



Screen distractions during Memrise MALL experience: Course-of-action study on students' performance and perception

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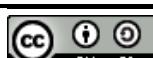
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ABSTRACT

This study employed *Course-of-Action* methodology in a mixed-methods approach to examine the impact of screen distractions on Memrise MALL experience in an EFL flipped classroom setting. An Exploratory Sequential Design was utilized to analyze the two-week Memrise MALL experience and its impact on the screen behaviors of 46 Indonesian first-year university students. Descriptive and nonparametric inferential statistics were employed to analyze the quantitative data, while confrontative interview data were transcribed and encoded using *in vivo* coding to mark key phrases in the participants' comments. Results of the study indicated that social media and entertainment apps were the most common type of distraction and that these distractions had a detrimental effect on task performance. The participants expressed their appreciation for the customizable learning experience and found the app layouts and gamification features were encouraging; however, they found it challenging to switch between multiple tabs or windows on a mobile screen. There was a small correlation between total screen distractions and total vocabulary learned, as well as a strong correlation between total screen distractions and the total time spent on the task.



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The advent of mobile apps such as Memrise has revolutionized language acquisition and foreign language teaching (Dore et al., 2019). Boasting a combination of gamification, memorization, and other engaging screen activities, mobile-assisted language learning (MALL) is a valuable instructional tool for language instructors, particularly in a hybrid or flipped

classroom setting (Pea & Sharples, 2022). However, it is also vulnerable to on-screen distractions such as games and social media (Hollis & Was, 2016), making it difficult for language learners to stay focused on their learning objectives. Several behaviors have been documented, either in a controlled classroom environment or laboratory setting, on how students deal with the screen distractions caused by incoming calls or notifications (Hollis & Was, 2016; Kay et al., 2017; McCoy, 2013; Winter et al., 2010). Specifically, taking notes with note-taking apps, reading message boards, performing a distracting cognitive task while screen learning, and scrolling social media by means of taking breaks from screen learning all produce more distractive effects than learning without mobile apps. Another study showed that students learned to manage distractions by integrating competing screen activities and attending to task-related requirements (Lee et al., 2018). Studies documented a range of behaviors students adopt in response to the interruption of calls or notifications on digital devices (May & Elder, 2018). Research has consistently indicated a link between screen distractions and decreased learning performance, with multitasking often being identified as a distraction that may impede learning. However, the cases were often supported by self-reports but not always by actual performance data.

Strategies for managing time spent on screens, such as blocking notifications and developing self-managed task-switching, have been developed. Recent research in the context of self-regulated learning has shown that the effectiveness of these strategies depends heavily on the individual and environmental contexts in which they are implemented (Li & Chan, 2021). Implementing these strategies can lead to varied experiences of psychological flow, like immersion or engagement, which ultimately shape students' interpretations of on-screen distractions. Screen multitasking and window switching are altering student behavior concerning screen learning (Levine et al., 2012). In many cases, students often utilize mobile devices for activities other than learning. MALL has considered this and proposed some principles for effective implementation and strategies for dealing with the issues in various MALL settings. Studies have indicated that the presence of multimedia content has an adverse effect on focus and cognitive performance, particularly when visual processing is necessary (Ruck, 2022).

Despite efforts to minimize screen distractions, more than 20% of students reported that they found MALL quite affordable due to its integration of conventional and digital learning and did not perceive smartphones as distracting while studying. However, if their learning tracks were lost, they tended to spend much time reading messages and accessing social media (Hardyansyah, 2021). Some studies suggested appropriate strategies for students to deal with screen distractions and improve their MALL experience (Azli et al., 2018; Mulyawan & Resmayani, 2022). First,

learners need to identify the sources of distraction that impede their focus and create a plan for avoiding them. Second, they should set ground rules for how frequently they allow themselves to check notifications and missed calls. Third, they should create a conducive environment for screen-based learning by finding a quiet place to access their apps or using headphones to listen to multimedia materials.

