation (88%) and vocabulary transfer to communicative contexts (93.6%). Interview data corroborated these findings with experimental group learners describing spaced repetition, multimodal input and gamified rewards as key factors supporting retention and engagement. These findings suggest that Duolingo, when implemented as a structured and monitored supplementary tool, can meaningfully enhance vocabulary retention and foster positive learning attitudes among young EFL learners.

KEYWORDS: Attitude, Duolingo, EFL young learners, Mobile-assisted language learning, Vocabulary retention.

1. INTRODUCTION

The integration of mobile technology into language education has generated considerable scholarly interest in recent years, particularly with respect to its capacity to extend vocabulary learning beyond the formal classroom. For young EFL learners in Vietnam, this question carries both theoretical and practical urgency. Vocabulary has long been identified as a foundational component of communicative competence (Nation, 2022), yet the challenge for young learners aged 10 to 11 lies not in encountering new lexical items but in retaining them over time. In many private English centers in Vietnam, vocabulary is introduced within short instructional cycles with limited systematic provision for review or retrieval practice, a structural constraint that has been associated with rapid post-instruction forgetting (Schmitt, 2008).

Mobile-assisted language learning (MALL) has been proposed as a practical response to these limitations. Applications such as Duolingo provide learners with frequent, brief practice opportunities outside the classroom, enabling distributed review and repeated retrieval of previously learned vocabulary. Empirical evidence from several EFL contexts supports the positive effects of Duolingo on vocabulary outcomes and learner motivation (Loewen et al., 2019; Pullupaxi, 2023; Rahman et al., 2024; Ta'amneh et al., 2024). However, most existing studies have focused on vocabulary acquisition, as measured by immediate post-test performance, rather than on vocabulary retention, defined here as the maintenance of lexical knowledge over an extended instructional period. This distinction is theoretically important because immediate recall does not reliably predict whether knowledge will be sustained across time (Kohnke et al., 2019).

A further gap in literature concerns the limited use of the Affective-Behavioral-Cognitive (ABC) attitude model (Eagly & Chaiken, 1993) in studies of young EFL learners' responses to MALL tools. Prior research has tended to report overall satisfaction or general motivation without distinguishing between the emotional, behavioral and evaluative dimensions of learner attitudes—dimensions that bear differently on sustained engagement and, by extension, on retention outcomes. Additionally, almost no studies

have examined this question in the specific institutional context of private English centers in Vietnam where Duolingo is commonly assigned as homework without structured frameworks or systematic monitoring.

The study addresses these gaps through a sequential explanatory mixed-methods investigation of 60 young EFL learners at a private English center in Ho Chi Minh City. It is guided by two research questions: (1) How does Duolingo influence vocabulary retention among young EFL learners? and (2) What are young learners' attitudes toward using Duolingo as a supplementary vocabulary learning tool? The study contributes to the MALL literature by distinguishing vocabulary retention from acquisition, applying the ABC model in a young learner Vietnamese EFL context, and examining the role of teacher-mediated monitoring as a variable in technology integration.

2. THEORETICAL FRAMEWORK AND LITERATURE REVIEW

2.1. Vocabulary retention and Technology-Assisted Vocabulary Learning

Vocabulary retention is conceptually distinct from vocabulary acquisition. Whereas acquisition denotes the initial ability to recognize or recall a newly encountered lexical item, retention refers to the maintenance of that knowledge over time through repeated exposure, practice and consolidation (Nation, 2022; Schmitt, 2010). In second language acquisition research, Kohnke et al. (2019) have emphasized that immediate post-test gains may reflect transient learning effects, whereas retention provides a more ecologically valid measure of sustained learning. This distinction is particularly salient in young learner EFL contexts where working memory constraints and limited self-regulatory capacity render learners especially susceptible to rapid forgetting without systematic review support (Pavičić Takač, 2008).

