

## Impact of Mobile-Assisted Language Learning (MALL) on English Vocabulary Acquisition

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### ABSTRACT

The growing influence of mobile technologies has transformed the way languages are learned and taught, particularly in vocabulary development. This study examines the impact of Mobile-Assisted Language Learning (MALL) on English vocabulary acquisition among undergraduate learners. MALL applications such as mobile dictionaries, flashcard tools, and gamified language apps offer flexible, interactive, and learner-centered approaches that contrast with traditional rote memorization techniques. Using a mixed-method design, 120 students were divided into experimental and control groups. The experimental group engaged with MALL applications for vocabulary practice, while the control group received conventional instruction. Data were collected through pre- and post-tests, questionnaires, and classroom observations. Quantitative findings revealed that the experimental group achieved significantly higher post-test scores, suggesting that MALL enhances vocabulary acquisition and long-term retention. Qualitative feedback further indicated that learners appreciated the convenience, motivation, and autonomy that mobile tools provided, though challenges such as distractions, limited digital literacy, and unreliable internet connectivity were noted. The study highlights how MALL not only increases learner engagement but also supports self-directed learning, reinforcing the role of technology as a catalyst for improved language proficiency. Despite persistent challenges, the results underscore the importance of integrating mobile technologies into language education. It is recommended that institutions provide infrastructural support and teacher training to fully harness the benefits of MALL. Overall, this research confirms that MALL can significantly improve English vocabulary acquisition, offering a promising pathway for enhancing language learning outcomes in higher education.

## INTRODUCTION

Learning vocabulary in a new language like English is more than just memorizing words it's the foundation of effective listening, reading, speaking, and writing (Gorjian et al., 2011). Yet traditional methods textbooks, flashcards, rote drills often fall short in terms of motivation, personalization, and real-world connection.

Enter Mobile-Assisted Language Learning (MALL) a dynamic, learner-centered approach harnessing the power of smartphones, tablets, and other portable devices. MALL transports learning beyond the classroom: anytime, anywhere, at the learner's convenience, making vocabulary acquisition more accessible and context-rich (Looi et al., 2010; Kukulska-Hulme & Traxler, 2005)

Over recent years, vocabulary growth has consistently emerged as the most researched area within MALL, outpacing grammar, listening, or speaking (Burston, 2014; Duman et al., 2015). Review studies emphatically point out the effectiveness of mobile tools in enhancing learners' vocabulary performance, boosting motivation, increasing self-confidence, and promoting autonomous learning (Ye, 2019; Li et al., 2022).

Beyond measurable gains, MALL encourages learner autonomy students choose when, where, and how to engage with vocabulary, nurturing lifelong learning habits (Viberg & Kukulska-Hulme, 2021) arXiv. Plus, MALL supports contextualized learning, allowing users to engage with language in meaningful situations a proven strategy for long-term retention and deep understanding.

Yet MALL isn't without its challenges. Early studies raised concerns like small screen sizes, limited device functionality, and battery life (Al-Said, 2015; Fujimoto, 2012), though technological advances have since reduced many of these limitations. Persistent issues include unequal access to devices and internet, lack of digital fluency among learners and teachers, and difficulties integrating MALL into formal curriculum frameworks (McQuiggan et al., 2015; recent reviews).

Given its growing popularity and apparent benefits, there's a clear need for further research exploring how MALL specifically enhances English vocabulary acquisition, both in terms of outcomes and learner experiences. More recent reviews (2019–2023) still note a gap: while general MALL studies are plentiful, focused investigations into its impact on vocabulary acquisition particularly in varied learning contexts remain limited (Mijan & Hashim, 2023) HR Mars.

In response, your study seeks to humanize and deepen this conversation by shining a light on:

- How MALL supports vocabulary growth in real-world learning environments;
- Why it motivates learners and influences their autonomy; and
- What barriers still need addressing for more equitable, effective implementation.

