Screen distractions and vocabulary gains in Memrise mobile-assisted vocabulary learning (MAVL) setting

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Abstract

Despite the significance of investigating the impact of screen distractions on mobile-assisted vocabulary learning (MAVL), research in this area is limited. This experimental study investigated the impact of screen distractions on participants’ Memrise MAVL experience. It employed an exploratory case study design in an EFL flipped classroom setting and examined the impact of a two-week Memrise MAVL experience on participants' vocabulary gains, time spent on the process, engagement with screen activities, and the effect of screen distractions. The results showed no significant differences in the completion of target units between the control and experimental groups. However, there was a significant difference in the total amount of screen distractions among individuals in both groups. The study also found significant correlations between participants’ total finished target words and other dependent variables. The linear regression test indicated a strong correlation between total screen distractions and participants' finished target words. Although screen distractions did not significantly affect individual performance on vocabulary gains, they did contribute to the total time spent on the process. Overall, this study highlights the potential of mobile-based apps in self-directed and independent vocabulary learning within the flipped classroom setting.

Keywords: mobile-assisted vocabulary learning (MAVL); Memrise app; Memrise MAVL; mobile-assisted; mobile learning; screen distraction; vocabulary learning
Introduction

Driven by the literature in English language teaching (ELT) and computer-assisted language learning (CALL), the integration of language skills in a holistic manner with the support of technology enables students to acquire language knowledge and develop contextual language proficiency (Dudeney & Hockly, 2015; Pirasteh, 2014; Rafiee & Purfallah, 2014; Shokrpour et al., 2019). Mobile-assisted language learning (MALL) emerges as a promising approach from CALL, leveraging mobile devices to enhance CALL experiences. Studies demonstrate that MALL positively impacts language learning outcomes, improving grammar acquisition (Pirasteh, 2014) and fostering positive attitudes among teachers and students toward technology integration (Kashef et al., 2014; Rafiee & Purfallah, 2014). MALL offers interactive and multimodal learning experiences (Van & Thanh, 2022), and the use of mobile devices significantly enhances language skills acquisition, as evidenced by the consequential impacts on grammar learning (Pirasteh, 2014). Teachers and students displayed positive attitudes towards MALL, recognizing its potential to enhance language learning in EFL settings (Kashef et al., 2014; Rafiee & Purfallah, 2014). However, careful implementation and selection of appropriate applications are crucial in realizing the full potential of MALL (Kacetl & Klimova, 2019).

Since MALL became a well-recognized concept in the EFL literature, studies (Gutiérrez-Colón et al., 2020; Lin & Yu, 2017; Xue, 2022) have been focused on exploring, identifying, and categorizing several challenges related to the mobile environment. Screen distractions are among the most common issues in MALL (Davie & Hilber, 2015). There is conclusive evidence that switching between screen activities is highly distracting for many students (Abidin, 2023; Winter et al., 2010). Metacognitive awareness is weakened by an inability to concentrate on a task for a certain amount of time (Zhou, 2022). Students feel less responsible for maintaining the pace, so learning tasks take longer to complete (Warfvinge et al.,
Distractions cause detrimental cognitive effects as the memory of materials learned is less effective over time (Skulmowski & Xu, 2021). It makes tasks more difficult and contributes to a higher rate of errors (Zhou, 2022). This also affects the mood state, which distracts students' ability to focus on executive functions to mental tasks (Cumming et al., 2022). In the end, learning objectives are not met, and students feel less enthusiastic about their performance.

More specific than MALL, mobile-assisted vocabulary learning (MAVL) indeed has a leverage on EFL vocabulary gains (Hanson & Brown, 2020). MAVL helps students to become more self-reliant (Seifert & Har-Paz, 2020). Vocabulary learning is better when it is based on an individual's preferences and engagements (Hiver et al., 2021). Both are key factors in building students' interests and directly affect levels of material understanding (Firduas & Sulandra, 2021; Koper, 2015). However, concerns have been noted about the psychological facts that the owned private smartphone presents a number of distractions (Flanigan & Titsworth, 2020; Li & Chan, 2021) when it has practical uses apart from learning. There should be an adverse effect on how much students are willing to engage with it. Current studies on the use of mobile devices in vocabulary learning revealed some challenges, such as distractions associated with the mobile environment and the excessive use of mobile phones (Xodabande & Hashemi, 2022). The experimental design of MAVL also concluded that students performed better using mobile apps (Shahbaz & Khan, 2021). These studies distinguish between MAVL and non-MAVL results with different treatments or settings. In a specific design using the Memrise app, the focus was set on self-regulated learning (Fathi et al., 2018), vocabulary enhancement (Taebenu & Katemba, 2021), and supplementary materials (Paradhina & Myrna, 2021). Little effort has been put into exploring the effect of screen distractions in the Memrise MAVL experience on students' vocabulary gains, considering the total amount of time spent in the process.

The present study set out to document the distribution of the participants' total finished target words from both groups, figure the total amount of participants' finished target words based on the present on-screen distractions, and find the correlations among observed variables. This study was centered around the subsequent research inquiries:

1. Is there a significant difference in the distribution of the total number of target words completed by the participants?
2. Do the screen distractions prefigure the total amount of participants’ finished target words?
3. Are there strong correlations among observed variables?

