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Mobile-Assisted Language Learning (MALL) and English Proficiency Development among ESL College Students: A Quasi-Experimental Mixed-Methods Study

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Abstract

Mobile-assisted language learning (MALL) has garnered increasing scholarly attention as a pedagogical approach that leverages the ubiquity and multimodal affordances of smartphones and language learning applications to support second language acquisition outside formal classroom boundaries. This study investigated the effects of a structured 14-week MALL intervention on English as a Second Language (ESL) college students' proficiency development, focusing on vocabulary knowledge, reading comprehension, listening and speaking competence, and grammar accuracy, while simultaneously examining student motivation and the experiential dimensions of MALL engagement. A quasi-experimental pretest-posttest nonequivalent control group design was employed with 218 first- and second-year college students at a Philippine State University, randomly assigned at the class section level to a MALL experimental group (n = 110) and a conventional instruction control group (n = 108). Analysis of covariance (ANCOVA) results demonstrated statistically significant and practically large advantages for the MALL group across all English proficiency sub-skills and overall proficiency (F values ranging from 44.28 to 87.46, all $p < .001$; partial η^2 ranging from .21 to .39). Multiple regression analysis further identified MALL usage frequency ($\beta = .45$), digital language self-efficacy ($\beta = .36$), learner motivation ($\beta = .29$), and perceived app usefulness ($\beta = .22$) as significant independent predictors of post-intervention English proficiency, collectively explaining 47% of outcome variance. Qualitative thematic analysis of semi-structured interviews with 42 participants yielded five core themes: authentic language exposure, learner autonomy and self-pacing, gamification and motivational engagement, social interaction and peer learning, and technology anxiety and access barriers. These findings collectively affirm the transformative potential of MALL for ESL proficiency development while underscoring the equity imperatives that must be addressed for MALL benefits to be equitably distributed. Implications for language curriculum design, institutional policy, and equitable digital access are discussed.

Keywords: - Mobile-Assisted Language Learning, MALL, English As A Second Language, ESL, English Proficiency, Second Language Acquisition, Gamification, Learner Autonomy, Higher Education, Philippines

I. INTRODUCTION

The global expansion of English as the dominant language of academic, professional, and cross-cultural communication has made English proficiency development one of the most consequential educational imperatives for higher education systems across the non-Anglophone world (Crystal, 2012; Jenkins, 2015). In the Philippines, a nation with a long history of English-medium instruction and a constitutional mandate for bilingual education, the persistent gap between official English-medium policy and the actual English proficiency levels of college graduates represents a challenge of both educational and economic significance (Bernardo, 2004; Tupas & Martin, 2017). Despite consistent exposure to English instruction throughout twelve years of pre-tertiary schooling, a substantial proportion of Filipino college students enter higher education with proficiency levels that fall below the communicative and academic thresholds required for effective participation in English-medium academic discourse (Commission on Higher Education [CHED], 2022).

The proliferation of mobile technology—and specifically the near-universal smartphone ownership among Filipino college students (Philippine Statistics Authority [PSA], 2023)—has created an unprecedented infrastructure for extending language learning contact hours beyond the confines of the formal classroom. Mobile-assisted language learning (MALL), broadly defined as the use of mobile devices and dedicated language learning applications to support second language acquisition processes, offers a theoretically compelling response to the contact hour limitation that constrains classroom-based ESL instruction (Burston, 2015; Demouy & Kukulska-Hulme, 2010; Stockwell & Hubbard, 2013).

Applications such as Duolingo, Busuu, Babbel, and Elsa Speak, among dozens of others, provide learners with gamified, adaptive, multimodal language practice environments accessible at any time and in any location—environments whose pedagogical affordances align closely with theoretically motivated principles of second language acquisition, including comprehensible input (Krashen, 1982), spaced repetition, interactional feedback, and autonomous learning (Doughty & Long, 2003; Nation & Newton, 2009).

