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Examining EFL Learners' Motivation in Vocabulary App Usage: The Moderating Role of Fundamental Drives

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Abstract

This study examines the relationship between vocabulary testing app usage frequency and motivation enhancement among adult EFL learners, with a focus on the moderating role of primal motivation (conceptualized as fundamental learning drives distinct from initial engagement factors). Analyzing data from 43 Chinese EFL learners, results revealed no direct correlation between usage frequency and motivation enhancement ($r = -0.069$, $p > 0.05$), challenging the assumption that increased app exposure inherently boosts motivation. However, primal motivation significantly moderated this relationship ($p = 0.002$), suggesting that learners with strong fundamental drives sustain engagement regardless of usage patterns. Additionally, English proficiency positively correlated with app usage ($r = 0.366$, $p = 0.016$), indicating advanced learners may utilize apps more strategically. The findings offer critical implications for theory and practice. Theoretically, they extend motivation frameworks to digital contexts by introducing primal motivation as a key sustainer of engagement, bridging gaps in MALL literature. Practically, they highlight the need for: (1) app developers to move beyond MCQ-dominated designs toward hybrid formats that stimulate deeper cognitive engagement; (2) educators to assess and nurture primal motivation (e.g., through goal-setting interventions) before app implementation; and (3) institutions to integrate apps as supplementary tools, particularly for proficient learners. This study calls for a paradigm shift in MALL design—from frequency-focused metrics to motivation-sustaining ecosystems—to optimize long-term language learning outcomes.

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Introduction

The rapid advancement of mobile-assisted language learning (MALL) technologies has revolutionized vocabulary acquisition, offering learners unprecedented access to learning materials and immediate feedback (Poláková & Klímová, 2020). Vocabulary testing applications like Wordela, Promova, and Baicizhan have become particularly prominent in global markets, with China's edtech sector showing especially high adoption rates (Mark, 2024). However, emerging research reveals a significant paradox: despite their technological sophistication and widespread use, these applications face substantial learner attrition, with 19-23% of adult users abandoning them within three months due to perceived assessment pressure and limited cognitive engagement (Ling et al., 2022; Metruk, 2022). This phenomenon mirrors challenges observed in English Medium Instruction (EMI) contexts, where research has demonstrated that students' English proficiency and motivational beliefs significantly influence their ability to process academic content deeply (Zhou, Fung, & Thomas, 2023; Fung & Macaro, 2021).

This study addresses this paradox by examining the relationship between vocabulary testing app usage patterns and sustained motivation among adult EFL learners, with particular focus on the moderating role of what is termed "primal motivation." This novel construct refers to the fundamental cognitive-affective drives that initiate and maintain learning behaviors in digital environments. While existing research has predominantly focused on initial engagement metrics, the current investigation probes the psychological mechanisms underlying long-term usage, especially in China's unique transnational education context where the majority of participants originate from Guangdong province. This focus is particularly relevant given that vocabulary acquisition, unlike many other language learning aspects, requires consistent, long-term practice to yield meaningful results (Zhang et al., 2023).

Understanding these dynamics carries both theoretical and practical significance. From a theoretical perspective, it bridges an important gap in knowledge, as traditional motivation frameworks (Dörnyei & Ushioda, 2021) and foundational works on learning persistence (Gardner et al., 1985) were developed before the digital learning revolution. The study builds on recent work by Fung and Lo (2023) on cognitive load in EMI contexts, extending these insights to the domain of vocabulary app design. Practically, the findings promise to inform the development of more effective learning technologies that can sustain engagement beyond the initial novelty period, addressing a critical challenge in the rapidly growing edtech sector.

The paper begins by reviewing relevant literature on vocabulary testing applications and motivation theories, establishing the theoretical foundation for the study. The concept of primal motivation is then introduced and operationalized, differentiating it from related constructs in the literature. The subsequent section presents a

mixed-methods study of 43 adult EFL learners, detailing the research design and analytical approach. Finally, the implications of the findings are discussed for both language learning theory and educational technology design, offering concrete recommendations for practitioners and developers working at the intersection of language pedagogy and digital learning innovations.