This study looked at the impact of a preliminary trial of a two-week EFL learning experience via the android-based Memrise application on participants’
achieving results, the proportion of time spent in the process, individual engagement with the screen activities, and the effect of screen distractions. To ensure the participants understand the mobile app technicalities for uninterrupted screen learning, successful compliance with the trained procedure was expected to occur in response selection and the presence of screen distractions since both of these behaviors should be outplayed throughout the learning. As a result, I hypothesized that individuals who participated in focus-group sessions and were highly engaged with MAVL would demonstrate faster progress and a greater ability to ignore screen distractions compared to individuals who did not participate. These outcomes would serve as the dependent variables, measuring learning performance.

Literature review

Mobile instructions and vocabulary learning

Multimodal learning approaches incorporating sensory experiences have been shown to enhance vocabulary acquisition (Montero-SaizAja, 2022) as they positively affect vocabulary enrichment, fostering motivation and enjoyment among students (Abdelrady et al., 2022). Dynamic assessment strategies, which provide continuous feedback, self-regulated learning, and personalized guidance for vocabulary instructions, have been shown to improve critical reading skills and vocabulary comprehension (Sana’ati et al., 2019). These studies highlighted the importance of incorporating diverse methods and strategies to enhance vocabulary learning in EFL contexts. In addition, metacognitive strategies, such as goal setting, information organization, and self-monitoring, have been proven effective in vocabulary acquisition in ESP contexts (Al-Zahrani & Chaudhary, 2022). Mobile devices have become valuable tools for self-regulated and self-directed vocabulary learning, offering engaging learning opportunities and dynamic assessment strategies (Rahmani et al., 2022). However, these existing studies had not explored the use of mobile-assisted vocabulary learning in a flipped classroom setting. This indicates a research gap, as further investigation is needed to understand the effectiveness of mobile-assisted instruction in vocabulary learning within a flipped classroom framework. Bridging this gap can provide valuable insights into optimizing vocabulary instruction and promoting language proficiency in EFL settings.

Integrating vocabulary learning materials and exercises into mobile format does not detract students’ learning experience (Dudeney & Hockly, 2015). Mobile instructions offer greater possibilities and expansions to creative learning
formats (Warfvinge et al., 2022). Higher education benefits from this because it promotes a more appropriate learning environment that accommodates a wide range of student preferences (Gambo & Shakir, 2019). Paying heed to the requisite factors for e-course instructional design on mobile devices holds certain significance, such as the need for constant support and the absence of screen distractions (Winter et al., 2010). Considering the lack of teacher assistance in training even basic vocabulary skills in EFL due to limited classroom duration, mobile learning becomes a necessary supplementary instruction to enrich the flipped learning experience (Stockwell, 2007; Xodabande & Hashemi, 2022). Studies (Pea & Sharples, 2022; Warfvinge et al., 2022) also confirmed that learning through a mobile app is more convenient than e-course via web browsers in mobile format. It converts a smaller screen into extended features such as smooth interaction, clear navigation, and proportional screen layout to compact rich and contextual information in a single-screen presentation (Lee et al., 2018).

The MAVL units of Memrise range from thematic vocabularies to practical expressions (Zhang, 2019). The new target vocabularies are unlocked after users have completed all unit sessions. Typically, there are seven to thirty-five words available within a lesson. The default setting for the learning pace is five words per unit session and twenty-five words per review session (Zhang, 2019). However, students can adjust their preference for learning pace in their account settings. Memrise also incorporated several gamification features into screen activities (Fathi et al., 2018). The material delivery comes with the audiolingual presentation, and the target words are learned through constant repetition via various instructional task modes (Taebenu & Katemba, 2021). Tasks are designed to enhance students’ memorization of word meanings through literal translation. Memrise features short clips of recorded pronunciation by native speakers to add a more authentic experience to MAVL (Zhang, 2019). In terms of instructional treatment (Aminatun & Oktaviani, 2019; Fathi et al., 2018) or supplementary materials (Łuczak, 2017; Paradhina & Myrna, 2021), Memrise has been proven to enhance vocabulary learning and improve vocabulary gains.

Compromising the advantages, MAVL is frequently used in environments where the user is distracted by another screen task (Davie & Hilber, 2015), for example, by switching to social media pages (Portanova, 2021) or checking incoming notifications (Hoffmann et al., 2008). When users have to divert some of their attention to a relatively simple task, such as closing pop-up ads, their performance with the MAVL is negatively affected (Lin & Yu, 2017). Studies (Corkin et al., 2021; Kızıl & Savran, 2018; Lin & Lin, 2019) found that multi-window switching presents more cognitive loads than the split screen option due to increased response demand. In distracted environments, visual feedback can be
misinterpreted, resulted in inaccurate inputs (Negulescu et al., 2012). Multitasking in screen environments relates to distraction, distractibility, and impulsivity (Anderson & Subrahmanyam, 2017; Levine et al., 2012). Research provides clear evidence that screen multitasking is distracting (Eirich et al., 2022; Karkashadze et al., 2022), with consequences for divided attention (Vedechkina & Borgonovi, 2021), focus deficiency (Lissak, 2018), and cognitive loads (Kim et al., 2020). Greater use of multiwindow switching and pop-up notifications is correlated with higher levels of trait impetuosity and inattentiveness (Corkin et al., 2021). Still, the measure of impacts based on the number of present distractions has not been extensively explored. Smartphone users may become more skilled at multitasking over time, but intervention is currently required to improve the efficient and effective use of screen instructions.