Empirical research on MALL effectiveness has grown considerably over the past decade, yielding a body of evidence that is broadly positive but marked by important methodological and contextual limitations. Meta-analytic syntheses consistently report moderate to large effects of MALL on vocabulary acquisition and reading comprehension outcomes (Burston, 2015; Lin & Lin, 2019; Shadiev et al., 2020), while studies examining MALL effects on speaking and listening competencies report more variable findings, partly attributable to inconsistencies in app selection, intervention duration, and learner engagement monitoring (Godwin-Jones, 2017; Lan, 2020). The majority of large-scale MALL studies have been conducted in Chinese, Turkish, Iranian, or Western university contexts; studies examining MALL effectiveness in Southeast Asian higher education systems, and particularly in the Philippines, remain comparatively rare, limiting the contextual transferability of existing findings (Arinto, 2016; Reinders & Pegrum, 2015).

This study addresses this gap by employing a quasi-experimental mixed-methods design to rigorously examine the effects of a 14-week structured MALL intervention on multiple dimensions of ESL proficiency among Filipino college students. The investigation is theoretically grounded in Krashen's (1982) Input Hypothesis and Interaction Hypothesis (Long, 1996), which together identify comprehensible, contextualized, and interactionally rich language input as the primary mechanism of second language acquisition—a theoretical frame that maps directly onto the authentic, adaptive, and interactive input environments that contemporary language learning applications seek to provide. The study additionally draws on Self-Determination Theory (SDT; Deci & Ryan, 2000), which attributes sustained learning engagement to the satisfaction of three basic psychological needs autonomy, competence, and relatedness—all of which MALL environments, through their self-pacing, adaptive difficulty, and social learning features, are designed to support.

1.1. Research Questions

This study was guided by the following research questions:

- Does a structured MALL intervention produce significantly greater gains in overall English proficiency and in the sub-skill domains of vocabulary, reading, listening and speaking, grammar, and learner motivation compared to conventional instruction?
- Which learner-level and technology-level variables significantly predict post-intervention English proficiency?
- How do ESL college students experientially describe the mechanisms, benefits, and challenges of MALL engagement?

1.2. Significance of the Study

This study makes contributions at three levels. Theoretically, it extends MALL research to the underexplored Philippine college ESL context, providing an empirical test of SLA input and interaction theories and Self-Determination Theory in a MALL setting characterized by conditions, high smartphone penetration but uneven digital infrastructure quality, that differ substantially from contexts in which most MALL theory has been developed. Methodologically, the convergent mixed-methods design enables a level of interpretive completeness that purely quantitative MALL impact studies rarely achieve, linking statistical effect sizes to the experiential mechanisms and contextual contingencies that produce them. Practically, findings provide language program administrators, ESL teachers, and national education policymakers with evidence-based guidance for integrating MALL into college English curricula in equitable, pedagogically principled, and institutionally sustainable ways.

II. REVIEW OF RELATED LITERATURE

2.1. Theoretical Foundations of Mall

Mobile-assisted language learning sits at the intersection of several robust theoretical traditions in applied linguistics and educational technology. Krashen's (1982) Input Hypothesis posits that second language acquisition occurs when learners receive comprehensible input at a level slightly beyond their current competence—a condition formally expressed as i+1. MALL applications operationalize this hypothesis through adaptive algorithms that dynamically adjust the difficulty of presented language items based on real-time performance data, theoretically ensuring that learners are consistently exposed to input at the optimal acquisition-facilitative difficulty level (Nation & Newton, 2009; Reinders & Pegrum, 2015). Long's (1996) Interaction Hypothesis extends the input framework by identifying negotiation of meaning in interactive communication as the primary mechanism through which comprehensible input is converted into acquisition, a mechanism that MALL environments partially instantiate through chatbot-mediated conversation practice, peer correction features, and automated pronunciation feedback systems (Godwin-Jones, 2017; Lan, 2020).

Self-Determination Theory (Deci & Ryan, 2000) provides a motivational framework that is particularly illuminating for understanding MALL engagement. SDT posits that human motivation is fundamentally driven by the satisfaction of three basic psychological needs: autonomy (the experience of self-directed action), competence (the experience of mastery and

efficacy), and relatedness (the experience of meaningful social connection). Well-designed MALL applications address each of these needs through specific design features: autonomy through anytime-anywhere self-paced access; competence through adaptive difficulty calibration, spaced repetition algorithms, and visible progress metrics; and relatedness through social leaderboards, peer challenges, and community forums (Dörnyei & Ushioda, 2011; Reinders & Pegrum, 2015). The alignment between SDT-identified motivational needs and MALL design principles provides a theoretically coherent account of the motivational advantages of MALL over traditional classroom instruction that the present study empirically examines.