Technology-Assisted Vocabulary Learning (TAVL) has been theorized as a means of addressing these structural limitations through two core mechanisms. First, spaced practice, the distribution of learning episodes across time, has been consistently associated with superior long-term retention compared with massed practice (Roediger & Karpicke, 2006). Mobile vocabulary applications can operationalize spaced practice by scheduling the redistribution of previously learned items across multiple sessions. Second, retrieval practice, the active recall of previously encountered material, strengthens subsequent retention through the testing effect (Karpicke & Roediger, 2008). Applications such as Duolingo incorporate frequent low-stakes retrieval activities including recognition checks and multiple-choice tasks that cumulatively build toward durable lexical consolidation. A further mechanism is multimodal encoding which is the simultaneous presentation of vocabulary through audio, images and contextual sentences supports form-meaning associations and reduces lexical ambiguity. Kohnke et al. (2019) concluded that mobile vocabulary applications can function as effective retention support systems, particularly when learners engage consistently throughout an intervention period.

2.2. Learner attitudes and the ABC Model

Learner attitudes are widely recognized as a significant determinant of language learning outcomes, particularly in self-directed learning environments that require sustained engagement. Gardner (2010) conceptualized attitude as encompassing learners' cognitive evaluations, affective responses and behavioral tendencies in relation to the tools or resources they employ. The Affective-Behavioral-Cognitive (ABC) model proposed by Eagly and Chaiken (1993) provides a structural framework for analyzing these three interdependent components. Which are the affective component refers to emotional responses such as enjoyment and anxiety, the behavioral component encompasses observable learning actions such as usage frequency and habit formation and the cognitive component concerns beliefs and evaluative judgments about the utility and ease of use of a given tool.

In TAVL contexts, the ABC model has been applied to explain how learner attitudes toward mobile applications translate into or inhibit sustained practice. Positive affective responses to Duolingo's gamified design including enjoyment and reduced anxiety have been associated with higher behavioral engagement in multiple studies (Loewen et al., 2019; Rahman et al., 2024). Reinders and White (2016) and Viberg et al. (2020) further argue that learner acceptance of technology depends on the degree to which it affords personalization, flexibility and autonomy. For young learners, Linse and Nunan (2005) and Cameron (2001) note that affective variables, particularly curiosity and enjoyment, are especially influential in sustaining attention and engagement. This theoretical alignment positions the ABC model as a particularly appropriate lens for investigating young learners' attitudinal responses to Duolingo in an EFL setting.



2.3. Empirical evidence on Duolingo in EFL contexts

Empirical investigations of Duolingo in EFL contexts have broadly documented positive effects on vocabulary outcomes and learner attitudes. Pullupaxi (2023) found that Ecuadorian primary school students using Duolingo outperformed those receiving conventional instruction on vocabulary assessments, while also demonstrating greater self-motivation and autonomy. Rahman et al. (2024) reported that Indonesian primary school students who used Duolingo showed higher vocabulary test scores and greater enthusiasm than those relying on traditional flashcard-based methods. Ta'amneh et al. (2024) similarly found that Duolingo use was associated with improved vocabulary acquisition and more positive attitudes toward English among Jordanian EFL students. In a more methodologically diverse investigation, Loewen et al. (2019) reported broadly favorable user experiences with Duolingo and found that app-based instruction supported receptive vocabulary and grammar knowledge when learners engaged consistently.

However, several limitations characterize this body of research. A predominance of post-test designs means that most studies measure acquisition rather than retention, leaving the question of whether vocabulary gains persist over time largely unresolved (Kohnke et al., 2019). The application of the ABC model specifically to young EFL learner populations remains limited, with most attitude research targeting adult or university-level learners. Furthermore, the specific institutional context of private English centers in Vietnam, where Duolingo is commonly used without systematic monitoring, has received minimal empirical attention. As a result, the present study addresses these gaps directly.

3. METHODOLOGY

3.1. Research design and context

The study employed a sequential explanatory mixed-methods design (Creswell & Creswell, 2017) integrating a quasi-experimental pre-test/post-test control group framework with qualitative semi-structured interviews. This approach was selected because vocabulary retention constitutes a measurable learning outcome amenable to statistical analysis, whereas learner attitudes require interpretive analysis to capture subjective perceptions and experiences. The study was conducted at Greva English Center in Ho Chi Minh City, Vietnam over a 12-week intervention period. Ethical approval was obtained from the supervising institution, and informed parental consent was secured prior to data collection.