**Memrise MAVL and screen distractions**

The integration of the Memrise mobile application has significantly impacted EFL flipped classroom instructions, drawing substantial attention for its potential to enhance vocabulary acquisition and self-regulation skills, leading researchers to thoroughly investigate its nuances and uncover diverse findings and controversies. Abidin (2023) sheds light on a significant concern by investigating the phenomenon of screen distractions during screen learning via Memrise. This inquiry prompted a reexamination of the seemingly smooth integration of this pioneering mobile learning instrument. In contrast, Taebenu and Katemba’s (2021) innovative proposition of coupling Memrise with Google Classroom showcases a collaborative approach that not only mitigates distractions but also amplifies vocabulary learning efficacy. The tensions between these findings find resonance with Aminatun and Oktaviani (2019), who extolled Memrise’s role in fostering autonomous learning skills. Yet, Abarghoui and Taki’s (2018) exploration of high school students’ perceptions introduces a layer of contention, spotlighting potential misalignments between educators’ expectations and students’ lived experiences.

Beyond immediate learning needs, Memrise’s potential extends into the domain of long-term memory retention, as elucidated by Fadhilawati et al. (2022), providing a strategic pathway for enduring vocabulary implantation. This notion converges with Ismagilova et al.’s (2019) characterization of mobile applications as modern tools for language learning, underlining Memrise’s relevance within contemporary pedagogical frameworks. Yet, Putri and Simanjuntak (2022) injected a nuanced perspective by unraveling the multifaceted nature of students’ perceptions, thereby encapsulating the diverse tapestry of students’ experiences. In the midst of this continuum of research, the
Abidin

Screen distractions and vocabulary gains

semina\nwork of Fathi et al. (2018) stood as a pivotal contribution, illuminating Memrise’s potential to not only enhance vocabulary acquisition but also to cultivate indispensable self-regulation skills, thereby forging an essential cornerstone within the discourse of MAVL. Transitioning seamlessly from examining Memrise’s impact on vocabulary learning, the discourse now shifts to comprehensively scrutinizing the implications of screen distractions on MAVL experiences. Mulyani et al. (2019) employ a mixed methodology to delve into the screen behavior of high school students within a mobile learning context. Through focus group discussions and a meticulous study design, they unearth a vexing reality: students’ attention is fragmented by incessant shifts between windows, engrossed in social networks, instant messaging, and other entertaining content. This sentiment resonates with Winter et al. (2010), who expand the purview to online environments, including mobile-based learning, revealing a pervasive pattern of multitasking behavior that sidelines learning-focused activities in favor of more entertaining alternatives. Incoming calls and messages further compound this issue, as Alamri et al. (2017) discerned their detrimental impact on students’ concentration spans.

Concerning the case, Zhonggen et al. (2019) augmented this phenomenon with a comprehensive investigation, surveying 340 tertiary students in both quantitative and qualitative domains. Their findings emphasize the persistent influence of screen distractions, with entertaining content such as chats, music, movies, news reports, and gossip messaging remaining formidable hindrances. Even attempts to employ second display screens to segregate tasks and non-tasks prove insufficient in quelling these disruptions. Similarly, Shin et al. (2016) delved into the dynamics of second-screen usage in multitasking scenarios, establishing that sequential engagement yields lower cognitive loads but fails to entirely eliminate screen distractions. Meanwhile, Lee et al. (2018) offered insights into the impact of parallel screen activities, revealing that despite the advantages of split attention, cognitive loads increase, compromising learning performance in this context. In sum, integrating the Memrise mobile application has sparked significant discourse within the MAVL discussion. Its potential to enhance vocabulary acquisition and self-regulation skills has been explored amidst a backdrop of diverse findings and debates. The issue of screen distractions, a pertinent concern in MAVL, underscores the need for strategic implementation to maximize efficacy. As the scholarly discourse advances, it becomes evident that while screen distractions pose challenges, they also prompt researchers to develop innovative strategies to optimize mobile learning experiences, a quest that remains crucial in an ever-evolving flipped classroom instruction.
Method

Design

This study delved into the efficacy of mobile screen learning within a flipped EFL classroom setting, utilizing an Android-based Memrise MAVL application. The study adopts an exploratory case study design (Creswell, 2014; Hancock et al., 2021; Yin, 2014) to comprehensively examine the preliminary trial of the Memrise app. By leveraging this methodological framework, the study design enables an immersive exploration of the dynamic interplay among technology, pedagogy, and participant behavior. Central to this design is its focus on participants' lived experiences within the flipped classroom, affording quantifiable outcomes and a deep understanding of underlying mechanisms. The investigation scrutinizes diverse facets, such as time allocation per unit lesson, app usage patterns, sessions and repeats, and the influence of screen distractions. The primary research questions anchoring this study pertain to discerning whether a significant disparity exists in participants' distribution of completed target words, the predictive role of screen distractions in participants' achieved target words, and the presence of robust correlations among observed variables. Using an exploratory case study design, this study not only enhances our comprehension of technology-mediated instructions but also offers insights on participant's screen engagement. Moreover, this study unravels the untapped potential of mobile platforms like Memrise in facilitating MAVL, thus contributing to the broader discourse on technology-enhanced instructional approaches in contemporary EFL contexts. Specifically, the design of the present study concerns the research questions.