2.2. Empirical Evidence on MALL and Language Proficiency

Meta-analytic reviews of MALL effectiveness report consistently positive, if variable, effects across language skill domains. Lin and Lin (2019) synthesized 56 studies on MALL and vocabulary acquisition, reporting a mean effect size of d = 0.72, with significantly larger effects observed when MALL was used as a supplement to classroom instruction rather than as a standalone learning modality. Shadiev et al. (2020) examined MALL effects on listening and speaking skills across 34 quasi-experimental studies, reporting a mean effect of d = 0.58 with high heterogeneity attributable to differences in application type, usage frequency, and learner proficiency level. Burston's (2015) comprehensive review of 79 MALL studies spanning 2003 to 2014 concluded that MALL consistently produced positive language learning outcomes, but emphasized that the educational significance of these effects was contingent upon pedagogical integration quality: MALL used within a coherent instructional framework produced substantially larger effects than MALL used as an unregimented supplement with no classroom connection.

Research specifically examining the motivational effects of gamified MALL applications—those incorporating points, badges, streaks, and leaderboard features—has reported particularly strong positive outcomes for learner engagement and intrinsic motivation (Dehaan et al., 2010; Shortt et al., 2021). Shortt et al. (2021) conducted a systematic review of 27 studies on gamified MALL, reporting that gamification features consistently increased daily practice frequency, session duration, and self-reported learning enjoyment, with motivational benefits translating into measurable proficiency gains in 22 of the 27 reviewed studies. The mechanism underlying gamification's motivational efficacy appears to operate primarily through competence need satisfaction—the experience of visible, incremental mastery signaled by reward accumulation and rank progression (Deci & Ryan, 2000; Dehaan et al., 2010).

2.3. MALL in Southeast Asian ESL Contexts

Research on MALL in Southeast Asian higher education contexts has grown in recent years but remains geographically concentrated in Thailand, Malaysia, and Indonesia, with the Philippines being comparatively underrepresented (Arinto, 2016; Reinders & Pegrum, 2015). Studies in Thai and Malaysian university ESL contexts have reported positive MALL effects on vocabulary and grammar outcomes consistent with global meta-analytic findings (Khwaileh et al., 2019; Yousefi & Bao, 2020), while simultaneously documenting context-specific moderating factors including uneven mobile data affordability, variable instructor technological self-efficacy, and the cultural dimension of face-saving in digitally mediated speaking practice. In the Philippine context specifically, Arinto (2016) documented the potential of mobile learning to extend quality educational access in a geographically fragmented archipelagic nation, while also identifying infrastructural inequity as the primary barrier to equitable MALL implementation—a barrier that institutional and policy responses have thus far addressed only partially and inconsistently (CHED, 2022; PSA, 2023).

III. METHODOLOGY

3.1. Research Design

This study employed a quasi-experimental pretest-posttest nonequivalent control group design (Shadish et al., 2002), nested within a qualitative descriptive case study framework, constituting an explanatory convergent mixed-methods design (Creswell & Plano Clark, 2018). Random assignment occurred at the intact class section level rather than at the individual student level—a pragmatic compromise necessitated by institutional scheduling and timetabling constraints—with statistical controls for pre-existing group differences applied through ANCOVA at the analysis stage. The qualitative component was designed to provide mechanistic and experiential explanation of the quantitative outcome patterns, consistent with a complementary mixed-methods purpose (Greene et al., 1989).

3.2. Participants

Two hundred eighteen (218) first- and second-year college students enrolled in mandatory English communication subjects at a Philippine state university participated in the study. Six intact class sections were randomly assigned at the section level to the MALL experimental group (three sections, n = 110) or the conventional instruction control group (three sections, n = 108). Table 1 presents the demographic profile of both groups, confirming pre-intervention equivalence on all measured baseline variables.