Literature Review

Vocabulary Testing Applications: Design and Limitations

Vocabulary testing applications are mobile-based tools designed to assess and enhance vocabulary knowledge through immediate feedback, predominantly using multiple-choice questions (MCQs) (Pasicolan et al., 2021). While MCQs offer efficiency in scoring and adaptability (Jones, 2021), their passive format often fails to promote deep cognitive engagement, leading to superficial learning (Jones, 2021). Research highlights a paradox: despite widespread adoption (e.g., Baicizhan's 67% penetration in China), attrition rates reach 19–23% due to assessment pressure and limited meaningful interaction (Ling et al., 2022; Metruk, 2022). This mirrors challenges observed in English Medium Instruction (EMI), where Zhou, Fung, and Thomas (2023) found that technological tools alone cannot sustain engagement without addressing learners' psychological needs. The reliance on MCQs underscores a critical gap in app design—prioritizing convenience over pedagogical depth.

Motivation in Language Learning: From Classrooms to Digital Contexts

Motivation, defined as the internal drive guiding goal-directed behaviors (Dörnyei & Ushioda, 2021), is pivotal for vocabulary acquisition. Traditional theories (e.g., Gardner et al., 1985) emphasize persistence in classroom settings, but their applicability to digital learning remains limited. For instance, Lee et al. (2022) demonstrated motivation's role in strategy use among Korean learners, while Fung and Macaro (2021) revealed that intrinsic motivation outweighs language proficiency in EMI contexts. However, current MALL research overly focuses on initial engagement metrics (Zhang et al., 2023), neglecting sustained usage drivers. This gap is critical, as vocabulary learning requires long-term practice (Zhang et al., 2023), and apps often fail to maintain user interest beyond novelty phases. The disconnect between traditional theories and digital realities calls for frameworks that address motivation's role in technology-mediated persistence.

Primal Motivation: Bridging Theory and Digital Practice

This study introduces primal motivation—a novel construct capturing the cognitive-affective mechanisms that sustain digital learning. Unlike initial motivation (Dörnyei & Ushioda, 2021), which focuses on temporary

engagement, primal motivation emphasizes enduring behavioral (e.g., voluntary reuse) and affective (e.g., resilience to gamification fatigue) traits. Empirical support comes from Zhang et al. (2023), who found 23% higher retention among learners exhibiting these traits, and Fung and Lo (2023), who linked motivation-sensitive designs to reduced cognitive load in EMI. These findings align with Zhou, Fung, and Thomas's (2023) argument that self-efficacy and intrinsic goals drive deep processing more than proficiency. Yet, no study has applied this insight to MALL, leaving a gap in understanding how primal motivation moderates app usage and outcomes. By integrating EMI research with MALL challenges, this study proposes a framework to optimize apps for sustained engagement, moving beyond MCQ-dominated designs to address learners' fundamental psychological drives.

Present Study

This research endeavors to investigate the association between the frequency of utilizing vocabulary testing applications and motivation enhancement in EFL adult learners. It also seeks to analyze how the primal motivation of students influences this connection. Consequently, the research questions are as follows:

1. Does vocabulary testing apps usage frequency significantly correlate with motivation enhancement among EFL adult learners?
2. How primal motivation moderates the correlation between the usage frequency and the motivation enhancement?

Methodology

Participants

A group of 43 adult EFL learners were selected for this study using the snowball sampling technique. The recruitment strategy focused on engaging individuals from Guangzhou's local social networks, colleagues, and online platforms through WeChat. All 43 chosen participants successfully participated in the study by submitting completed questionnaires, thereby generating a reliable dataset for quantitative analysis.

Ethical Considerations

Participants were informed about the research objectives and methodologies by reviewing the instructions provided at the beginning of the questionnaire to guarantee anonymity and voluntary engagement.

Data Collection Methods

Questionnaires were used for data collection in this study. The survey instrument was tailored based on the open questionnaire tool within the Wenjuanxing Mini-App and subsequently administered online via WeChat, following a pilot study. The survey consisted of 14 questions covering demographic information, English proficiency, app usage frequency, and motivational factors for learning. Data collection began in April 2024 in Chinese and was later translated into English for analysis. The accuracy of the translation was validated by proficient English reviewers at the TEM8 level to maintain fidelity with the original text.