3.2. Participants

A total of 60 learners aged 10 to 11 (CEFR Level A2) participated in the study, recruited via purposive sampling based on age, proficiency level and prior enrollment in the center's English program. Participants were assigned to an experimental group (n = 30) and a control group (n = 30), matched for English proficiency based on pre-test scores. Both groups attended the same center under identical scheduling, instructional conditions and with the same teachers, ensuring comparability of baseline conditions. The experimental group used Duolingo as an after-school supplementary tool for approximately 30 minutes per day, five days per week. Usage was mandatory and monitored weekly via Duolingo for Schools. The control group received conventional classroom vocabulary instruction only, without any digital supplementation. Participation posed no academic risk and involvement was voluntary throughout.

3.3. Instruments

Three instruments were employed to collect data. First, a researcher-designed parallel-form receptive vocabulary test (30 multiple-choice items, maximum score 10.0) was administered as a pre-test and post-test to both groups. Items assessed form-meaning recognition and vocabulary comprehension within contextualized input, deliberately restricting assessment to receptive knowledge consistent with the study's operationalization of retention. The test was reviewed by the research supervisor and experienced center teachers for content validity and age-appropriateness (CEFR A2). Second, a 25-item attitude questionnaire grounded in the ABC model (Eagly & Chaiken, 1993) and adapted from validated MALL instruments (Loewen et al., 2019; Munday, 2016) was administered to the experimental group (n = 30) following the intervention. Items were rated on a 5-point Likert scale (1 = Strongly Disagree; 5 = Strongly Agree) and organized across three subscales corresponding to the affective, behavioral and cognitive ABC components. Third, semi-structured interviews were conducted with ten purposively selected participants (five from each group) in Vietnamese to ensure comprehension. Each session lasted approximately three to five minutes and was audio-recorded and transcribed. A five-item demographic section was also included in the questionnaire to support interpretive contextualization.



3.4. Data analysis

Quantitative data from the vocabulary tests were analyzed using paired-samples t-tests in SPSS (Version 25) to assess within-group differences between pre-test and post-test scores. Descriptive statistics including means, standard deviations and standard errors were computed to characterize performance at both measurement points. Questionnaire data were analyzed through Likert-scale mean score computation across the three ABC subscales. Qualitative interview data were analyzed using thematic analysis following the six-phase framework of Braun and Clarke (2006), with an inductive coding approach to allow themes to emerge from the data. Data triangulation across test scores, questionnaire responses and interview themes were employed to strengthen the validity of the findings.

4. FINDINGS AND DISCUSSION

4.1. Vocabulary retention outcomes (Research question 1)

Table 1 presents descriptive statistics for pre-test and post-test scores across both groups.

Table 1. Descriptive statistics for vocabulary test scores (Pre-test and Post-test)

Group	Test	Mean	SD	Std. Error	N
Experimental	Pre-test	6.19	.820	.150	30
	Post-test	7.16	1.000	.183	30
Control	Pre-test	6.19	.720	.131	30
	Post-test	6.69	1.017	.186	30

Note. SD = standard deviation. Maximum possible score = 10.0 (0.33 points per correct item, 30 items).

As shown in Table 1, both groups entered the study with virtually identical pre-test means (EXP: M = 6.19, SD = .820; CTRL: M = 6.19, SD = .720), confirming baseline equivalence. By the conclusion of the 12-week intervention, both groups demonstrated vocabulary gains. However, the experimental group recorded a substantially higher post-test mean (M = 7.16, SD = 1.000) compared with the control group (M = 6.69, SD = 1.017). The experimental group's gain of approximately 0.97 points was approximately twice that of the control group (0.50 points).

Table 2 below presents the paired-samples t-test results.

Table 2. Paired-Samples T-Test results for Experimental and Control groups (Pre-test – Post-test)

Group (Pair)	Mean Diff.	SD	SE	95% CI	t	df	Sig. (2-tailed)
Experimental (Pre-Post)	-.967	.385	.070	[-1.110, -.823]	-13.760	29	< .001
Control (Pre-Post)	-.502	.429	.078	[-.662, -.342]	-6.412	29	< .001

Note. CI = confidence interval. Both results significant at p < .001.

As shown in Table 2, both within-group gains were statistically significant (EXP: t = -13.760, df = 29, p < .001; CTRL: t = -6.412, df = 29, p < .001). The experimental group's mean difference of -0.967 (95% CI [-1.110, -.823], SE = .070) was characterized by a narrow confidence interval and low standard error, indicating that gains were consistent and evenly distributed across participants rather than driven by exceptional performance from a subset of learners. The control group also demonstrated significant improvement (MD = -.502, 95% CI [-.662, -.342], SE = .078), confirming that conventional classroom instruction supported retention during the intervention period. Nevertheless, the experimental group's approximately doubled gain, larger



absolute t-value, and narrower confidence interval collectively indicate that Duolingo's supplementary integration provided measurably greater retention support.