Current studies on the impact of screen distractions on English as a Foreign Language (EFL) learning via mobile phone devices (Corkin et al., 2021; Eirich et al., 2022; Lee et al., 2018) suggest that distractions are unavoidable and hard to ignore, but screen learning may continue to occur. In different settings, studies (Kaminske et al., 2022; Pielot et al., 2014; Sato et al., 2015) have demonstrated that notifications and calls can be a significant distraction for students during lectures and other classroom activities. The study highlighted that when students employed smartphones in the classrooms, their susceptibility to distractions from incoming calls and messages, social media, and other online activities was heightened compared to when they used paper notes. In the flipped classroom design, the research (Dudeney & Hockly, 2015; Hollis & Was, 2016) has demonstrated that students who use smartphones in lecture-based classes are more likely to look up additional information online and less likely to be dissuaded by off-task activities. Further research is needed in this area, yet current studies indicate that mobile screens can serve as a distraction or a learning tool, depending on their configuration.

The research trends in the field focus on the psychological impacts of screen distractions on students' learning in classroom contexts (Flanigan & Titsworth, 2020; Green, 2019; Li & Chan, 2021). Studies have sought to elucidate how using mobile devices for classroom learning can lead to heightened anxiety and stress. However, the academic discourse has been limited in terms of strategies to effectively implement mobile learning experiences that reduce the potential for screen distractions. The current discussion in the field of EFL learning via MALL lacks empirical studies that provide a comprehensive understanding of the impact of mobile phone applications on language teaching and learning. While there is a growing body of literature that examines the potential of MALL, there is a need for more rigorous studies that investigate the efficacy and effectiveness of smartphone-based MALL in comparison to the conventional MALL approaches. Additionally, there is a need for further research that examines the impact of MALL on different types of language learners in different contexts. Further research is necessary, specifically in a flipped classroom context, to ascertain the impact of screen distractions on mobile learning in terms of engagement, retention, and completion rates. The present study examined the impact of 25 unit learning encompassing a total of 948 target

vocabularies via the Memrise application on Android smartphone devices regarding first-year non-English major University students' completion of targets, total time spent, individual engagement with on-screen activities, and their perception of Memrise MALL in the presence of screen distractions. It sought to investigate how participants dealt with screen distractions and how they perceived them in relation to the completion of MALL objectives. This study hypothesized that screen distractions would have a substantial impact on the completion of desired learning objectives, as well as augment the overall time spent learning through the Memrise mobile app. Additionally, the individual perception was anticipated to elucidate how screen distractions affected the Memrise MALL experience. Specifically, the design of the present study concerned the following research questions: (a) how did first-year non-English majored University students complete MALL objectives using the Memrise app on Android smartphone devices?, (b) what impact did screen distractions have on the overall performance of the Memrise MALL?, and (c) what were the individual perceptions regarding the impact of screen distractions on the overall Memrise MALL experience?

METHOD

Research Design and Memrise MALL Context

This study employed the *Course-of-Action* methodology in a mixed-methods approach to investigate the Memrise MALL experience within an EFL flipped classroom setting. Participants were instructed to take screenshots of their account details from the profile page and to record their screen activities during each unit lesson. Screenshots and recordings were then uploaded to distributed Google Drive folders to serve as raw data to understand participants' behaviors as they navigated different screen activities and encountered distractions. The behaviors documented in both screenshots and recordings included the duration of each unit lesson, the number of hours spent using apps, the number of sessions and repeats for each unit lesson, and the frequency of distractions. Additionally, the participants' experiences and perceptions of Memrise MALL, including the disruptive interference of screen distractions, were explored in depth through confrontative interview sessions consisting of small groups of six to seven members. The interview sessions sought to gain insight into how participants reacted to and perceived screen distractions throughout the screen activities.