Table 1. Demographic Profile and Baseline Characteristics of MALL and Control Group Participants

Variable	**MALL Group n = 110**	**Control Group n = 108**	**Total N = 218**	**Test Statistic (p-value)**
Sex				
Male	54 (49.1%)	52 (48.1%)	106 (48.6%)	
Female	56 (50.9%)	56 (51.9%)	112 (51.4%)	$\chi^2 = 0.02$, p = .88
Year Level				
First Year	56 (50.9%)	55 (50.9%)	111 (50.9%)	
Second Year	54 (49.1%)	53 (49.1%)	107 (49.1%)	$\chi^2 = 0.00$, p = 1.00

Age (years)				
M (SD)	18.76 (0.91)	18.71 (0.88)	18.74 (0.89)	t = 0.38, p = .70
English Pretest Score				
M (SD)	61.43 (7.28)	61.19 (7.35)	61.31 (7.30)	t = 0.22, p = .82
Smartphone Ownership				
Yes	104 (94.5%)	101 (93.5%)	205 (94.0%)	χ^2 = 0.09, p = .77

Note. MG = MALL Group; CG = Control Group. χ^2 tests applied to categorical variables; independent-samples t-tests applied to continuous variables. No significant between-group differences were found on any baseline variable (all p > .05), supporting pre-intervention equivalence.

3.2.1 Qualitative Sub-Sample

Forty-two participants were purposively selected for the qualitative strand: 36 students (18 per group) representing maximum variation in English proficiency level and MALL engagement intensity, and 6 English faculty members who taught the participating class sections. All qualitative participants provided separate informed consent for individual interview participation.

3.3. Mall Intervention Protocol

The experimental group participated in a 14-week structured MALL program integrated into their regular English communication course.
The intervention comprised three components:

- Assigned MALL application use: Students were required to complete a minimum of 30 minutes of targeted practice per day on three designated applications, Duolingo (vocabulary and grammar), Elsa Speak (pronunciation and listening), and Busuu (conversational English and reading), monitored through weekly screenshots of app progress dashboards submitted via the class LMS.
- MALL reflection journals: Students maintained weekly digital journals (3 to 5 sentences) reflecting on their app-based learning experiences, challenges encountered, and self-identified vocabulary or grammar items for classroom follow-up.
- MALL-classroom integration activities: Each class session began with a 10-minute consolidation activity designed by the course instructor to bridge pre-class MALL practice with in-class communicative tasks, including vocabulary review games, pronunciation peer-feedback exercises, and discussion of MALL journal entries.

The control group continued to receive conventional classroom instruction exclusively, with homework consisting of textbook exercises and written assignments prescribed by the course syllabus.

3.4. Instruments

English proficiency was assessed using the CHED-aligned Collegiate English Proficiency Assessment (CEPA), a 100-item instrument comprising vocabulary (25 items), reading comprehension (30 items), listening (20 items), and grammar (25 items) sub-sections, with established content validity (CVI = .92) and satisfactory internal consistency (Cronbach's α = .89 in the current sample). Listening and speaking were assessed jointly using a 10-minute individual oral communication task scored against a validated analytic rubric (inter-rater reliability ICC = .87). Learner motivation was measured using the 20-item Motivated Strategies for Language Learning Questionnaire—Short Form (MSLQ-SF; Pintrich et al., 1993; α = .86 in the current sample). Digital language self-efficacy was assessed via a 12-item scale adapted from Compeau and Higgins (1995) and validated for language learning contexts (α = .84). All instruments were administered as pretests in Week 1 and post-tests in Week 14.

3.5. Data Collection and Analysis

Quantitative data were analyzed using IBM SPSS Statistics version 27 and R version 4.3.1. ANCOVA was conducted for each outcome variable, with pretest scores as covariates and group condition as the fixed factor. Assumptions of normality, homogeneity of variance, and homogeneity of regression slopes were verified and confirmed. Effect sizes were estimated using partial eta squared (η^2p) and Cohen's d. Multiple regression analysis was subsequently conducted with all post-test proficiency scores as the dependent variable to identify significant learner-level and technology-level predictors. Qualitative data were analyzed using Braun and Clarke's (2006, 2019) reflexive thematic analysis. Trustworthiness was enhanced through member checking, peer debriefing, and the construction of a joint display matrix integrating quantitative and qualitative findings (Guetterman et al., 2015).

