Enhancing Vocabulary Learning and Self-Regulation via a Mobile Application: An Investigation of the Memrise App

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Abstract

The purpose of the present study was to investigate the effects of the use of mobile application (app) of Memrise on the second language (L2) vocabulary learning and self-regulatory capacity in vocabulary acquisition. In so doing, a sample of 59 Iranian English-as-a-foreign language (EFL) learners from two intact classes participated in this quasi-experimental study. The two classes were randomly assigned to the experimental group (N=33) and the control group (N=26). Over a period of a 13-week semester, the students in the experimental group made use of the Memrise app to learn the new vocabulary items while those in the control group learned the new words traditionally without use of any app or technological devices. The multiple choice recognition test of vocabulary and self-regulating capacity in vocabulary learning scale were administered to collect the data. The findings revealed that Memrise helped students improve their L2 vocabulary learning and self-regulating capacity more than the control group. The findings provide implications for L2 researchers and practitioners.

Keywords: Memrise, App Learning, Vocabulary Learning, Self-Regulation, MALL

1. Introduction

With a rapid changing speed, the whole world is turning into a media-driven space which gives rise to the adoption of mobile multimedia devices with precious chances for education. Knowing the significance and potentials of new technologies, many teachers have decided to utilize technologies to remove time and space restrictions in learning and prevent from lagging behind the times (Chapelle, 2008). As a commonly-used type of technology, mobile assisted language learning (hereafter, MALL) is a technology-oriented learning which represents itself in different forms like face-to-face and distant or online modes. Unlike computer assisted language learning (CALL), MALL takes advantage of personal and portable devices that offer new learning methods and underscores permanency and spontaneity of access and interaction in various contexts (Kukulska-Hulme & Shield, 2008). With the establishment of MALL as a field in its own rights in the past decades, mobile phones have become inseparable part of students' academic life regardless of their age and purposes.

Upon such ubiquitous devices, numerous applications can be installed to provide an impressive market of educational resources for the learners to become self-regulated. Apps are among the three predominant approaches to learning vocabulary through MALL, which are backed by various theoretical underpinnings including social constructivism and behaviorism (Lin & Lin, 2019). With regard to the potentials and benefits of apps for language education, many scholars have stated that apps can improve both language skills and knowledge of the contexts within which the language is spoken (Burston, 2014; Godwin-Jones, 2011; Kim & Kwon, 2012; Lafford, 2011; Rosell-Aguilar, 2009). Additionally, they can offer chances to get involved in interactive, meaningful, and engaging tasks, and improve collaborative, rewarding, and challenging tasks along with a chance to produce the target language (Chapelle, 1998; Meskill, 1999; Oxford, 1990; Skehan, 2003).

Given the novelty, potential, and excitement in mobile-mediated learning (m-learning), a great body of research in the literature has scrutinized the efficiency and influence of mobile devices on learning and teaching processes either inside (Chang, Lee, Chao, Wang, & Chen, 2010; Lin, 2014) or outside the classroom context (e.g., Derakhshan & Kaivanpanah, 2011; Rachels & Rockinson-Szapkiw, 2018), and in some cases, both inside and outside the classroom context (Ahn & Lee, 2015; Liu & Chen, 2015). There are also some studies in which the locus of investigation has not been specified (Huang & Huang, 2015; Li & Hegelheimer, 2013). Likewise, many researchers have explored the value and usability of apps in L2 learning and the students' perceptions about learning with them. The common theme in these studies is that there has been a positive attitude toward learning through apps (Brown, Castellano, Hughes,

& Worth, 2012; Khaddage & Lattemann, 2013). Other scholars have beckoned to the flexibility, convenience, portability, and the ability to customize student learning (Steel, 2012; Zou & Li, 2015).