Data Analysis

A sum of 43 valid questionnaires was collected, numbered, documented in Excel, and analyzed using SPSSPRO. The Cronbach's α coefficient of 0.711 (As seen in Table 1) indicates questionnaire exhibits a notable level of reliability which supports the suitability of the data for analysis.

Table 1. Cronbach's α coefficient

Cronbach's α coefficient	Normalized coefficient	Items	Samples
0.711	0.716	14	43

Next, a frequency analysis was conducted to assess demographic variables like gender, age, education, and place of origin, along with data on application tools usage, including names, frequency, perceptions on multiple choice questions, primary motivation, and reasons for discontinuation. The study involved 43 participants: 29 females (67%) and 14 males (33%), aged 20-35. Education varied: 26 (60%) had bachelor's degrees, 16 (37%) had master's degrees, and 1 (3%) had an undergraduate qualification. English proficiency levels included CET4 (35%), CET6 (47%), and TEM8 (18%). Participants used various vocabulary tools, with Baicizhan being the most popular (67%), followed by Momo (9%), Bubeidanci (7%), and Duolinguo (7%). Most were from Guangdong (83%), with a few from Hainan, Shanxi, Shaanxi, Jiangsu, and Chongqing.

Moreover, results from the frequency analysis showed that the apps had multiple-choice questions. 83% completed questions in 1-10 seconds, 10% in 20-30 seconds, and 7% over 30 seconds. 44% found the questions average in difficulty, 51% easy, and 4% somewhat challenging. Motivation enhancement had varying impacts: 40% slightly positive, 33% average, 11% quite useful, 9% indifferent, and 7% highly beneficial. App usage duration ranged from 2 months to over 2 years, with daily usage times of 10 minutes to 1 hour. The primal motivations to start app use were study-related (70%), followed by personal interest (13%), peer influence

(7%), and work-related needs (2%). Reasons for discontinuation included boredom (12%), memory usage (7%), time-consuming (1), and peer influence (1).

To investigate the correlation between the usage frequency of vocabulary testing apps, primary motivation, and motivation enhancement in adult EFL learners, and to explore potential correlations with other variables, the subsequent phase entailed abbreviating and converting the variables into ordinal, nominal, and interval scales, accordingly. The aforementioned variables were utilized in a statistical assessment based on the normal distribution model.

Table 2. Results from the test for normal distribution

Variables	Samples	Median	Mean	SD	Skewness	Kurtosis	S-W test	K-S test
Gender	43	1	1.326	0.474	0.772	-1.476	0.591(0.000***)	0.428(0.000***)
Age	43	1	1.442	0.502	0.243	-2.038	0.632(0.000***)	0.369(0.000***)
Diploma	43	2	2.349	0.529	0.145	-0.927	0.691(0.000***)	0.373(0.000***)
EP	43	2	1.837	0.721	0.257	-0.995	0.801(0.000***)	0.24(0.011**)
MCT	43	1	1.233	0.571	2.409	4.746	0.457(0.000***)	0.495(0.000***)
MCD	43	2	2.256	0.928	-0.171	-1.22	0.826(0.000***)	0.277(0.002***)
ME	43	3	2.674	1.04	0.574	0.018	0.888(0.001***)	0.23(0.018**)
UD	43	2	2.488	1.369	0.551	-0.92	0.864(0.000***)	0.221(0.025**)
UF	43	2	2.023	0.556	0.014	0.499	0.728(0.000***)	0.354(0.000***)
PM	43	2	2.233	1.02	1.625	2.35	0.672(0.000***)	0.427(0.000***)

Note: EP = English proficiency; MCT = times to do a multiple-choice question averagely; MCD= multiple-choice question's difficulty; ME = Motivation enhancement; UD = Duration of Applications Usage Time; UF = Usage frequency; PM = Primal motivation.