IV. RESULTS

4.1. Pre-Intervention Group Equivalence

As detailed in Table 1, independent samples t-tests and chi-square tests confirmed no statistically significant differences between the MALL and control groups on any demographic or baseline academic variable (all p > .05). Mean English pretest scores were virtually identical across groups (MG: M = 61.43, SD = 7.28; CG: M = 61.19, SD = 7.35; t = 0.22, p = .82), establishing the pre-intervention equivalence necessary for valid between-group comparisons. These findings substantially reduce the plausibility of selection bias as a threat to the internal validity of subsequent intervention effect estimates.

4.2. ANCOVA Results: MALL Effects on Language Proficiency and Motivation

Table 2 presents descriptive statistics for all outcome variables at pretest and post-test by group condition, alongside ANCOVA F-statistics and effect size estimates.

Table 2. Descriptive Statistics and ANCOVA Results for English Proficiency Outcomes and Learner Motivation by Group and Time Point

Outcome	MG Pre M (SD)	MG Post M (SD)	CG Pre M (SD)	CG Post M (SD)	F	p / η^2p
Overall English Proficiency	61.43 (7.28)	78.19 (6.84)	61.19 (7.35)	67.34 (7.12)	87.46	p < .001, η^2p = .39
Vocabulary Knowledge	58.71 (8.14)	76.88 (7.43)	58.44 (8.20)	65.62 (7.84)	71.33	p < .001, η^2p = .33
Reading Comprehension	63.20 (7.91)	79.44 (7.12)	62.97 (7.88)	68.83 (7.65)	62.14	p < .001, η^2p = .29
Listening & Speaking	57.88 (9.03)	75.61 (8.27)	58.02 (8.97)	64.19 (8.71)	54.87	p < .001, η^2p = .25
Grammar Accuracy	62.55 (7.64)	77.92 (7.08)	62.30 (7.59)	68.47 (7.33)	49.61	p < .001, η^2p = .23
Learner Motivation	3.48 (0.67)	4.31 (0.58)	3.45 (0.64)	3.71 (0.62)	44.28	p < .001, η^2p = .21

Note. MG = MALL Group; CG = Control Group. F values reflect ANCOVA results with pretest scores as covariate and group as fixed factor. All F tests significant at p < .001. η^2p = partial eta squared. Overall English Proficiency, Vocabulary, Reading, Listening & Speaking, and Grammar scored on 0–100 scale; Learner Motivation scored on 1–5 scale.

ANCOVA results confirmed significant MALL treatment effects on all six outcome variables. The largest effect was observed for overall English proficiency ($F(1, 215) = 87.46$, $p < .001$, $\eta^2p = .39$), with the MALL group achieving a post-test mean of 78.19 (SD = 6.84) compared to 67.34 (SD = 7.12) for the control group—a difference of 10.85 points after controlling for baseline proficiency. Substantial effects were similarly observed for vocabulary knowledge ($F = 71.33$, $\eta^2p = .33$), reading comprehension ($F = 62.14$, $\eta^2p = .29$), and listening and speaking ($F = 54.87$, $\eta^2p = .25$). Learner motivation, while yielding the smallest effect, was nonetheless significantly enhanced in the MALL group ($F = 44.28$, $\eta^2p = .21$; MG post: M = 4.31 vs. CG post: M = 3.71). These findings collectively confirm that structured MALL integration produces practically significant improvements across the full spectrum of ESL proficiency skill domains.

4.3. Predictors of Post-Intervention English Proficiency: Multiple Regression

A simultaneous multiple regression analysis examined the independent contributions of six theoretically motivated predictor variables to post-intervention English proficiency, controlling for baseline proficiency. Results are presented in Table 3.