Memrise MAVL context and procedures

Participants installed the Memrise app (version 2021.9.8.0) and signed up for monthly subscriptions. Both groups completed 25 unit lessons of A1 and A2 levels (which comply with the CEFR framework) from the app, including lexical activities, spelling and pronunciation exercises, and listening comprehension. The screenshots in Figure 1 showed participants' experience points, completed words, numbers of sessions per screen time, and ratings in the global community.

Participants in the experimental group underwent a comprehensive pre-experimental training program, which consisted of an interactive workshop conducted by experienced trainers. During the training, participants were provided with detailed explanations of the study objectives, methods, and procedures. They were introduced to the specific terms and conditions associated with their involvement in the study, and they were given informed consent.
sheets to review and sign. Additionally, the training session included practical demonstrations and hands-on exercises to familiarize participants with the Memrise MAVL technicalities.

**Figure 1**  
*Participants’ user page with account details*

![Participants’ user page with account details](image)

Moving forward, the experimental group participants were scheduled for daily MAVL sessions, each lasting for an hour and thirty minutes. These sessions were conducted over a period of two weeks. They were designed to focus on enhancing the participants’ focus on the completion of learning units. On the other hand, the control group participants were assigned a self-directed learning approach. This group did not receive any formal training or participate in the pre-experimental training program. They maintained regular contact with the research team through a dedicated WhatsApp group. This group served as a platform for the research team to send daily reminders and keep the participants informed about upcoming deadlines related to the study.

**Participants**

The present study centered on 46 Indonesian first-year university students, comprising 16 males and 30 females, who were selected using a purposive sampling method (Campbell et al., 2020; Klar & Leeper, 2019). The inclusion
criteria entailed the following conditions: the participants must be non-English majors and have never had experience with an android-based MAVL before. Prior to the commencement of the study, an initial screening of the participants’ English proficiency levels was conducted to ensure homogeneity among the participants. All participants had studied EFL in high schools for a period of six years. Their EFL proficiency levels, as determined by the university placement test, ranged from Beginner to Pre-Intermediate based on CEFR levels. The inclusion of this screening provides a preliminary insight into the participants’ language abilities and allows for a more accurate understanding of their performance throughout the study. The demographics information of the research participants is shown in Table 1.

**Table 1**

*Participants’ demographics*

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>16</td>
<td>34.78</td>
</tr>
<tr>
<td>Female</td>
<td>30</td>
<td>65.22</td>
</tr>
<tr>
<td>MAVL preference</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>20</td>
<td>47.82</td>
</tr>
<tr>
<td>Control</td>
<td>24</td>
<td>52.18</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 years-old</td>
<td>41</td>
<td>89.13</td>
</tr>
<tr>
<td>19 years-old</td>
<td>5</td>
<td>10.87</td>
</tr>
<tr>
<td>Android version</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 (Marshmallow)</td>
<td>7</td>
<td>15.21</td>
</tr>
<tr>
<td>7 (Nougat)</td>
<td>31</td>
<td>67.39</td>
</tr>
<tr>
<td>8 (Oreo)</td>
<td>8</td>
<td>17.40</td>
</tr>
<tr>
<td>EFL proficiency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beginner (A1)</td>
<td>37</td>
<td>80.43</td>
</tr>
<tr>
<td>Pre-Intermediate (A2)</td>
<td>9</td>
<td>19.57</td>
</tr>
</tbody>
</table>

All participants agreed to enroll in premium accounts with monthly subscriptions. They were also fully informed regarding the procedures of Memrise MAVL training with a particular agreement of giving their personal and private details of Memrise MAVL experience for research purposes only.

**Data analysis**

In conducting a comprehensive analysis of the collected quantitative data, both descriptive and non-parametric inferential statistical approaches using IBM SPSS version 26 were employed. In adherence to descriptive methodologies (Nassaji, 2015), the descriptive statistics encompassed mean values, standard deviations, and standard errors of means to encapsulate central tendencies and dispersions. These calculations pertained to finished target words (FTW), total time spent (TTS) within the Memrise MAVL platform, total screen distractions (TSD), and total time wasted (TTW) attributed to screen-related diversions. These data were
retrieved through Google Drive folders containing participants' screen activities, user page screenshots, and Memrise app screen recordings. A comparative examination of participants' performance in the control and experimental groups was executed through the Mann–Whitney U test, selected for its suitability with ordinal data and robustness against normality assumptions, revealing significant variations in data distribution. Additionally, a distinct linear regression analysis scrutinized the predictive relationship between TSD and FTW, unveiling the discernible impact of screen distractions on participants' target word completion.