These findings are consistent with the theoretical framework established. The experimental group's superior retention gains support the position that TAVL, when implemented as a structured supplementary tool, extends the review opportunities that classroom instruction alone cannot reliably provide (Nation, 2022; Schmitt, 2008). Two mechanisms appear to account for this differential most directly. First, Duolingo's algorithmic redistribution of previously encountered vocabulary across multiple sessions operationalizes spaced practice, which research on verbal learning has consistently identified as superior to massed practice for long-term retention (Karpicke & Roediger, 2008). Second, the application's task formats such as recognition checks, matching exercises and multiple-choice prompts function as repeated low-stakes retrieval events, engaging the testing effect that Roediger and Karpicke (2006) identified as a powerful contributor to memory consolidation. These findings are broadly consistent with Pullupaxi (2023) and Rahman et al. (2024), both of whom reported superior vocabulary outcomes for learners using Duolingo relative to conventional instruction. The magnitude of the between-group difference observed in the present study, approximately double the gain, is also consistent with the effect sizes reported in those studies.

4.2. Learner attitudes toward Duolingo (Research question 2)

Table 3 below presents questionnaire findings for the experimental group across the three ABC dimensions.

Table 3. Learner attitudes toward Duolingo by ABC Dimension (Experimental Group, n = 30)

Dimension	Sub-dimension	Agreement Rate (%)	Neutral / Disagree (%)
Affective	Enjoyment	90	10
	Motivation	88	12
Behavioral	Usage	83	17
	Intention	86	14
Cognitive	Ease of Use	84	16
	Usefulness	86	14
	Retention	78	22
	Gamification	85	15

Note. Agreement rates reflect the percentage of Likert responses of 4 (Agree) or 5 (Strongly Agree). Neutral/Disagree reflects responses of 1–3.

The affective dimension recorded the highest overall endorsement. Ninety percent of participants agreed that learning with Duolingo was enjoyable, and 88% reported increased motivation to learn English, with zero disagreement recorded on the core enjoyment items. The item "Duolingo makes me want to learn English more" achieved 90.3% agreement (64.5% Agree; 25.8% Strongly Agree), the highest agreement rate within the affective subscale, suggesting that the application actively stimulates learners' desire to continue beyond the immediate task. Immediate feedback also contributed to affective engagement; 83.9% of learners agreed that they felt satisfied when answering correctly, pointing to the role of small, frequent successes in sustaining motivation over time.

Behavioral engagement was consistently strong. Over 80% of participants reported using Duolingo regularly and independently at home, indicating that many learners had voluntarily integrated the application into their daily routines. The persistence item "I continue even when it is difficult" reached 80.7% agreement with zero disagreement, suggesting that Duolingo's scaffolded design contributed to sustained effort. The most striking finding was the vocabulary transfer item: 93.6% of learners



reported actively using Duolingo vocabulary when speaking or writing, the highest agreement rate in the entire questionnaire. This level of productive transfer to communicative contexts exceeds what is typically expected of a supplementary receptive tool and suggests a degree of lexical internalization beyond simple recognition.

Cognitive responses were positive across all four sub-dimensions, with agreement rates ranging from 78% to 86%. Ease of use (84%) and usefulness (86%) attracted the highest endorsement, reflecting learners' perception that the interface was intuitive and that the application genuinely supported vocabulary learning. The comparatively lower agreement on the retention sub-dimension (78%), accompanied by a notably higher neutral response rate (22%), is consistent with recognized limitations of spaced-repetition applications. While Duolingo effectively supports consolidation during an active intervention period, durable long-term retention likely requires integration with broader reading, listening, and communicative practice (Kohnke et al., 2019).