Participants

A sample of 46 Indonesian first-year University students, 16 males and 30 females, were selected for this study as they met the inclusion criteria: non-English majors, with no prior experience with an Android-based MALL. All participants were enrolled in the General English subject at the time of the

study. Informed consent was obtained from all participants, who agreed to enroll in premium accounts with monthly subscriptions, and to share their personal and private details of the Memrise MALL experience for research purposes only.

Instruments and Procedures

Documented Screen Behaviors

After downloading the Memrise app (version 2021.9.8.0) onto their smartphones, the participants created new accounts with monthly subscriptions. Both groups were assigned 25 units to complete, including Levels A1 and A2 of the app, encompassing 948 target vocabularies. In order to maximize their vocabulary gains, they were required to meet the objectives of the unit lessons, including lexical activities, spelling and pronunciation exercises, and listening comprehension. To better understand of the participants' screen behaviors, they were asked to use the inbuilt screen-recording feature on their smartphones to record their activities with a timestamp. Once all unit lessons had been completed, the participants were instructed to take a screenshot of their account details from the user page. These screenshots and their screen recordings were then uploaded to shared Google Drive folders.

Confrontative Interview

Confrontative interview is designed to provoke a reaction and force truthful information out of the interviewee. This interview method is specific to the *Course-of-Action* research method (Dieumegard et al., 2021). They involve assertive questioning techniques, confirmations, and hard-proof evidence showing. The interviewer presented evidence to the interviewee or challenged their statements with facts, which were the participants' screen recordings and screenshots of their account details. The interview method distinguished itself from other interviews, such as informational or behavioral, which are more informal and less confrontational, typically involving open-ended questions. The purpose of the confrontative interview was to gain insight into the participants' experience with Memrise MALL, as well as their impressions when navigating through the app. Specifically, it aimed to confirm participants' behaviors in concerning their documented responses to screen distractions.

Before initiating the Memrise MAVL, procedures were outlined to ensure compliance and anticipate potential technical issues that may arise during screen activities. This study aimed to evaluate the impact of screen distractions on Memrise MAVL screen activities. Participants were provided with informed consent sheets and daily MAVL goals. They were also briefed on the number of unit lessons required to be completed. To maintain

communication between the researcher and participants, a Whatsapp group was created whereby participants could report their daily screen activities and receive daily reminders from the researcher regarding Memrise MAVL screen learning and deadlines. A week after the MALL target had been met, confrontative interview sessions were organised and conducted separately. The interview sessions involved open-ended questions to confirm why the participants responded in particular behavior while dealing with screen distractions judging from their screen recordings. It also challenged any inconsistencies or contradictory statements made by the interviewee while showing the screen recordings and historical progress from the account profile page they uploaded themselves.

Data Analysis Procedures

An exploratory sequential analysis was utilized to elaborate on the two-week Memrise MALL experience and its effects on participants' screen behaviors. Descriptive and non-parametric inferential statistics were employed to analyze quantitative data utilising IBM SPSS version 26. Descriptive statistics were employed to calculate quantitative findings, including mean values, standard deviations, and standard error of means for the total time spent in Memrise MALL, the total screen distractions, and the total time wasted from screen distractions. Additionally, a linear regression was applied to determine the impact of total screen distractions on total time wasted and time spent in Memrise MALL. In a separate section, qualitative data from confrontative interviews were transcribed and further analyzed using in vivo coding to identify key phrases in the participants' comments, which were used to contextualize and elaborate the quantitative findings. The keywords or key phrases in the excerpts were marked based on the following categories: Memrise experimental learning, material delivery, layout design, screen navigation, material organization, material presentation, and visual appeal for Memrise MALL experience. The following categories were marked in relation to screen distractions: pleasant and unpleasant experiences, intrusive occurrence, temporarily disabled service, inner drive to switch between screen activities, external motivation, time allocations, notification checking and clicking, and multi-tasking tendencies.