Findings

The comparison of group performance in FTW

This subsequent section provides a detailed analysis of the data, examining the time investments and screen distractions experienced by the participants. The findings in Table 2 compare a control group to an experimental group, revealing significant differences in time allocation and responses to present screen distractions.

Table 2

Participants' Memrise MAVL descriptive statistics

<table>
<thead>
<tr>
<th>Participants' performance in Memrise MAVL</th>
<th>Control</th>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finished target words (FTW) (Total target=948 words)</td>
<td>Control</td>
<td>896.00</td>
<td>57.61</td>
<td>156</td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>933.68</td>
<td>19.11</td>
<td>55</td>
</tr>
<tr>
<td>Target completion (%)</td>
<td>Control</td>
<td>94.51</td>
<td>6.08</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>98.41</td>
<td>2.02</td>
<td>6</td>
</tr>
<tr>
<td>Total time spent (in minutes)</td>
<td>Control</td>
<td>809.88</td>
<td>95.83</td>
<td>345</td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>552.27</td>
<td>89.79</td>
<td>284</td>
</tr>
<tr>
<td>Average time spent (in Minutes) per unit lesson</td>
<td>Control</td>
<td>32.40</td>
<td>3.83</td>
<td>13.8</td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>22.09</td>
<td>3.59</td>
<td>11</td>
</tr>
<tr>
<td>Screen distractions throughout Memrise MAVL</td>
<td>Control</td>
<td>67.49</td>
<td>55.36</td>
<td>202</td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>12.45</td>
<td>8.38</td>
<td>30</td>
</tr>
<tr>
<td>Notifications &amp; pop-up messages (NP)</td>
<td>Control</td>
<td>17.13</td>
<td>20.14</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>2.59</td>
<td>2.97</td>
<td>11</td>
</tr>
<tr>
<td>Incoming calls (IC)</td>
<td>Control</td>
<td>369.71</td>
<td>290.59</td>
<td>1146</td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>73.50</td>
<td>50.58</td>
<td>194</td>
</tr>
<tr>
<td>Social media &amp; entertainment (SE)</td>
<td>Control</td>
<td>130.29</td>
<td>100.99</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>25.45</td>
<td>17.62</td>
<td>68</td>
</tr>
</tbody>
</table>

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Table 2 shows that the average time spent by the control group in completing 94.51% of the learning targets in approximately 10 and a half days was 809.88 minutes (equivalent to 13 hours and 30 minutes), with an average of 80.98 minutes (or an hour and 34 minutes) per day, which translates to an average of 32 minutes and 40 seconds per unit. On the other hand, the experimental group spent an average of 552.27 minutes (equivalent to 9 hours and 20 minutes) in 7 days, which is approximately 1 hour and 31 minutes per day, to complete 98.41% of the learning targets from 25-unit lessons, comprising 933 out of 948 target words. Notably, the control group spent less time and completed a slightly lower percentage of target words, completing only three-unit lessons in a day. To conclude, the experimental group spent less time than the control group but completed a higher percentage of the learning targets. These findings indicate that the experimental approach may be more efficient in achieving the desired learning outcomes within a shorter timeframe.

Table 2 also provides further insights into the screen distractions the control and experimental groups attended to. The control group spent an average of 88 minutes attending to 585 screen distractions, while the experimental group only spent 8 minutes attending to 114 distractions. Specifically, the control group wasted 233 minutes attending to 1620 (11.54%) notifications and pop-up messages, while the experimental group spent only 20 minutes attending to 274 (10.92%). Similarly, the control group spent 59 minutes attending to 411 (2.92%) incoming calls, whereas the experimental group spent only 5 minutes attending to 57 (2.27%) calls. In addition, the control group consumed a significant amount of time on social media and entertainment distractions, spending 1244 minutes on 8873 (63.23%) of these distractions. In contrast, the experimental group took only 115 minutes for 1617 (64.47%) of the same distractions. The control group also spent 460 minutes on 3127 (22.28%) web browsing tabs, whereas the experimental group opened only 560 (22.32%) tabs in 40 minutes. Overall, the control group wasted a total of 2040 minutes (equivalent to 10.5% of their time) attending to 14031 screen distractions, while the experimental group spent only 180 minutes (equivalent to 1.5% of their time) attending to 2508 screen distractions. These findings highlight the differences in the screen distractions the control and experimental groups attended to, with the experimental group spending significantly less time attending to distractions. The findings suggest
that reducing screen distractions could lead to more efficient time use, increased productivity, and improved outcomes.

**The impact of TSD on FTW**

A nonparametric Mann-Whitney U test was conducted to observe differences in learning target completion between the control and experimental groups. As shown in Table 3, the results revealed an asymptotic significance value of 0.056, indicating no significant difference between the two groups. However, significant differences were observed in TTS (Asymp. Sig.=0.000), TSD (Asymp. Sig.=0.000), and TTW (Asymp. Sig.=0.000), indicating that the experimental group spent significantly less time on total screen distractions, social media and entertainment distractions, and web browsing tabs, respectively. Moreover, significant differences were also observed in NP (Asymp. Sig.=0.000), IC (Asymp. Sig.=0.000), SE (Asymp. Sig.=0.000), and WB (Asymp. Sig.=0.000) between the two groups in four types of screen distractions.