Qualitative interview data corroborated and elaborated these quantitative findings. Experimental group learners consistently described stronger vocabulary recall, attributing this to the application's repetition mechanism:

"In Duolingo, old words come back again, so I meet the same words many times." (S5)

"Duolingo helps me remember words better because it has pictures and repeats many times." (S3)

Control group learners, by contrast, described a pattern of exam-driven review and rapid forgetting:

"I review words sometimes, but not regularly. Usually, I only look at them again when a test is coming." (S7)

"This method helps me remember at the time, but the next day I will forget" (S10)

All five control group learners expressed a desire to access technology-based learning alternatives, indicating that their comparatively lower engagement was attributable in part to the limited motivational affordances of their instructional environment rather than to disinterest in vocabulary learning. This finding aligns with Dörnyei's (2001) observation that negative or indifferent attitudes toward learning tools tend to reduce participation and disrupt the practice consistency that retention requires.

4.3. Discussion

A key theoretical contribution of this study lies in its demonstration of the ABC attitude chain as a mediating mechanism linking Duolingo use to vocabulary retention. The affective dimension, characterized by high enjoyment, reduced anxiety and motivation, appears to have lowered what Krashen (1982) termed the affective filter, transforming vocabulary review from a cognitively burdensome task into a game-like, emotionally positive experience. This positive affect, in turn, translated into the behavioral engagement documented in the questionnaire. That is regular, independent practice and voluntary vocabulary transfer to communicative contexts. The behavioral engagement, repeated exposure and retrieval across multiple sessions, then provided the conditions necessary for lexical consolidation, as theorized by Nation (2001) and Schmitt (2010). This causal chain, affect driving behavior and behavior enabling retention extends Krashen's affective filter hypothesis to the specific domain of vocabulary retention and provides empirical grounding for the theoretical integration of the ABC model with TAVL retention research.

An important and underappreciated finding concerns the role of teacher-mediated monitoring. The experimental group's sustained engagement was supported not only by Duolingo's intrinsic motivational design but also by weekly progress monitoring via Duolingo for Schools which transformed the application from a passive homework option into a structured, accountable learning activity. This oversight dimension has received limited attention in MALL research but appears to be a significant variable in translating app availability into actual learning outcomes. Future research should examine teacher monitoring as an independent variable in technology integration studies.

5. CONCLUSION

This study provides empirical evidence that Duolingo, when implemented as a structured and monitored supplementary tool, can meaningfully enhance vocabulary retention among young EFL learners beyond what conventional classroom instruction alone achieves. The experimental group's approximately doubled vocabulary gain, achieved without modification to in-class instruction, demonstrates that Duolingo's mechanisms of spaced repetition and frequent retrieval practice provide systematic review opportunities that traditional instructional contexts rarely afford. Learners' strongly positive attitudes across all three ABC dimensions including a notably high rate of productive vocabulary transfer (93.6%), suggest that the application was not merely tolerated as a homework requirement but was genuinely valued as a learning experience. The ABC attitude chain identified in the data, positive affect generating behavioral engagement, which in turn supports lexical consolidation, offers a theoretically grounded account of how attitudinal factors mediate the relationship between TAVL use and retention outcomes.



Three conclusions carry particular practical relevance. First, the benefits of Duolingo are neither automatic nor unconditional. First, the monitoring dimension, weekly oversight via Duolingo for Schools, appears to have been instrumental in sustaining engagement and should be treated as a necessary component of effective TAVL integration rather than an optional administrative measure. Second, the affective dimension of vocabulary instruction merits treatment as a pedagogical variable. Particularly, instructional designs that systematically reduce anxiety, incorporate enjoyment and provide immediate feedback generate the behavioral consistency that long-term retention requires. Third, Duolingo functions most effectively as one component within a broader vocabulary learning ecosystem. The slightly lower cognitive endorsement scores on long-term retention items (78%) suggest that durable lexical knowledge requires additional support, teacher-mediated feedback, contextual reading, communicative practice beyond what any single application can reliably provide.

Several limitations should be noted. The absence of a delayed post-test means that the durability of the experimental group's advantage beyond the intervention period cannot be confirmed, and future research should incorporate delayed assessment at two to four weeks following intervention completion. The purposive sample of 60 learners from a single institution constrains generalizability, and larger multi-site studies are warranted. The absence of formal reliability testing (Cronbach's Alpha) for the questionnaire prior to data collection represents a methodological limitation that subsequent studies should address. Future research might also examine the dose-response relationship between Duolingo usage intensity and retention outcomes, extend the investigation to older or more proficient learner groups and incorporate measures of productive vocabulary knowledge to determine whether attitudinally driven behavioral engagement translates into the deeper lexical knowledge required for fluent language production.

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