As for the practical side of the story, research has demonstrated that mobile apps bring about improvements in different language skills including spelling, reading comprehension, and listening comprehension (Hao, Lee, Chen, & Sim, 2018); phonology (Kim, 2013), grammar in a language other than English, here Spanish, (Castaneda & Cho, 2016; Rachels & Rockinson-Szapkiw, 2018), writing through WhatsApp (Awada, 2016), and also the main focal point of this study, namely vocabulary acquisition (Hao et al., 2018; Rachels & Rockinson-Szapkiw, 2018; Rosell-Aguilar, 2016, 2018; Steel, 2012). Although some such studies have focused on vocabulary, based on Lin and Lin (2019), research has yet to examine the effect of MALL on vocabulary learning; which is the main concern of the present study. In the same vein, while discussing the possible challenges in vocabulary learning, Derakhshan and Kaivanpanah (2011) highlighted the need to design such learning tasks that can provide more opportunities for learners to enhance the number of their vocabulary items.

An astonishing and brand-new mobile app which can offer invaluable opportunities and insights into EFL learners' language learning is "*Memrise*" which is a learning platform that utilizes flashcards as memory aids and uses creative ways to recall vocabulary which is considered by Folse (2004) as a fundamental, albeit neglected element of SLA. The purpose of the app is to assist its users to enlarge their vocabulary repertoire by learning in an effective way. Unlike social networks like WhatsApp and Telegram, Memrise provides an offline mode to learn. Despite its potentialities, Memrise has been kept at the margins in the research context of Iran which warrants the conduction of empirical studies on its impact on language skills and sub-skills like self-regulatory capacities as under-researched constructs. Furthermore, considering Memrise as a substantial app for teaching foreign languages and calling for more studies, Rachels and Rockinson-Szapkiw (2018) steered upcoming researchers toward exploring this domain. Motivated by all these backdrops, the present study was an attempt to demystify the impact of Memrise on Iranian EFL learners' vocabulary learning and self-regulatory capacity in vocabulary acquisition. More specifically, it sought to answer the following formulated research questions:

1. Does using Memrise app significantly improve vocabulary learning of Iranian EFL learners?
2. Does using Memrise app significantly enhance self-regulating capacity in vocabulary learning of Iranian EFL learners?

2. Literature Review

Vocabulary learning, one of the key challenges in L2 learning (Lin & Lin, 2019) since it can potentially impede learners' communication skills (Nation, 2001), has been facilitated through the use of mobile apps enabling learners to acquire words as either single words or multiword components (López, 2018) due to their various features. The omnipresent and interactive affordances of mobile apps make L2 vocabulary learning feasible in that learners can spend their spare or quality time on practicing words which are tailored to their current level of language proficiency (Hung, Huang, Su, & Lin, 2012; Sung, Chang, & Liu, 2016). From a sociocultural perspective, providing materials attuned to learners' proficiency level helps them achieve their Zone of Proximal Development (ZPD) (Ebadi, Vakilifard, & Bahramlou, 2018; Lantolf & Poehner, 2008). Such features as being convenient, ubiquitous, socially interactive, and contextually sensitive (Kukulska-Hulme, 2006), to name just a few, have made for a continuing growth of empirical MALL-oriented vocabulary research studies while having different foci of investigation including participants' age and language proficiency (Lin & Lin, 2019). These affordances have also motivated different scholars to carry out comparative studies with an attempt to evaluate the effectiveness of making use of apps as opposed to traditional approaches of learning vocabulary (Rachels & Rockinson-Szapkiw, 2018) and to examine perceptions of learners who used mobile apps to enhance their lexical range (Chen & Chung, 2008).

One of the socioculturally inspired purviews in vocabulary is learners' self-regulatory capacity in vocabulary learning. Self-regulation is an executive functioning skill and its development can lead to better academic achievement (Guirguis & Antigua, 2017). From a Vygotskian perspective, learners' language ability can be developed if it is linked to self-regulation, which has been the focal point of a plethora of studies (e.g., Amirian, Mallahi, & Zaghi, 2015; Guirguis & Antigua, 2017; Şahin Kızıl & Savran, 2018; Ziegler, 2015). To overcome the lack of theoretical explanation and back the strategic nature of vocabulary learning, Self-regulating Capacity in Vocabulary Learning Scale (SRCvoc) was introduced by Tseng, Dörnyei, and Schmitt (2006), but since then it has enthused controversy between its opponents (Rose, 2012) and proponents (Yesilbursa & Bilican, 2013). While its advocates claim SRCvoc provides supportive backing for strategic vocabulary learning (Yesilbursa & Bilican, 2013; Ziegler, 2015), its critics warn researchers of using this scale owing to its infancy (Rose, 2012). SRCvoc is a psychometric instrument (Mizumoto & Takeuchi, 2012) which was developed to both present the notion of self-regulation in L2 learning and also create a new alternative to other instruments measuring vocabulary which are not theoretically supported (Dörnyei, 2005).