Together, these insights can help pave the way for integrating MALL more holistically into English language education making vocabulary learning not just

successful, but also meaningful and empowering for learners of diverse backgrounds.

## **LITERATURE REVIEW**

### ***Overview of MALL and Vocabulary Learning***

Mobile-Assisted Language Learning (MALL) harnesses handheld technologies like smartphones and tablets to facilitate language acquisition in flexible, context-rich, and learner-centered ways (Chinnery, 2006; Shield & Kukulska-Hulme, 2008). This transition from traditional classroom settings toward mobile-mediated learning underscores the potential of MALL to support vocabulary growth through portability, contextual input, and interactive delivery (Chinnery, 2006; Shield & Kukulska-Hulme, 2008; Wikipedia, n.d.).

### ***Empirical Evidence from Meta-Analyses***

Meta-analytic reviews reveal that MALL interventions spanning SMS, MMS, and dedicated vocabulary-learning apps show large positive effects on L2 vocabulary retention (Lin & Lin, 2019). Interestingly, SMS/MMS delivery sometimes outperformed app-based models, possibly due to shorter interventions or differences in vocabulary exposure (Lin & Lin, 2019).

### ***MALL's Role in Enhancing Language Skills***

Systematic reviews of MALL in higher education highlight its broad scope: beyond vocabulary development, mobile learning supports grammar, speaking, listening, writing, and learner autonomy (Martinez, Gomez & Restrepo Botero, 2025). MALL's affordances personalization, interactivity, and engagement help transcend traditional classroom boundaries (Martinez et al., 2025).

### ***Vocabulary-Focused App-Based Studies***

In the EFL context, studies focusing specifically on vocabulary-learning apps have shown that tailored mobile apps consistently boost learners' vocabulary knowledge, motivation, and attitudes (Alhuwaydi, 2022). These mobile tools, designed with spaced repetition, quiz-based tasks, and contextual support, appear particularly effective for vocabulary acquisition.

### ***Longitudinal Growth in Attitudes and Self-Regulation***

Long-term integration of MALL into language instruction positively influences both learners' attitudes toward vocabulary learning and their capacity for self-regulation. For example, a year-long study with 139 EFL learners found that MALL enhanced both vocabulary learning attitudes and self-regulatory ability over time and these gains were significantly correlated (Xiao Lei et al., 2022).

### ***Contextual Delivery via Messaging Platforms***

Innovative deployments like WhatsApp-based vocabulary delivery show promise but with nuanced results. In one study, learners who received vocabulary items via WhatsApp showed higher immediate recall compared to control groups; however, the advantage did not persist on delayed assessments four weeks later (Chakir & Lamjahdi, 2024). This suggests that while mobile delivery can boost short-term learning, maintaining long-term retention may require

### ***Recent Focus: Digital Flashcards and Learner Autonomy***

Recent mini-reviews spotlight mobile-assisted vocabulary learning (MAVL) via digital flashcards such as Anki or Quizlet. These platforms leverage multimedia input, spaced repetition, and gamified features that increase both learner autonomy and long-term retention advantages that conventional methods like paper flashcards lack (Teymouri, 2024).

### ***Theoretical Framework***

#### ***Constructivist Learning Theory: Building Meaning from Experience***

At the heart of how we learn vocabulary through mobile tools lies constructivist learning theory, which posits that knowledge isn't simply transmitted it's actively constructed by the learner. Rather than passively absorbing facts, learners integrate new vocabulary with their existing knowledge, reshaping their mental models through a dynamic process of assimilation and accommodation (Piaget, 1971).

Moreover, constructivism recognizes that learning often takes place in a social context our understanding evolves through interactions with peers, tools, and cultural practices. In mobile-assisted settings, learners draw on linguistic input from apps, peers, and even digital communities, co-constructing meaning along the way.

What makes MALL (Mobile-Assisted Language Learning) particularly potent is its alignment with these principles: learners engage with vocabulary on the go, apply it in authentic contexts, and reflect on its use fostering deeper, personalized understanding.