FINDINGS

Quantitative Results: Descriptive and Nonparametric

The data displayed in Table 1 and Chart 1 were used to address the first research question on the completion of MALL objectives by first-year non-English majored University students through the use of the Memrise app on Android smartphones. Table 1 reveals that 48% ($N=22$) of the participants completed the target vocabularies, while 41% ($N=19$) achieved 90% or more

,and 11% ($N=5$) completed approximately 80%. Regarding the Memrise MALL experience duration, 35% ($N=16$) of the participants took less than 600 minutes or around 7 days. However, 11% ($N=5$) took 10 days, 13% ($N=6$) took 800 minutes, 20% ($N=9$) took 700 minutes, and 22% ($N=10$) spent more than 600 minutes in 8 days. Overall, 31587 minutes were accumulated based on the documented screen recordings.

Table 1. Descriptive Statistics

	N	Min	Max	Mean Statistic	SD	SD	Variance
Vocabulary Gains	46	792	948	914.02	6.961	47.214	2229.177
Total Time Spent	46	408	995	686.67	23.490	159.318	25382.225
Screen Distractions	46	16	1935	361.26	60.349	409.310	167534.597
Time Wasted	46	1	226	48.22	7.878	53.433	2855.063

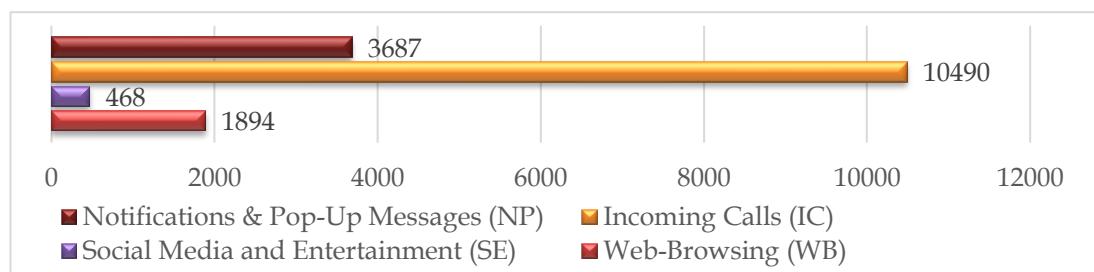


Chart 1. Screen distractions documented by participants

Chart 1 illustrates that a total of 16539 screen distractions were attended to by participants. Social media and entertainment apps were the most distracting, accounting for 63.43% of all Memrise MALL screen activities. Web browsing was the second most common source of distraction (22.29%), followed by incoming notifications and pop-up messages (11.45%). Incoming calls accounted for a small portion of distractions (2.83%). The participants collectively spent 2220 minutes (7.03%) attending to the present distractions during their Memrise MALL experience. Table 2 presents the Spearman's Nonparametric correlation analysis between total screen distractions and other variables.

Table 2. Nonparametric Spearman's Correlation Results

		Vocabulary Gains	Total Time Spent	Screen Distractions	Time Wasted
Vocabulary Gains	Correlation Coefficient	1.000	-.300*	-.295*	-.320*
	Sig. (2-tailed)	.	.043	.047	.030
	N	46	46	46	46
Time Spent	Correlation Coefficient	-.300*	1.000	.859**	.949**
	Sig. (2-tailed)	.043	.	.000	.000
	N	46	46	46	46
Screen Distractions	Correlation Coefficient	-.295*	.859**	1.000	.936**
	Sig. (2-tailed)	.047	.000	.	.000

		Vocabulary Gains	Total Time Spent	Screen Distractions	Time Wasted
Time Wasted	N	46	46	46	46
	Correlation Coefficient	-.320*	.949**	.936**	1.000
	Sig. (2-tailed)	.030	.000	.000	.
	N	46	46	46	46