Rapid development of communication technologies in the recent years has opened new avenues for education (Reynolds & Anderson, 2015) since people are not confined to only traditional classroom environments (Wu, 2016). This has steered the orientation of research toward combining CALL in different purviews of language learning including assessment (Ebadi, Weisi, Monkaresi, & Bahramlou, 2018) and reading and vocabulary (Gordani, 2013), and even extending it to a relatively more accessible form of technology, namely mobile learning (Awada, 2016; Dashtestani, 2015; Sandberg, Maris, & De Geus, 2011). The ubiquity of mobile phones has facilitated this type of technology-oriented learning (Cárdenas-Robledo, & Peña-Ayala, 2018). The availability of mobile apps has further made mobiles be means of choice for learning English (Zhang, Song & Burston, 2011). These factors have contributed to making MALL, especially app learning, a more favorable area of research in more recent years as shown by Lin and Lin (2019).

Various studies have been conducted to examine learner experience of language learning with mobile apps. In an attempt to facilitate the learning path for students who had struggle with learning EFL, for example, Hao et al. (2018) while making use of their Android-supported free-to-download application, called Detective ABC APP, found out that not only was the app successful in facilitating English learning, but also it prepared a practically possible path for both types of individual and cooperative learning. Their follow-up questionnaire to evaluate the attitudes of the learners indicated that they had positive attitudes toward the app, which influenced their confidence in learning in a positive way. In line with Hao et al. (2018) study, there is a general consensus among scholars on the positive attitude of language learners toward learning with apps (e.g., Castañeda & Cho, 2016; Rosell-Aguilar, 2018) mainly owing to various reasons including the portability and the adjustability of the apps in tailoring the needs of the learners (Steel, 2012), their user-friendliness and providing a pleasant environment for memorizing vocabulary words (Hao et al., 2018), their convenience (Zou & Li, 2015), their ubiquity and freeness (Rachels & Rockinson-Szapkiw, 2018), and their ubiquity and fostering learner autonomy (Chen & Kessler, 2013).

In total agreement with these published studies, Rachels and Rockinson-Szapkiw (2018) underscored that using apps, here Duolingo[®], as the only tool of instruction was as effective as the traditional face-to-face way of teaching in improving learners' achievement. The results obtained from the participants of this quasi-experimental study, 164 pupils learning Spanish in primary school (79 in the experimental and 88 in the control group), showed no statistically significant difference between their academic achievement and self-efficacy, although they used different ways of delivering instruction. This led them to conclude that Duolingo[®] was a

beneficial app for teaching Spanish to students at the elementary level. Drawing on the finding that both types of instruction made for equivalent results, they invited educators to consider using apps as a substantial solution to traditional classes, while exercising caution to avoid any bias toward the effectiveness of one over the other.

In the EFL contexts of Iran, research on MALL is not an uncharted territory; nevertheless, little has been done on the effects of mobile apps on Iranian EFL learners' performance in different language areas. In an attempt to investigate the impacts of Short Message Service (SMS) on Iranian learners' retention of vocabulary as well as reading comprehension ability, Motallebzadeh and Ganjali (2011) conducted an experimental study. Using a pretest-posttest design with 40 EFL learners, the t-test results of their study revealed that using SMS as a learning tool had a significant impact on the performance of the students in that they outperformed the ones in the control group.

Vocabulary lends itself easily to *adaptive learning* and "the simplest form of online language instruction that can be called adaptive is a digital flashcard app (usually for vocabulary) which incorporates automated spaced repetition of the target language item" (Kerr, 2015, p. 89). Gaining inspiration from the existing literature, the present study focuses on the use of Memrise, a flashcard app or learning platform with an offline mode. Memrise, as a digital flashcard app featuring spaced-repetition system (SRS), makes use of adaptive learning in vocabulary instruction, which is believed to help learners develop their vocabulary growth in a more desirable condition (Wang, 2016). Kerr (2015, p. 88) defined adaptive learning as "a way of delivering learning materials online, in which the learner's interaction with previous content determines (at least in part) the nature of materials delivered subsequently." Assuming that adaptive learning is correlated with vocabulary is indicative of its interactive and dynamic nature, which is reflected in Memrise as well. Through conducting this study, it is hoped that fresh insight be generated into the role of supplementing Memrise as an under-researched learning app in boosting vocabulary learning and self-regulation of Iranian EFL learners.