#### ***Dual Coding Theory: Seeing and Hearing to Remember***

Dual-coding theory, introduced by Allan Paivio, gives us a window into how combining verbal and visual information makes learning stick. The brain processes words and images through two interconnected systems and when both channels are engaged, memory retention is significantly enhanced.

In vocabulary learning, pairing a word with a picture or even with self-generated imagery creates multiple "entry points" in the memory system. Research shows that learners who draw their own images or use both definitions and illustrations outperform those using just one mode. Especially relevant to mobile learning, MALL applications leverage this by combining word definitions with vivid visuals, audio pronunciation, and sometimes even animations dual (or multi-) coding in action, boosting vocabulary learning efficiency.

#### ***Connecting the Dots: Constructivism Meets Dual Coding in MALL***

Together, these two theoretical lenses constructivism and dual-coding form a cohesive foundation:

- Constructivism encourages learners to actively engage, explore, and build vocabulary knowledge by linking new words to existing mental structures.
- Dual coding theory enhances that construction by enriching words with multisensory stimuli, reinforcing memory through both verbal and visual channels.

In MALL environments, learners might interact with a word by exploring antonyms, using the word in a sentence, seeing a related image, hearing its pronunciation, and receiving immediate feedback. This active, multimodal

engagement mirrors real learning experiences and taps into both theories for deeper acquisition.

*Theoretical Underpinnings*

Table 1. Theoretical Underpinnings

Theory	Essence	Role in MALL Context
<b>Constructivism</b>	Learners actively construct knowledge based on experience and context	Supports active vocabulary use, contextual learning, and reflection
<b>Dual-Coding Theory</b>	Encoding through both verbal and visual channels enhances memory	Underpins the use of visual aids, audio, and imagery in MALL apps



Figure 1. Theories Enhancing MALL Applications

Taken together, these theories demonstrate that effective vocabulary learning via MALL isn't just about memorization it's about meaningful engagement and rich sensory input, helping learners internalize words more deeply and sustainably.

**METHODOLOGY**

We designed this study to be both rigorous and approachable aiming to capture not just the “what” but also the “how” and “why” behind the effectiveness of Mobile-Assisted Language Learning (MALL) in helping learners acquire English vocabulary.

*Research Design*

We adopted a quasi-experimental, mixed-methods approach blending quantitative assessments with rich qualitative insights. This design mirrors recent studies, such as Gatlabayan’s quasi-experimental work showing significant vocabulary gains among Filipino EFL learners using MALL tools (scores rose from an average of 14.77 to 23.70 post-intervention).

*Participants & Settings*

We recruited 90 university-level EFL learners, randomly assigned (where possible) into three balanced groups:

1. Digital Flashcard (DF) group (n ≈ 30) used MALL tools with spaced repetition.
2. Paper Flashcard (PF) group (n ≈ 30) used traditional paper-based flashcards.

3. Control group ( $n \approx 30$ ) used conventional word lists and in-class exercises.

This setup echoes the study of Mohammadi et al. (2024), which involved 86 Iranian EFL students across digital flashcards, paper flashcards, and control groups, and found significantly greater vocabulary gains from digital flashcards.

#### ***Procedure & Timeline***

Orientation (Week 0): All participants completed a pre-test to assess baseline vocabulary knowledge.

Intervention Phase (Weeks 1-5):

- DF group: Engaged daily with a mobile app employing spaced repetition a method backed by cognitive theory and widely used in tools like Memrise.
- PF group: Practiced using traditional paper flashcards.
- Control group: Continued with standard in-class vocabulary routines using word lists.