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

The quantitative results presented in Table 2 were intended to address the second research question: what impact did screen distractions have on the overall performance of the Memrise MALL? Table 2 reveals that the Spearman rank correlation coefficient between total screen distractions and total vocabulary learned is estimated at -0.295, with a 95% confidence interval (-0.5389, -0.0048). This indicates that the Spearman rank correlation coefficient is statistically significantly different from 0, with a p-value of 0.047 and a type I error rate of 5%. However, the estimated coefficient is small in size. Regarding the association between total screen distractions and total time spent throughout the Memrise MALL experience, the Spearman rank correlation coefficient is estimated to be 0.859, with a 95% confidence interval (0.7583, 0.9202). This is also found to be statistically significantly different from 0, with a p-value of <0.001 and a type I error rate of 5%. Screen distractions significantly correlated with the time spent attending distractions, resulting in an increase in the total time spent in the Memrise MALL experience. The association between the two variables was estimated to be 0.936, with an asymptotic 95% confidence interval (0.8862, 0.9642). The statistical test of a zero Spearman rank correlation coefficient yielded a p-value of <0.001, indicating that the Spearman rank correlation coefficient is statistically significantly different from 0 at a Type I error rate of 5%.

Qualitative Results: Participants' Individual Perceptions

The following results from confrontative interviews were used to address the third research question what were the individual perceptions regarding the impact of screen distractions on the overall Memrise MALL experience? Most participants reported perceiving the Memrise MALL experience as effective and convenient. Perceptions were associated with ease and convenience in completing all target vocabularies in the unit learning activities on the screen. In particular, the app's layout and the gamification features surrounding the lesson material presented on the screen, as well as the vocabulary tasks related to the topic, were found to create an environment that strongly encouraged active engagement. Participants also expressed appreciation for the ability to customize their learning experience to better suit their needs and goals. Generally, participants reported positive perceptions of self-paced time schedules when they could customize them. Positive ratings were recorded

for single-word or short-phrase length, with participants reporting increased satisfaction with their Memrise MALL experience. This ultimately resulted in improved learning outcomes. The comments of the following three participants on the issue were translated into English:

"Based on my personal experience, I think that Memrise is a great app for learning English. It is very user-friendly and has a lot of great features. It is also very affordable. The delivery of the material was great, I mean the way texts and videos were presented on a single screen. Basically, it was like the games I had on my phone; I play through it and see how I progressed so far. Thank you, though, for putting me on the list in this experimental learning." (P4)

"Well, I feel pretty good. I mean the app because, other than the schedule we should focus on, the app really allowed me to set my own goals. I can switch between unit learning and learn whatever I want to learn when I had the opportunity to open the app. The sample sentences and expressions were easy to memorize because they were quite short and applicable in everyday conversations. Oh, if I may add, I had an unpleasant experience when I tried to connect my phone to my external Bluetooth speaker. The sync was delayed." (P23)

"I love the experience. The layout design in the app was just perfect on my big screen and also, it was easy to navigate. I like how the app was organized and how the lessons are presented. The app is also visually appealing and easy on the eyes." (P35)

Participants perceived social media distractions during the Memrise MALL experience to negatively impact their ability to focus and learn. This led to compensatory cognition, where participants invested more attention in on-screen entertainment than screen learning. As a result, participants exhibited poor motivation and attentiveness, negatively affecting their capacity to stay on the app. Consequently, this had a detrimental effect on their performance and resulted in a negative attitude toward the task. This attitude resulted in reduced cognitive investment and enthusiasm for reaching daily objectives. Participants perceived that such digital activities increased the time necessary to accomplish tasks yet decreased the quality of material acquired. Additionally, they observed that social media notifications were especially distracting, with participants reporting feeling obligated to inspect their mobile device or social media profile each time they received a notification.