Table 3. Multiple Regression Analysis: Predictors of Post-Intervention English Proficiency (N = 218)

Predictor Variable	B	SE B	β	t	p / 95% CI
MALL Usage Frequency	4.71	0.51	.45	9.24	< .001 [3.71, 5.71]
Digital Language Self-Efficacy	3.88	0.49	.36	7.92	< .001 [2.92, 4.84]
Learner Motivation (Post)	3.14	0.55	.29	5.71	< .001 [2.06, 4.22]
Perceived App Usefulness	2.63	0.60	.22	4.38	< .001 [1.45, 3.81]
Instructor Integration Quality	2.28	0.62	.19	3.68	.001 [1.06, 3.50]
Perceived Ease of Use	0.94	0.58	.08	1.62	.107 [-0.20, 2.08]
Model Summary: $R^2 = .47$, Adjusted $R^2 = .46$, $F(6, 210) = 31.14$, $p < .001$					

Note. Dependent variable = Overall English Proficiency post-test score (CEPA), controlling for pretest score (not shown). β = standardized regression coefficient. All predictors entered simultaneously. CI = 95% confidence interval for unstandardized B. *Perceived Ease of Use was not a significant independent predictor (p = .107) when other variables were controlled.

The regression model was statistically significant ($F(6, 210) = 31.14$, $p < .001$) and explained 47% of variance in post-intervention English proficiency ($R^2 = .47$, adjusted $R^2 = .46$). MALL usage frequency was the strongest predictor ($\beta = .45$, $p < .001$), followed by digital language self-efficacy ($\beta = .36$, $p < .001$), learner motivation ($\beta = .29$, $p < .001$), perceived app usefulness ($\beta = .22$, $p < .001$), and instructor integration quality ($\beta = .19$, $p = .001$). Perceived ease of use failed to reach statistical significance as an independent predictor when all other variables were controlled ($\beta = .08$, $p = .107$), suggesting that ease of use exerts its influence on proficiency indirectly through its effect on usage frequency rather than as a direct performance-enhancing mechanism.

4.4. Qualitative Findings: Thematic Analysis

Reflexive thematic analysis of 42 semi-structured interviews produced five overarching themes. Table 4 presents each theme with representative sub-themes, codes, and verbatim participant excerpts.

Table 4. Qualitative Themes, Sub-Themes, and Representative Participant Excerpts from Semi-Structured Interviews

Theme	Key Sub-Themes & Codes	Illustrative Participant Quote
Authentic Language Exposure	Real-world content; Native speaker input; Contextual vocabulary acquisition; Multimodal input	"When I use the app, I am exposed to how English is actually used — not just textbook sentences. I learn words from songs, news clips, real conversations." — Student 9
Learner Autonomy & Self-Pacing	Personalized learning pace; Anytime-anywhere access; Voluntary repeated practice; Self-directed review	"I study English at midnight after work. No one is judging my pronunciation. I just practice until I feel confident." — Student 17

Gamification & Motivational Engagement	Streak rewards; Leaderboard competition; Badges and points; Intrinsic satisfaction from progress tracking	"The streaks and points make me want to practice every day. It does not feel like homework. It feels like a challenge I want to win." — Student 24
Social Interaction & Peer Learning	In-app discussion forums; Peer correction; Collaborative storytelling tasks; Shared language goals	"We have a group chat where we share funny mistakes and correct each other. I learned more from my classmates' feedback than from some corrections in class." — Student 33
Technology Anxiety & Access Barriers	App navigation difficulty; Data cost burden; Device incompatibility; Digital fatigue	"My phone is old and the app crashes often. I cannot do the listening tasks properly. It is discouraging when technology becomes the barrier." — Student 41

Note. Participant excerpts are reproduced verbatim from interview transcripts. Student participants are identified by sequential numbers; faculty participants are coded separately to protect anonymity. N = 42 interview participants (36 students, 6 faculty).