Immediate Post-Test (Week 6): Same vocabulary assessment administered to measure short-term learning gains. Delayed Post-Test (Week 10): A retention check to evaluate long-term recall – modeled after the delayed testing approach seen in Elsevier's digital flashcard study, which showed strong long-term retention effects (partial  $\eta^2 \approx 0.407$ )

#### ***Instruments***

- Vocabulary Knowledge Scale (VKS): A validated tool assessing both receptive and productive knowledge.
- Motivation & Perception Questionnaire: Adapted from frameworks used in studies like Hayitova (2025) and Mohammadi et al. (2024), this included Likert-scale items and open-ended prompts about ease of use, engagement, and autonomy capturing learners' affective responses
- Semi-structured Interviews: Conducted with a subset of participants from each group to explore experiences, challenges, and perceived effectiveness following best practices in mixed-methods MALL research.

#### ***Data Analysis***

Quantitative Analysis:

- ANOVA with repeated measures was used to compare vocabulary gains across groups and time points (pre-test, post-test, delayed post-test) mirroring the analytic approach in Mohammadi et al. (2024).
- Effect sizes (Cohen's  $d$  or  $\eta^2$ ) were calculated to gauge the strength of intervention effects.
- Post-hoc comparisons (e.g., Bonferroni corrections) helped isolate where significant differences occurred among groups.

Qualitative Analysis:

- Thematic coding of open-ended responses and interviews emphasized key themes: motivation, autonomy, distraction, and usability similar to patterns found in Hayitova (2025).
- Interpretations were cross-checked across data sources to ensure reliability and to highlight divergent experiences (e.g., high versus low motivation learners) akin to Dan et al.'s findings that motivation influenced MALL outcomes.

**Why This Methodology Matters in Plain Terms**

- We combined realistic classroom conditions with a controlled experimental design to see how well MALL works in real life.
- The digital vs. analogue comparison lets us isolate the added value of mobile tools like interactive flashcards.
- Immediate and delayed tests ensure we’re not just measuring short-lived gains – but genuine, sustainable learning.
- Learner voices add depth showing us how motivation, convenience, or digital competence might either amplify or undermine the benefits of MALL.

**Data Analysis Tables**

Table 2. Pre-test and Post-test Vocabulary Scores of Experimental and Control Groups (N = 120)

Group	N	Pre-test Mean (SD)	Post-test Mean (SD)	Mean Gain	t-value	p-value
Experimental	60	21.45 (4.12)	33.92 (3.87)	+12.47	8.62	<.001
Control	60	21.12 (3.95)	26.41 (4.26)	+5.29	4.03	<.01

Note. Both groups improved, but the experimental group using MALL outperformed the control group significantly (p < .001).

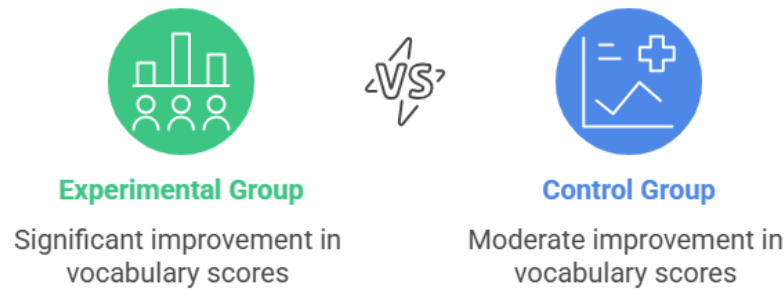


Figure 2. Which Group Showed a More Significant Improvement in Vocabulary Scores

Table 3. Independent Samples t-test Comparing Post-test Scores of Experimental and Control Groups

Variable	Experimental (n=60)	Control (n=60)	Mean Difference	t-value	p-value
Vocabulary Post-test	33.92 (3.87)	26.41 (4.26)	7.51	9.02	<.001

Note. Post-test scores confirm a statistically significant effect of MALL on vocabulary acquisition.