Moreover, they found it difficult to return to studying after being diverted by social media and felt that social media utilization impeded their capacity to concentrate on their learning targets. The following are the comments reproduced in English from two participants:

"Well...what can I say (laughing). Social media can be very addictive, and it was difficult for me to focus on Memrise learning when there were constant notifications and updates coming in. I tried my best to limit social media use by promising not to switch between windows until a topic has been completed and I had already put new vocabularies on my list." (P2)

"Actually, I found it less intrusive and can be easily ignored if I wanted to. You know, many social media platforms now have features that allow users to temporarily disable notifications or limit the amount of time they spend on the screen, which can help minimize distractions. The main problem was me. I couldn't resist my inner drive to check on Instagram posts or Whatsapp messages. What if my friends tagged me or sent me some messages that I should respond to? What would they say about me when I replied late?" (P37)

There was a range of perceptions among participants regarding notifications and pop-up messages, with some finding them informative and helpful while others deemed them intrusive and annoying. It appears that participants preferred notifications and pop-up messages which were pertinent to the task at hand and did not disrupt their screen activities. Furthermore, participants likely valued notifications and pop-up messages which were succinct and straightforward, allowing them to quickly and easily respond without having to exit the Memrise app window. Participants noted that an excessive amount of notifications and pop-up messages could interfere with the efficacy of the on-screen learning experience. They concurred that notifications and pop-ups should be used judiciously and only attended to when necessary. The following two translated excerpts are representative of the responses of the participants on this issue:

"I don't know what notification you are referring to because Memrise also has notifications. I really appreciated it, since it allowed me to keep on track with my progress. Other notifications, such as from messaging apps or pop-ups, were usually helpful in staying connected to my family when I was learning to use the screen. No, I do not think it slowed my

progress, I just needed to respond with short replies and went on to continue my screen activity." (P9)

"In my case, I disabled them. They were so annoying and distracting. Screen learning in Memrise took only a few minutes for a unit. I applied a basic rule for window-switching; 10-5-10 and full break. I mean 10 minutes for screen learning, 5 minutes for checking notifications or social media interlude, 10 minutes for another screen activity and after that a complete break from my phone. I usually continue to learn on my screen after 15 to 20 minutes of a complete break. (P26)

The participants found it difficult to multitask between web-browsing and on-screen learning content. This was due to the complexity of window-switching and additional information seeking, which increased the cognitive load and made it harder to view webpages clearly on a mobile screen. Although some participants felt the need to be constantly connected to the Internet to open browser tabs, most could use the app offline by downloading the content and accessing it without an internet connection. It was concluded that web browsing significantly distracted participants' focus on Memrise MALL. Participants indicated that phone calls could be a source of annoyance during on-screen learning, as they hamper the enjoyment of material acquisition and can be a distraction. Furthermore, it was reported that phone calls could interfere with the ability to hear pronunciation from video contents, making pronunciation practices more challenging to follow. Concerning the issues, the participants commented:

"Browsing allowed me to look up information or resources that I need such as definitions or more examples. My friends found it quite distracting when they browsed the web while trying to have a more focused Memrise experience. Honestly, I agree that Memrise is more than enough. No need to browse for more example sentences. I usually use the app without connection to the Internet. When I was on campus, I looked for wifi and downloaded materials on topics I wanted to learn in my dorm." (P10)

"We documented some potential issues when browsing the Web to support on-screen learning, including difficulty reading text on a small screen, having to scroll frequently, and dealing with a lot of pop-ups and ads. I found it quite tricky to find specific information or navigate to the desired content to learn more than just memorizing Memrise

vocabularies. But, it was so difficult to switch between apps and to maintain focus after a lot of browsing." (P18)

"Definitely, calls bother me a lot. They disrupted the flow of my screen learning. This is especially true if I was focused on something specific, like retaking the lessons I had failed before or there were vocabularies I missed out. Even when the call ended, it was difficult to retain information or simply returned to my screen activities. I think everyone agrees with me in this one." (P21)

"I must admit, making phone calls require more attention than simply looking at a screen. I found it difficult to multitask and pay the same attention to the phone calls and the on-screen learning." (P46)

Participants reported that it was challenging to remain focused when multiple windows were open and that phone calls were particularly disruptive. It was difficult for them to effectively multitask and provide both the phone calls and the on-screen learning with adequate attention.