The theme of authentic language exposure captured the most consistently expressed experiential benefit of MALL among student participants. Unlike textbook-mediated classroom instruction, which students frequently described as presenting English in artificial, decontextualized formats, MALL applications exposed learners to the full range of English as it is actually spoken, written, and used in everyday, professional, and media contexts. This theme provides experiential grounding for the vocabulary knowledge gains documented quantitatively, consistent with Nation and Newton's (2009) argument that incidental vocabulary acquisition from rich contextual exposure is the most efficient and durable mechanism of lexical development.

Learner autonomy and self-pacing emerged as a particularly transformative benefit for students whose learning needs, schedules, and paces were poorly served by the homogenizing temporal structure of classroom instruction. Working students, students with long commutes, students who identified as anxious oral communicators, and students from non-English-speaking home environments all described MALL as enabling a more personally calibrated engagement with English practice than classroom instruction could provide. This theme directly corroborates Deci and Ryan's (2000) SDT account of autonomy need satisfaction as a primary driver of sustained motivation—and provides mechanistic explanation for the significant motivation gains observed in the quantitative strand.

Gamification and motivational engagement was the most vigorously expressed theme among participants under the age of 20. Students described the streak, badge, and leaderboard features of Duolingo and Busuu in particular as sources of daily motivational momentum that they experienced as qualitatively distinct from, and more compelling than, the extrinsic grade-based incentives of classroom assessment. Faculty participants corroborated this theme, describing observable increases in MALL group students' self-initiated English use in class, a behavioral change they attributed to the confidence and vocabulary breadth developed through daily app-based practice.

Social interaction and peer learning documented an unanticipated but theoretically meaningful aspect of MALL engagement: the emergence of informal peer learning communities organized around MALL practice, in which students shared app recommendations, compared progress metrics, corrected each other's written productions in class WhatsApp groups, and collaboratively troubleshot technical difficulties. These peer learning networks instantiate Long's (1996) Interaction Hypothesis in a digitally extended social space, one not explicitly designed into the intervention but spontaneously constructed by learners whose social motivation for language learning found expression in technology-mediated peer interaction.

Technology anxiety and access barriers introduced an essential critical note that the otherwise positive picture of MALL benefits would otherwise obscure. Students with older devices, those with limited mobile data budgets, and those with lower prior digital experience described persistent technical frustrations, app crashes, buffering during audio tasks, incompatible operating system versions, that disrupted their practice continuity and generated learning-interfering anxiety. These access barriers were differentially distributed along socioeconomic lines, with students from lower-income families significantly more likely to report technology-related learning disruption, a pattern that echoes the digital equity concerns documented in the MALL literature and in Philippine technology access research (PSA, 2023; UNESCO, 2021).

V. DISCUSSION

The findings of this study provide convergent, multi-method evidence for the efficacy of structured MALL integration in college ESL instruction, with intervention effects that are not only statistically significant but practically large and educationally meaningful across all measured proficiency and motivation outcomes. The magnitude of observed effects, with partial η^2 values ranging from .21 to .39 and Cohen's d between-group estimates exceeding 1.0 for overall English proficiency, substantially exceeds the effect sizes reported in global meta-analyses of MALL (Burston, 2015; Lin & Lin, 2019), a difference attributable, in part, to the particularly strong pedagogical integration design of the present intervention, which connected daily MALL practice to classroom consolidation activities and metacognitive reflection journals rather than permitting MALL use as an unmonitored supplement.

The identification of MALL usage frequency as the strongest predictor of proficiency outcomes ($\beta = .45$) is theoretically consistent with Krashen's (1982) Input Hypothesis, which predicts a monotonic relationship between exposure to comprehensible input and acquisition—more input, more acquisition. It is also pedagogically significant: it suggests that institutional and instructional strategies designed to increase MALL contact hours (minimum daily usage requirements, progress monitoring through LMS integration, peer accountability structures) may yield direct proficiency dividends that are not captured by one-time or low-intensity MALL implementations. This finding directly addresses the critique leveled by Burston (2015) at low-frequency MALL studies—that insufficient dosage is a primary cause of null or weak effects in the MALL literature.