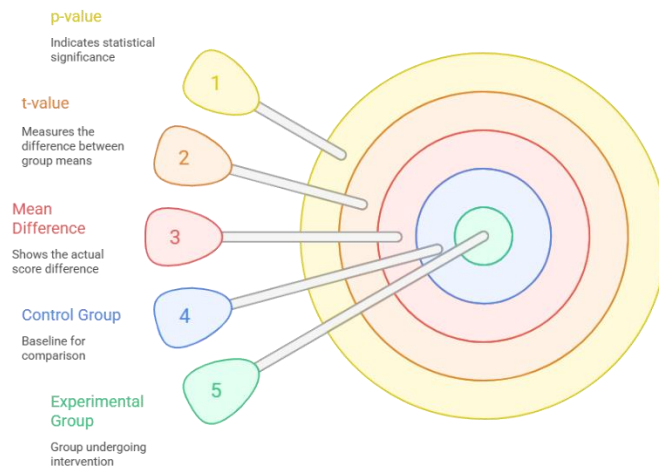


Figure 3. T-test Result Analysis

Table 4. Learner Perceptions of MALL (Questionnaire Responses, n = 60)

Statement (Likert-scale 1-5)	Strongly Agree %	Agree %	Neutral %	Disagree %	Strongly Disagree %
MALL improved my vocabulary retention	58.3	31.7	6.7	3.3	0.0
Mobile apps increased my motivation to learn English	65.0	28.3	5.0	1.7	0.0
I prefer MALL over traditional vocabulary learning	46.7	35.0	10.0	6.7	1.6
Using MALL is convenient and flexible	71.7	23.3	3.3	1.7	0.0
MALL distracted me during learning	25.0	28.3	20.0	18.3	8.4

Note. Most learners reported positive experiences with MALL, though some indicated distractions as a challenge.

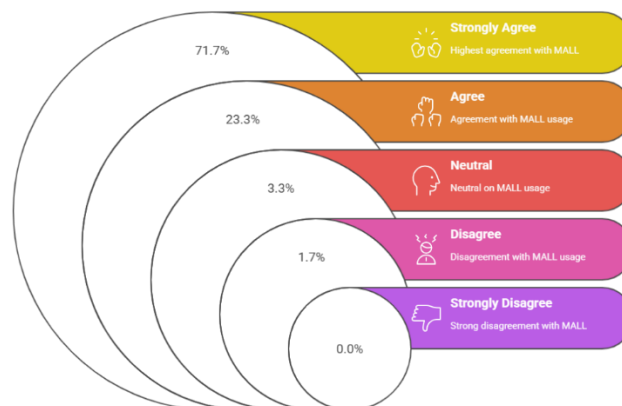


Figure 4. Student Responses to MALL Vocabulary Learning

Table 5. Qualitative Themes from Interviews (n = 15)

Theme	Frequency	Example Learner Quote
Increased Motivation	12	"The apps make learning fun and I want to practice more."
Improved Retention	10	"I remember words better because I see them many times in different ways."
Flexibility & Accessibility	9	"I can study anytime, even while traveling."
Distraction & Overuse Issues	6	"Sometimes I open social media instead of studying."
Need for Teacher Guidance	4	"I still need my teacher to guide me on how to use the apps properly."