DISCUSSION

The participants perceived the Memrise app to be particularly effective and convenient, with the customization being highly appreciated. The bite-sized, concise, and adjustable content was well-received, as it was easy to follow and readable on mobile devices. The layouts, gamification features and material presentations were also favored for their ability to facilitate screen learning in an efficient manner. The findings of this experimental study demonstrate that the app can serve as a useful tool for improving vocabulary acquisition and retention, as well as assisting with the development of reading and listening skills (Chen et al., 2019; Kohnke et al., 2019; Yu et al., 2022). Furthermore, research has determined that Memrise is an efficacious resource for grammar instruction (Paradhina & Laksman-Huntley, 2021), with the potential to supplement traditional language learning approaches in the classroom. The results of this study were highly satisfactory, with no participants attaining a score lower than 80% on the target vocabulary. Despite screen-based distractions during the Memrise MALL experience, the participants managed to reach the target faster than anticipated.

Research on users' perceptions of their experience with Memrise MALL is substantially limited. This scarcity of research on the subject is probably because the Memrise app is relatively new, having been released in 2010, and the initial reviews of the app did not emerge until 2012 (Golonka et

al., 2014; Gutiérrez-Colón et al., 2020). Due to the dearth of empirical evidence, this study examined the participants' perceptions based on their performance with the Memrise MALL experience, particularly their responses to current screen distractions while using the app. Research has suggested that Memrise MALL may serve as an efficient tool for foreign language learning, with numerous studies indicating beneficial outcomes in terms of users' language proficiency (Aminatun & Oktaviani, 2019; Fathi et al., 2018; Paradhina & Laksman-Huntley, 2021; Taebenu & Katemba, 2021). Evidence suggests that Memrise MALL may be more effective than traditional classroom instruction, particularly when learners can access to mobile devices for communication tasks (Fathi et al., 2018). The present study has identified various factors that may contribute to successful Memrise MALL experiences, such as engaging and interactive content, feedback, and gamification features tailored to the student's level.

Previous findings on the impacts of screen distractions on MALL concluded that screen distractions could lead to increased error rates and lower comprehension levels (Yu et al., 2022). It has been noted that screen distractions can impede the formation of long-term memory for language learning (Shin et al., 2016). This study identified that screen distractions during Memrise MALL sessions had a detrimental effect on learning in some ways. Initially, the shallower processing of information caused by distractions resulted in decreased learning outcomes. Additionally, increased task switching due to distractions contributed to a significant cognitive load. Lastly, distractions caused a lack of focus and concentration, decreasing the quality and quantity of the Memrise MALL experience.

Some studies implied that social media could be beneficial for MALL in several ways (Ansari & Khan, 2020; Giunchiglia et al., 2018). Research has indicated that social media can offer learners various advantages in informal language learning outside of the classroom, such as providing access to resources (Ansari & Khan, 2020), tips, and peer feedback (Giunchiglia et al., 2018). On the contrary, the present study noted that using social media could have some drawbacks for Memrise MALL, such as causing learners to become overwhelmed by the range of resources available, diminishing motivation, or leading to procrastination. Therefore, educators need to be aware of these potential risks and help learners use social media to maximize its positive impact on their Memrise MALL sessions.

Studies have also indicated that notifications and pop-up messages can potentially enhance learners' engagement with MALL tasks and materials (Chang et al., 2017; Pielot et al., 2014). Learners are reminded of upcoming tasks or deadlines and are provided with useful information about the language learning process by these tools, which are beneficial for their learning (Norrie & Murray-Smith, 2015). The present study found that some

participants perceived notifications and pop-up messages as both intrusive and disruptive, particularly when they were not pertinent to the task. These findings suggest that, when utilizing such messages within the Memrise MALL tasks, it is necessary to carefully contemplate the timing, content and frequency of these messages. Other distractions, such as incoming calls, were perceived to disrupt the focus of the MALL and elicit negative emotions, including anxiety and frustration (Huang et al., 2021). The results of the present study indicate that incoming calls have a detrimental effect on task performance and material comprehension. Participants were less likely to continue with their learning session once interrupted by a call, suggesting that these interruptions impair working memory and attention, which are essential for successful language acquisition. Furthermore, participants who received calls took longer to complete their Memrise MALL learning objectives, with no significant difference in vocabulary gains.