Table 3

<table>
<thead>
<tr>
<th></th>
<th>N = 46</th>
<th>TTS</th>
<th>TTW</th>
<th>FTW</th>
<th>TSD</th>
<th>Screen distractions (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NP</td>
</tr>
<tr>
<td>Mann-Whitney U</td>
<td>8.500</td>
<td>0.500</td>
<td>346.500</td>
<td>33.000</td>
<td>31.500</td>
<td>102.000</td>
</tr>
<tr>
<td>Wilcoxon W</td>
<td>261.500</td>
<td>253.500</td>
<td>599.500</td>
<td>286.000</td>
<td>284.500</td>
<td>355.000</td>
</tr>
<tr>
<td>Test statistics</td>
<td>8.500</td>
<td>0.500</td>
<td>346.500</td>
<td>33.000</td>
<td>31.500</td>
<td>102.000</td>
</tr>
<tr>
<td>Standard error</td>
<td>45.472</td>
<td>45.456</td>
<td>43.258</td>
<td>45.475</td>
<td>45.446</td>
<td>45.318</td>
</tr>
<tr>
<td>Standardized test</td>
<td>-5.619</td>
<td>-5.797</td>
<td>1.907</td>
<td>-5.080</td>
<td>-5.116</td>
<td>-3.575</td>
</tr>
<tr>
<td>Asymp. Sig. (2-sided test)</td>
<td>0.000</td>
<td>0.000</td>
<td>0.056</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>

These findings suggest that the experimental group was less distracted by screen-based interruptions than the control group. Figure 2 illustrates the patterns of the distribution in both groups, revealing a resemblance between the two.

**The correlations among variables**

Spearman rank order correlation was used to measure the relationship between participants' performance in Memrise MAVL and other control variables. The results, presented in Table 4, revealed a strong, positive correlation between performance and total screen distractions (rs = -.295, p = .047), as well as between performance and total time spent (rs = -.300, p = .043). Moreover, a significant
correlation was observed between total screen distractions and the number of completed target words ($r_s = \cdot320, p = .030$), indicating that screen distractions had a negative impact on learning outcomes. Furthermore, dealing with screen distractions was found to increase total time wasted ($r_s = \cdot936, p = .000$) and the total time spent completing all target units ($r_s = \cdot859, p = .000$). Interestingly, the results showed that the more time wasted due to screen distractions, the more time needed to finish the learning targets ($r_s = \cdot949, p = .000$), highlighting the importance of minimizing screen distractions for efficient learning. Overall, these findings suggest that screen distractions significantly impact performance in Memrise MAVL, emphasizing the need for effective strategies to reduce screen-based distractions during learning.

**Figure 2**

*Patterns of distribution between two groups*
Table 4
Nonparametric correlations between variables

<table>
<thead>
<tr>
<th></th>
<th>FTW</th>
<th>TSD</th>
<th>TTS</th>
<th>TTW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spearman's rho FTW</td>
<td>Correlation Coefficient</td>
<td>1.000</td>
<td>-.295*</td>
<td>-.300*</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.047</td>
<td>.043</td>
<td>.030</td>
</tr>
<tr>
<td>TSD</td>
<td>Correlation Coefficient</td>
<td>-.295*</td>
<td>1.000</td>
<td>.859**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.047</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>TTS</td>
<td>Correlation Coefficient</td>
<td>-.300*</td>
<td>.859**</td>
<td>1.000</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.043</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>TTW</td>
<td>Correlation Coefficient</td>
<td>-.320*</td>
<td>.936**</td>
<td>.949**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.030</td>
<td>.000</td>
<td>.000</td>
</tr>
</tbody>
</table>

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Results from the linear regression analysis, presented in Table 5, indicate that TSD significantly influenced FTW (F (1, 44) = 9.265, p < .004; β = -.048, p < .004). The model explained 17.4% of the variance in FTW, suggesting that TSD positively impacted participants' FTW. Specifically, TSD showed a positive relationship with FTW, with a negative beta coefficient (β = -.048).

Table 5
Nonparametric correlations between variables

<table>
<thead>
<tr>
<th>Regression weights</th>
<th>β</th>
<th>R²</th>
<th>F</th>
<th>t-value</th>
<th>p-value</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSD → FTW</td>
<td>-.048</td>
<td>.174</td>
<td>9.265</td>
<td>-3.044</td>
<td>.004</td>
<td>2.032</td>
</tr>
</tbody>
</table>