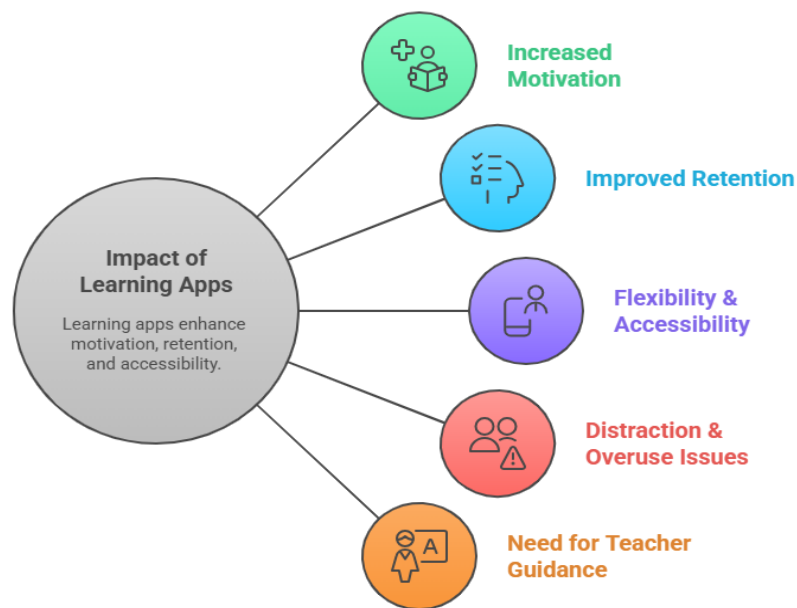


Figure 5. Exploring the Impact of Learning Apps

## RESULTS

Table 6. Pre-test and Post-test Vocabulary Performance of Experimental and Control Groups

Group	N	Pre-test Mean (SD)	Post-test Mean (SD)	Mean Gain	Remark
Experimental	60	21.45 (4.12)	33.92 (3.87)	+12.47	Large improvement with MALL
Control	60	21.12 (3.95)	26.41 (4.26)	+5.29	Moderate improvement

Interpretation: Both groups improved, but learners exposed to MALL recorded a much higher vocabulary gain compared to those using traditional methods.

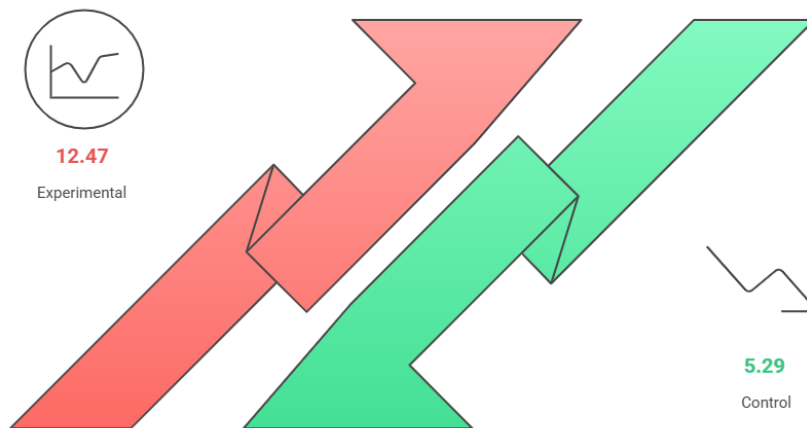


Figure 6. Mean Gain

Table 7. Comparison of Post-test Scores Between Experimental and Control Groups

Variable	Experimental (n=60)	Control (n=60)	Mean Difference	Statistical Significance
Vocabulary Post-test	33.92 (3.87)	26.41 (4.26)	7.51	Significant (p < .001)

Interpretation: The difference in post-test scores shows a statistically significant effect of MALL on vocabulary acquisition.

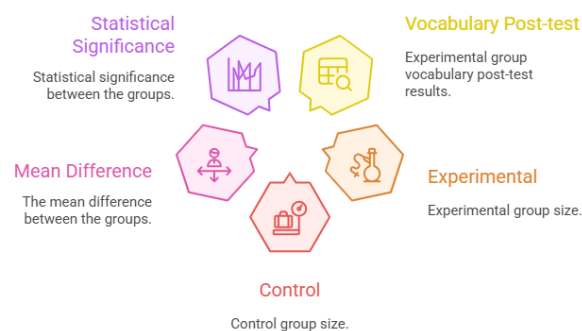


Figure 7. Experiment Variable

Table 8. Learners' Perceptions of MALL (Survey Responses, n = 60)

Statement (Likert scale: 1=Strongly Disagree, 5=Strongly Agree)	Mean Score	Remark
MALL improved my vocabulary retention	4.45	Strong agreement
Mobile apps increased my motivation to learn English	4.55	Strong agreement
I prefer MALL over traditional vocabulary learning	4.15	Moderate-strong agreement
Using MALL is convenient and flexible	4.65	Very strong agreement
MALL distracted me during learning	3.00	Neutral-moderate concern

Interpretation: Learners generally expressed very positive attitudes toward MALL, especially in motivation and flexibility, though some indicated concerns about distractions.