Regarding web-browsing, one study found that learners were more likely to be distracted by web browsing during a task if they were using a mobile device with a smaller screen, such as a smartphone, as opposed to a larger screen, such as a tablet (Lee et al., 2018). Other research has found that web browsing can negatively impact task performance, specifically in terms of working memory and task-switching ability (Chen & Yan, 2016). discovered that web browsing on mobile devices can have detrimental effects on Memrise MALL screen learning. Findings revealed that participants who window-switched to access the web during the screen learning session were less likely to recall vocabulary words and grammar rules and more prone to making errors when inputting answers on the screen. Concerning this, Lee (2012) demonstrated that web browsing can lead to declining task completion and comprehension rates. Mirzaee and Gharibeh (2016) reported a similar result, indicating that web browsing can decrease motivation to learn a language.

Screen distractions have been shown to have detrimental effects, including a decrease in focus and attention, reduced learning outcomes, an increase in wasted time and energy, and feelings of frustration and inadequacy. Additionally, the comparatively small size of mobile devices may impede the process of reading text or instructions, requiring students to expend extra effort to comprehend the material and to ensure the successful acquisition of language skills. It is recommended that MALL be strictly regulated during screen learning activities to ensure students remain focused and engaged with the material. This is due to students being occupied with notifications, scrolling through social media, playing games, watching videos, or using other apps, rather than concentrating on their language studies. Notifications, alerts, or messages on students' devices can act as a distraction that detracts from the time that could be spent on language learning.

Consequently, these kinds of screen distractions can pose a significant challenge in the context of MALL, particularly in a flipped classroom setting.

CONCLUSION

This study aimed at understanding the impacts of screen distractions on participants' Memrise MALL experience in an EFL flipped classroom setting. A small correlation exists between the total amount of screen distractions and the total vocabulary gained. Additionally, a strong correlation can be observed between the total screen distractions and the total duration of the Memrise MALL experience, as well as between the total time allocated to the distractions and the total time spent in the experience. Most participants reported that their experience of Memrise MALL was effective and convenient, with app layouts and gamification features stimulating their active engagement. They appreciated the ability to customize their learning experience and the self-paced time schedules, leading to more positive ratings of the learning experience and improved results. Additionally, participants recognized that social media distractions while using Memrise MALL had a detrimental effect on their performance. Social media notifications were particularly distracting, making it challenging to return to learning after being interrupted. Participants expressed varied perspectives on notifications and pop-up messages, with some individuals perceiving them as beneficial, while others may deem them intrusive. Cognitive overload was observed when transitioning to another window. Participants reported feeling disgruntled when their phone rang while engaging in on-screen learning, as it hindered their enjoyment of material acquisition and made pronunciation practices more challenging to comprehend.

The current study has been instrumental in advancing our knowledge of the detrimental effects of screen diversions on screen-based learning, specifically Memrise MALL in a flipped classroom setting. It has yielded novel insights and perspectives, enabling instructors and educators to make informed choices and devise effective MALL tactics. Additionally, the investigation has pinpointed specific facets of screen distractions to consider when screen learning occurs, thereby facilitating the creation of groundbreaking methods and assessing the efficacy of existing approaches. Despite the limited sample size and short duration, this study was based on participant screen recordings and personal reports in a flipped classroom setting. As such, the results cannot be generalized to other MALL settings and may not represent the entire population. To draw more accurate conclusions about long-term trends and changes over time, future studies should involve more language learning applications, larger samples, and multiple flipped-classroom or virtual settings.

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