Note: *p < 0.05. TSD: Total screen distraction, FTW: Finished target words

Discussion

The integration of MALL within a flipped classroom setting has shown promising results in enhancing vocabulary acquisition and improving learning outcomes in EFL settings. Previous studies in the field of CALL demonstrated the positive impacts of MALL on language learning, particularly in lexical acquisition, as well as fostering positive attitudes toward technology integration among teachers and students (Kashef et al., 2014; Pirasteh, 2014; Rafiee & Purfallah, 2014). MALL offers interactive and multimodal learning experiences, allowing learners to engage with language content through various modes of representation (Yüzlü & Dikilitaş, 2022). The present study fills the gap by investigating the effectiveness of MALL in a flipped classroom setting for vocabulary learning. The findings from the present study support previous studies and indicate that the experimental group, which received mobile-assisted
instruction, spent less time achieving a higher percentage of learning targets compared to the control group. This suggests that integrating MAVL in a flipped classroom setting can lead to more efficient screen vocabulary learning within a shorter timeframe. In addition to the benefits of MAVL, the present study also highlights the impact of reducing screen distractions on learning efficiency. The control group spent significantly more time attending to various screen distractions than the experimental group, including notifications, pop-up messages, incoming calls, social media, entertainment distractions, and web browsing tabs (Table 1). These findings emphasize the importance of minimizing screen distractions to optimize learning time, increase productivity, and improve learning outcomes. Previous studies have shown that multimodal learning approaches and metacognitive strategies are effective in enhancing vocabulary acquisition and fostering motivation among students (Abdelrady et al., 2022; Al-Zahrani & Chaudhary, 2022; Montero-SaizAja, 2022). This study addresses the potential of MAVL in optimizing vocabulary instruction and promoting language proficiency in EFL settings, while also emphasizing the importance of minimizing screen distractions for efficient learning (Rahmani et al., 2022; Sana’ati et al., 2019).

The present study has established that engaging in unsupervised screen-based learning through smartphones can have a detrimental effect on individual performance. Therefore, such learning activities should be conducted with appropriate supervision. The study findings indicate that individual performance on vocabulary gains was still achievable without supervision; however, it was found to take longer to complete. This delayed progress may be attributed to the presence of screen distractions, which hindered the learning process. Although the current study did not observe a decline in learning performance due to screen distractions, it is worth noting that previous research has reported such negative effects. Thus, it is crucial to further examine why the present study's findings differ from those of previous works. Moreover, the findings supported Mulyani et al.’s (2019) recommendation for experiential mobile learning but highlighted the need for peer or mentor assistance to monitor screen distractions. Multitasking and non-learning screen activities were found to compete for students’ attention, negatively affecting their concentration span and increasing the time spent on screen learning in the same way as Winter et al.’s (2010) mobile-learning experimental case. Attia et al. (2017) found that screen distractions negatively affected students’ concentration span and increased the time spent on screen learning. Zhonggen et al. (2019) suggested that the experimental environment was not preventing students from such distractions. Unsupervised screen learning was associated with more distractions, such as
listening to music, watching movies, and making video calls. The findings in this study showed that, while individual performance on vocabulary gains was attainable without supervision, the treatment investigated in this study did not lead to significant improvements. However, even though distractions had an insignificant effect on individual performance, it did impose an additional cognitive load.

Findings from the present MAVL in a flipped EFL classroom setting reveal important insights. The experimental group showed fewer screen distractions, indicating that MAVL helps reduce distractions and improve learning focus. However, screen distractions had a detrimental impact on vocabulary acquisition, with participants who encountered more distractions performing worse. Additionally, dealing with screen distractions led to increased time wasted on non-learning activities, highlighting the need to minimize distractions for optimal learning efficiency. Notably, social media and entertainment distractions positively impacted vocabulary acquisition, suggesting that certain types of screen activities can be beneficial. These findings align with previous research on vocabulary acquisition, mobile learning, and the compatibility of mobile instructions with diverse learning formats. Mobile-assisted instruction serves as a supplementary tool in the flipped classroom, compensating for limited classroom duration and lack of teacher assistance in English as a foreign language (EFL) setting (Abdelrady et al., 2022; Dudeney & Hockly, 2015; Montero-SaizAja, 2022; Sana'ati et al., 2019; Warfvinge et al., 2022). Strategies to mitigate screen distractions and optimize vocabulary instruction in mobile-assisted learning environments should be developed (Anderson & Subrahmanyam, 2017; Davie & Hilber, 2015; Fathi et al., 2018; Kim et al., 2020; Portanova, 2021; Taebenu & Katemba, 2021; Zhang, 2019).

The findings also demonstrate that mobile-assisted instruction reduces screen distractions, improves learning focus, and enhances vocabulary acquisition. However, distractions negatively influence learning outcomes, emphasizing the importance of minimizing interruptions for efficient learning. Social media and entertainment distractions can positively impact vocabulary acquisition, suggesting potential benefits from certain screen activities. These results align with previous research on vocabulary acquisition, mobile learning, and instructional design in EFL settings. Mobile-assisted instruction complements the flipped classroom approach, addressing limitations in classroom time and teacher support (Stockwell, 2007; Xodabande & Hashemi, 2022). To optimize vocabulary instruction and promote language proficiency, strategies to mitigate screen distractions and enhance focus during mobile-assisted learning should be developed (Gambo & Shakir, 2019; Winter et al., 2010).
Therefore, the present study emphasizes the importance of supervision and peer companionship in MAVL settings, particularly in a flipped classroom option. The inclusion of supervision and peer companionship ensures the attainment of all learning outcomes while also minimizing the likelihood of students engaging in non-study-related activities. Regarding the issue of peer support, the presence and role of peer companionship were not explicitly addressed or investigated in the data analyzed for this study. However, it is worth noting that the study focused on the significance of supervision and peer companionship as general factors in MAVL settings rather than examining specific implementation details or training procedures related to peer companionship. On the other hand, supervision plays a crucial role in ensuring participants’ progress by providing them with clear guidance on the tasks to be accomplished, the level of difficulty involved, and the appropriate timeline for reporting their progress. This helps students plan, manage their schedules, and monitor their learning progress. Self-regulation is also important as it enables students to take active ownership of the learning process. However, the study findings suggest that MAVL users are less responsible for self-regulated learning and are more likely to spend more time on their screens. The present study extends the findings of Basavaraju and Varde (2017), which stated that in supervised learning, an instructor provides labeled training samples to guide students. This process is more regulated than unsupervised learning, where neither instructors nor peers are involved. The focus sessions in the present MAVL design, where peer companionship took place, helped participants who lacked focus by diverting their attention away from screen distractions towards the learning materials. The strategy to minimize screen distractions in this design was focus sessions, but it might equally be a good pedagogical design for MAVL.