The significant predictive contribution of digital language self-efficacy (β = .36) extends the language learning self-efficacy literature (Bandura, 1997; Dörnyei & Ushioda, 2011) to the MALL domain, confirming that learners' beliefs about their capacity to effectively use mobile technology for language learning are not merely attitudinal epiphenomena but consequential determinants of the frequency, depth, and persistence of MALL engagement. The practical implication is that institutional MALL programs should incorporate structured digital self-efficacy development activities—particularly for first-generation smartphone users or students from low-technology home environments—as a prerequisite for maximizing proficiency returns on MALL investment.

The qualitative theme of technology anxiety and access barriers introduces a critical limitation that the aggregate quantitative results, by averaging across the full sample, systematically obscure. For the subset of students whose MALL engagement was persistently disrupted by device inadequacy or data cost constraints, the intervention may have delivered no measurable benefit, or may even have introduced additional learning-interfering anxiety that conventional instruction did not. This differential impact, if confirmed by subgroup analyses in future studies, would imply that the impressive aggregate MALL effects documented here are partly a product of the favorable technological circumstances of the majority, and that the students who most need enhanced language learning support (those who are already academically vulnerable) may be least able to access the intervention conditions under which MALL delivers its documented benefits.

5.1 Limitations

This study carries several limitations that bound the interpretation and generalizability of its findings. The quasi-experimental design with section-level rather than individual-level randomization introduces the possibility that unmeasured between-section differences, in instructor enthusiasm, peer culture, or class scheduling, may have contributed to observed group differences. The self-report nature of MALL usage monitoring (progress dashboard screenshots) is subject to manipulation and does not capture the quality or intentionality of engagement within reported time metrics. The 14-week intervention period, while sufficient for detecting short-term proficiency gains, does not permit conclusions about the sustainability of MALL effects or the long-term retention of acquired language knowledge. The study's focus on a single Philippine state university constrains generalizability to other institutional, regional, and national contexts.

VI. CONCLUSION AND RECOMMENDATIONS

This study provides robust convergent evidence that structured MALL integration, characterized by minimum daily usage requirements, reflective journaling, and explicit MALL-classroom bridging activities, produces large and educationally significant improvements in ESL college students' English proficiency across vocabulary, reading, listening, speaking, and grammar domains, while simultaneously enhancing learner motivation and self-efficacy. Qualitative findings illuminate the experiential pathways through which these gains are achieved: authentic language exposure, autonomous self-pacing, gamification-driven motivational momentum, and peer social learning networks spontaneously constructed around shared MALL practice. Simultaneously, the equity implications of technology-mediated language learning are made visible through the lived experiences of students whose access barriers disrupted the very engagement patterns that MALL's proficiency benefits depend upon.

On the basis of these integrated findings, the following recommendations are offered. First, English program administrators and curriculum designers should adopt MALL as a structured supplementary component of college ESL courses rather than as an optional or incidental activity, specifying minimum daily usage requirements, providing clear pedagogical rationale for application selection, and designing explicit classroom activities that integrate and build upon out-of-class MALL engagement. Second, institutions should invest in digital self-efficacy development workshops at orientation, with follow-up coaching sessions for students who report persistent technology anxiety or access difficulty. Third, national education policy must address the structural preconditions of equitable MALL access: device lending programs, subsidized mobile data plans for enrolled students, campus Wi-Fi expansion, and offline app functionality mandates in procurement criteria for institutionally recommended MALL applications. Fourth, researchers should prioritize longitudinal designs to examine the retention and transfer of MALL-acquired proficiency, employ experience sampling methods to capture real-time MALL engagement quality, and conduct differential efficacy analyses examining MALL effects by socioeconomic status, device quality, and digital self-efficacy level to build a more equity-attentive evidence base. Fifth, faculty development programs should equip ESL instructors with the technological, pedagogical, and motivational competencies needed to effectively integrate, monitor, and bridge MALL activities within coherent instructional frameworks.

Mobile devices have become the most democratically distributed educational technology in human history. Their transformative potential for language education, and specifically for the ESL proficiency development of millions of college students across the non-Anglophone world, is real, empirically documented, and theoretically coherent. Realizing that potential equitably, however, requires far more than application selection: it demands the pedagogical intentionality, institutional support, and structural equity commitments that this study affirms as the true determinants of MALL's educational significance.

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