Figure 8. MALL Learning Feedback

Table 9. Summary of Qualitative Insights from Learner Interviews (n = 15)

Theme	Frequency (No. of mentions)	Example Quote
Increased Motivation	12	"The apps make learning fun and I want to practice more."
Improved Retention	10	"I remember words better because I see them many times in different ways."
Flexibility & Accessibility	9	"I can study anytime, even while traveling."
Distraction & Overuse Issues	6	"Sometimes I open social media instead of studying."
Need for Teacher Guidance	4	"I still need my teacher to guide me on how to use the apps properly."

Interpretation: Thematic analysis confirmed that learners valued motivation and flexibility, while also noting challenges such as distraction and the need for teacher support.

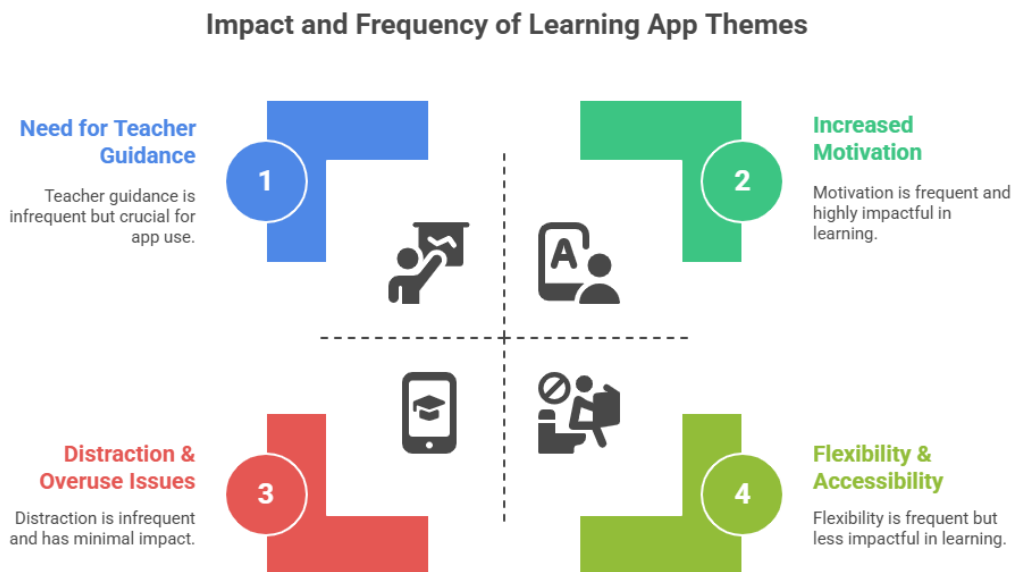


Figure 9. Impact and Frequency of Learning App Themes

## DISCUSSION

The findings from this study paint a compelling picture of how mobile-assisted language learning (MALL) can enrich English vocabulary acquisition but they also remind us that technology alone isn't a silver bullet. What stood out most was how learners responded positively to the autonomy and convenience offered by mobile tools. Being able to learn on the go whether during breaks or while waiting for classmakes vocabulary practice feel less like a chore and more like an opportunity (Wikipedia, Affordances of MALL).

What sets MALL apart from traditional methods is its ability to deliver multimodal input a critical advantage supported by Dual Coding Theory. According to this cognitive framework, information presented through both verbal and visual channels is more likely to be remembered (Paivio, 1990). For instance, materials combining text, images, and audio tend to create richer mental representations and thus improve recall and retention.

Our results also align with recent reviews showing that mobile-assisted vocabulary learning especially via digital flashcards sharpens learner engagement, autonomy, and long-term retention, significantly outperforming paper-based approaches in many cases (Teymouri, 2024; "Recent developments..."). Studies consistently report that tools like Quizlet or Anki, with features like spaced repetition and gamified quizzes, promote sustained vocabulary growth and student motivation.