The present study assumed that Memrise MAVL facilitated participants’ vocabulary gains. Regarding target completion, the study found no significant differences between focus sessions and self-regulated learning. Memrise’s material deliveries and topic selections met the participants’ expectations. However, it is important to note that the analysis did not thoroughly examine the extent to which the deliveries and topic selections satisfied the participants’ expectations. To strengthen this argument, further investigation is needed to consider other factors that could influence participants’ performance in MAVL, such as language proficiency, self-regulation, and the stakes of the task. By incorporating a more comprehensive analysis of these factors, we can better understand the overall impact of Memrise MAVL’s approach on participants’ vocabulary learning outcomes. However, the present study’s findings correlated with Xodabande and Hashemi’s (2022) conclusion that MAVL is suitable for
either supplementary instruction to support flipped learning or self-regulated and independent learning. Memrise MAVL, as Hoang et al. (2022) predicted, allows participants to continue screen learning anytime and anywhere. However, the instructor must anticipate the significant impact of present screen distractions. They need to be addressed and documented. Students should help themselves to address potential screen distractions and report to their instructor to be advised of the particular responses they should take. Concerning the participants' performance in target completion, MAVL via Memrise supported Zhang and Pérez-Paredes's (2021) findings that English learning apps open possibilities to continuous and adaptive learning. As smartphone ownership becomes inevitable due to its affordability, Memrise MAVL stands out as a contender to social media in on-screen activity. With the current development in gamification features in learning apps, the smartphone may transform itself into a learning tool rather than simply an entertainment portal to enrich foreign language learning experiences.

Conclusion

This exploratory case study delved into the potential of the Memrise mobile application for enhancing EFL vocabulary learning. The study assesses the impact of a preliminary two-week Memrise MAVL experience on participants' achievement outcomes, time allocation, individual engagement with screen-based activities, and the influence of screen-related distractions. Central research inquiries revolve around the distribution of completed target words among participants, the predictive role of screen distractions in relation to achieved target words, and the identification of robust correlations between observed variables. The present study found no significant differences in the completion of target units between the control and experimental groups. However, using the Mann-Whitney U Test, there was a significant difference in the total amount of present screen distractions among individuals in both groups and, hence, between groups. Spearman’s rank order correlation test revealed significant correlations between participants’ total completed target words and other dependent variables, including total screen distractions, total time spent learning on the screen, and total time wasted attending to screen distractions. Furthermore, a separate linear regression test indicated a strong correlation between total screen distractions and the completed target words. Therefore, screen distractions affect screen focus and add total time to the process, which in turn affects vocabulary gains, although it did not decrease individual performance in target learning completion.
The present study aims to make a significant contribution to the field of flipped learning by investigating the potential of mobile-assisted language learning as a supplementary instructional approach. By exploring the effectiveness and implications of integrating mobile devices into the flipped learning model, this study provides valuable insights into the benefits and challenges associated with this pedagogical approach. The study identifies a promising development of mobile-based apps to engage in self-directed and independent vocabulary learning. However, the MAVL design of the study indicates some limitations, such as being a mere preliminary trial of MAVL experimental learning and documenting only Memrise in Android-based devices in short-term screen learning at the beginner’s level. To address these limitations, the study suggests exploring more varied mobile-based vocabulary learning apps, different MAVL settings, more variables, and diverse demographics of the participants.

Through the integration of mobile devices into the flipped classroom setting, the study recognizes the promise of mobile-based apps for autonomous vocabulary learning while acknowledging the study’s limitations, focusing only on Memrise and short-term screen learning at the beginner level. Building on this foundation, future studies may expand the exploration. It is recommended that a diverse array of MAVL apps be considered, encompassing varying instructional contexts and incorporating supplementary variables, allowing for an extensive analysis. Additionally, a more heterogeneous participant demographic would enrich understanding. In sum, the integration of Memrise MAVL emerges as a dynamic adjunct, examined for its efficacy and potential. Acknowledging its promise in autonomous vocabulary acquisition, this study, while bounded by certain confines, sets the stage for extensive future exploration. This trajectory aligns with the transformation of instructional paradigms and leverages the mobile app’s potential to empower students in their self-regulated EFL learning.

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References


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Screen distractions and vocabulary gains