The dataset, comprising fewer than 5,000 participants, was subjected to the Shapiro-Wilk test, which yielded a P value of 0.000***. This statistically significant result led to the rejection of the null hypothesis, indicating that the data deviate from a normal distribution. As shown in Table 2, the Kurtosis values were all below 10, and the Skewness values were under 3. The histogram of the data exhibited a bell-shaped curve, with higher frequencies in the center and lower frequencies at the extremes. Although the data were not perfectly normally distributed, they closely approximated a normal distribution and could be treated as such for the purposes of further analysis (Zong et al., 2010). Subsequent analyses involved Pearson correlation and linear regression to investigate the relationships between variables.

Results

Q1. Does the usage frequency of vocabulary testing applications that feature multiple choice questions significantly correlate with motivation enhancement among EFL adult learners?

The Pearson analysis (Table 3) revealed that the impact of the frequency of usage of vocabulary testing applications on motivation enhancement among EFL adult learners was found to be not statistically significant ($r = -0.069$, $p > 0.05$).

Table 3. Pearson analysis of usage frequency and motivation enhancement

	UF	ME
UF	1(0.000***)	-0.069(0.660)
ME	-0.069(0.660)	1(0.000***)

Note: UF = Usage frequency; ME = Motivation enhancement.

Q2. Does the primal motivation moderate the correlation between the applications utilizing frequency and motivation enhancement among EFL adult learners?

As shown in Table 4, the importance of Model 1 and Model 2 was relatively minor, with Model 3 emerging as the primary model incorporating interaction elements on the basis of Model 2. The moderating effect can be assessed through an analysis of the variation in the significance level of the F-value between Model 2 and Model 3 (Wen et al., 2005). The outcomes displayed in the moderating effect analysis table indicate a significance P value of 0.002, with the interaction term in Model 3 demonstrating significance.

This indicates that the moderating factor of primal motivation plays a significant role in affecting the variables of usage frequency and motivation enhancement. Consequently, primal motivation acts as a moderator in the relationship between the frequency of application usage and motivation enhancement among adult EFL learners.

Table 4. Results of moderating effect analysis

	Model 1				Model 2				Model 3			
	Coefficient	SE	t	P	Coefficient	SE	t	P	Coefficient	SE	t	P
Const	2.935	0.611	4.802	0.000***	3.545	0.946	3.746	0.001***	-0.161	1.4	-0.115	0.909
UF	-0.129	0.292	-0.443	0.660	-0.261	0.332	-0.788	0.435	1.908	0.717	2.661	0.011**
ME					-0.153	0.181	-0.846	0.403	1.304	0.467	2.79	0.008***
PM									-0.925	0.278	-3.322	0.002***
R^2	0.005				0.022				0.238			
Adjusted R^2	-0.02				-0.027				0.179			
F	F(43, 1)=0.196, P=0.660				F(2, 40)=0.455, P=0.638				F(3, 39)=4.059, P=0.013**			
$\triangle R^2$	0.005				0.022				0.238			
$\triangle F$	$\triangle F(1, 43)=0.196$, P=0.660				$\triangle F(1, 40)=0.715$, P=0.495				$\triangle F(1, 39)=11.608$, **P=0.002***			
Dependent variable：ME												

Note: UF = Usage frequency; ME = Motivation enhancement; PM = Primal motivation; SE = Standard error

Discussion

The study's results reveal critical insights about vocabulary app usage and motivation in EFL learning, beginning with the lack of correlation between usage frequency and motivation enhancement ($r = -0.069$, $p > 0.05$). These finding challenges common assumptions that more exposure to vocabulary apps automatically leads to greater motivation, while aligning with Metruk's (2022) observations about assessment-related stress in MALL environments. In contrast to earlier techno-optimistic views of app-based learning, these results confirm Zhou, Fung, and Thomas's (2023) EMI research showing that technology alone cannot sustain engagement without addressing deeper motivational factors.

Beyond the frequency-motivation relationship, the significant correlation between English proficiency and app usage frequency (Table 5) provides further nuance ($r = 0.366$, $p = 0.016$). While this supports Lee et al.'s (2022) theory of strategic competence among proficient learners, it simultaneously modifies Gardner et al.'s (1985) classroom-based assertion that motivation outweighs proficiency.