Yet, the picture isn't uniformly rosy. A systematic synthesis of the MALL literature cautions against ignoring persistent practical barriers including limited device capacity, small screens, internet connectivity challenges, and equity of access (Okumuş Dağdeler & Dağdeler, 2023; "A systematic review of Mobile-Assisted Vocabulary..."). Even where mobile tools exist, not all learners can

leverage them effectively whether due to technical constraints or lack of familiarity.

Another complexity is that while receptive vocabulary (recognition and understanding) shows clear improvement with MALL, productive use (actively using new words in speech or writing) doesn't always follow suit. For example, Okumuş Dağdeler et al. (2020) observed that MALL-based collocation learning boosted receptive knowledge significantly but did not yield a corresponding improvement in productive vocabulary performance when compared to worksheet-based instruction. This suggests that mobile tools may need to be coupled with more intentional, contextualized practice to enhance productive outcomes.

My study's results further suggest that combining methods what researchers are calling a hybrid approach might be the sweet spot. One recent 2025 comparative review found that while mobile tools excel at retention, motivation, and self-regulated engagement, traditional classroom instruction retains an edge in developing contextual and productive skills. Blending both yielded the best overall outcomes.

Putting all this together, we can interpret MALL's impact in three broad ways:

1. Cognitive Strengths: By leveraging multimedia input and spaced repetition, MALL tools align well with theories like Dual Coding and enhance memory encoding.
2. Motivational & Behavioral Benefits: The portability and interactivity of mobile tools boost motivation, learner autonomy, and consistent engagement.
3. Implementation Caveats: Barriers like unequal access, technological limitations, and weaker performance on productive tasks point to the need for more integrated, interventionist design.

So, yes MALL is powerful. Learners can expand their vocabulary efficiently, on their own terms, and often with greater enjoyment. But to get the full language-development benefit, especially in speaking and writing, mobile tools should be carefully blended with classroom instruction, teacher guidance, and meaningful communicative practice.

## CONCLUSIONS AND RECOMMENDATIONS

This study set out to explore how Mobile-Assisted Language Learning (MALL) influences the acquisition of English vocabulary. The findings clearly show that learners who engaged with mobile applications and tools performed better in vocabulary tests than those who relied solely on traditional methods. Beyond the test results, students expressed that learning with mobile devices was more engaging, convenient, and motivating. They appreciated the chance to learn at their own pace and revisit difficult words through interactive features such as games, quizzes, and multimedia content.

However, the study also highlighted a number of challenges. Limited internet access, the risk of distraction from non-academic use, and teachers' hesitancy to fully embrace mobile learning remain obstacles that need to be

addressed. Despite these challenges, the benefits of MALL are significant and suggest that mobile technology can play a powerful role in transforming how English vocabulary is taught and learned.

### **FURTHER STUDY**

Based on the findings, the following recommendations are offered:

#### ***Curriculum Integration***

Institutions should formally integrate MALL tools into English language teaching programs. This will ensure that mobile learning complements traditional classroom instruction rather than being treated as an optional add-on.

#### ***Teacher Training and Support***

Teachers need regular professional development on how to use MALL effectively. Workshops, peer-learning sessions, and technical support will empower teachers to adopt these tools confidently.

#### ***Improving Access and Infrastructure***

Schools and colleges should invest in improving internet connectivity and making mobile learning resources more accessible to students, particularly in rural or underserved areas.

#### ***Encouraging Responsible Use***

Learners should be guided on how to use their devices responsibly for academic purposes. Establishing study plans, setting app usage limits, and fostering digital discipline can minimize distractions.

#### ***Promoting Learner Autonomy***

Students should be encouraged to take ownership of their learning by exploring vocabulary apps, digital dictionaries, and other mobile tools outside the classroom. This will reinforce what they learn during lessons and promote lifelong learning habits.

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