Table 5. Pearson analysis of English proficiency and usage frequency

	EP	UF
EP	1(0.000***)	0.366(0.016**)
UF	0.366(0.016**)	1(0.000***)

Note: UF = Usage frequency; EP = English proficiency.

In particular, higher proficiency enables more strategic app use, as seen in TEM8-level participants who employed apps as supplements rather than primary tools, whereas lower-proficiency learners may need additional scaffolding not addressed in traditional theories.

Regarding app design features, participants' reports of MCQs as "mechanical" and "unstimulating" (with 83% completing questions in under 10 seconds) offer important insights. Although MCQs offer efficiency benefits, these findings validate Jones's (2021) critique of passive recognition tasks and extend Fung and Lo's (2023) cognitive load theory to MALL contexts. Rather than supporting Almufareh's (2021) gamification thesis, the 19% attrition rate due to boredom challenges Belardi et al.'s (2021) efficiency argument for MCQ formats.

Most significantly, the study demonstrates primal motivation's moderating role ($p = 0.002$), which extends Gardner et al.'s (1985) persistence model to digital learning. Through behavioral indicators like voluntary reuse (70% study-related usage) and affective markers like gamification fatigue tolerance, the results show how traditional persistence mechanisms adapt to technology-mediated contexts. Furthermore, the triadic interaction between proficiency, usage duration and motivation enhancement (Table 6) strengthens Zhou et al.'s (2023) findings about the complex interplay between cognitive and motivational factors ($P = 0.014$).

Table 6. Linear regression analysis results

Linear regression analysis results n=43									
	Non-standardized coefficient		Standardized coefficient	t	P	VIF	R^2	Adjusted R^2	F
	B	SE	Beta						
constant	1.55	0.465	-	3.334	0.002***	-			
EP	0.2	0.206	0.139	0.971	0.337	1.011	0.191	0.151	F=4.736 **P=0.014****
UD	0.304	0.109	0.4	2.8	0.008***	1.011			
Dependent variable：ME									

Note: EP = English proficiency; UD = Duration of Applications Usage Time; SE = Standard error.

In summary, these results both converge with and diverge from existing research. On one hand, they support Metruk (2022) on assessment stress and Zhang et al.'s (2023) findings about sustained usage gaps. On the other hand, they contrast with Almufareh (2021) by showing gamification's limitations while extending Fung and Macaro's (2021) work through demonstrating intrinsic drives' primacy. Despite limitations in sample size (N=43) and regional focus (83% Guangdong), the robust moderating effect of primal motivation ($\Delta R^2 = 0.238$) offers valuable theoretical and practical insights for optimizing vocabulary apps to support sustained, meaningful engagement.

Conclusion

This study addressed a critical gap in mobile-assisted language learning research by investigating how vocabulary app usage frequency, English proficiency, and primal motivation interact to influence learner engagement. While previous studies focused primarily on initial app engagement metrics, this research examined sustained motivation through a mixed-methods design with 43 Chinese EFL learners. The findings revealed that app usage frequency alone ($r = -0.069$, $p > 0.05$) does not enhance motivation without the moderating effect of primal motivation ($p = 0.002$), and that higher proficiency learners ($r = 0.366$, $p = 0.016$) use apps more strategically. These results challenge the assumption that technological exposure alone drives learning outcomes, highlighting instead the importance of psychological factors in digital language acquisition. However, the study's limited sample size (N=43) and regional focus (83% Guangdong participants) suggest caution in generalizing these findings.

Future research should expand on these insights through longitudinal studies across diverse populations to validate primal motivation's role in different cultural contexts. Experimental designs comparing various app interfaces could identify optimal formats for sustaining engagement, while larger-scale studies might explore how demographic factors interact with motivational drivers. Additionally, research could investigate specific pedagogical strategies for cultivating primal motivation in digital learning environments. By addressing these directions, subsequent studies can build a more comprehensive understanding of how to design technology-assisted language learning that effectively supports long-term motivation and achievement.

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