3. Method

3.1. Participants

Fifty-nine Iranian EFL students who had enrolled in the preparation classes for Master-of-art (MA) degree university entrance exam took part in the study. The participants of the present study were 59 applicants of two classes in Modaresan-e Sharif and Mahan higher education institutes, the most famous institutes in Iran. The participants intended to take the teaching-

to-the-test courses to get ready for the MA national exam for English majors (i.e., language teaching, English literature, and translation). The two classes were randomly assigned to the experimental group (N=33) and the control group (N=26). The age of participants varied from 21 to 33 (mean age = 24.12). In terms of educational background, the participants either were the senior college students of English majors or got their bachelor degree from other disciplines. All of the participants stated that they had already experienced some kind of limited mobile learning. The same materials and textbooks were used for both classes. To ensure the homogeneity of the two groups in terms of general English proficiency, Oxford Placement Test (OPT) was administered prior to the treatment.

3.2. Materials and Instruments

3.2.1. English Proficiency Test

Oxford Placement Test (OPT) (Allan, 2004) was administered to determine the homogeneity of the participants with regard to their general English proficiency. OPT is claimed to have the capacity of being administered to any number of English learners to determine their accurate place at all levels (Allan, 2004). OPT has a 6 rating scale; students with a score between 0 and 17 are considered as basic (A1), and students with a score lying within 18-29 are regarded as elementary students (A2). Those whose scores are between 30 and 39 are in the lower intermediate group (B1), while the ones with the scores of 40-47 are considered as upper intermediate (B2) and the students with the scores 48-54, and 54-60 are recognized as advanced (C1) and very sophisticated (C2) respectively. The reliability coefficient of OPT as measured by Cronbach's alpha was reported to be 0.87 in the present study.

3.2.2. The Multiple Choice Recognition Test of Vocabulary

To measure the participants' vocabulary knowledge before and after the treatment, a 60-item multiple choice was developed. The items measured the knowledge of 60 vocabulary items randomly selected from the book the two groups of students were expected to cover. The three distractors of each item were selected from the vocabulary items included in the book. The stems of the items were the sentence examples used in the textbook. Two parallel forms of this test were developed for the pretest and posttest by changing the order of items and distractors. The reliability index of the test, as measured by KR-21, was estimated to be 0.82. An example of the test items is provided below.

3.2.2. Self-regulating Capacity in Vocabulary Learning Scale (SRCVoc)

SRCVoc, developed and validated by Tseng et. al. (2006) and validated predictively by Ziegler (2015), was employed to measure the

learners' self-regulatory capacity in vocabulary learning. SRCVoc includes 20 items measuring five subscales: commitment control is related to goal setting (e.g., 'When learning vocabulary, I persist until I reach the goals I set for myself.'); metacognitive control is concerned with concentration and procrastination (e.g., 'When learning vocabulary, I have special techniques to keep my attention focused.'); satiation control is related to controlling boredom (e.g., 'During the process of learning vocabulary, I am confident I can overcome any sense of boredom'); emotion control pertains to disruptive emotional states (e.g. 'When I feel stressed about learning vocabulary, I know how to reduce this stress.'); and environment control deals with controlling negative environmental factors (e.g. 'When learning vocabulary, I know how to arrange the environment to make learning more efficient.'). It is a 6-point Likert scale ranging from 1 = "strongly agree" to 6 = "strongly disagree". The internal consistency of the scale, as measured by Cronbach's Alpha formula, was 0.85 in the current study.

3.2.3. Memrise

Memrise is a modern word flashcard app that facilitates vocabulary memorization through its automatic spaced-repetition system (SRS) and its use of gamification strategies, which are conceived of as "recent developments" of apps (Kerr, 2015, p. 89). Regarding its cost, it is conceived of as a freemium app (the midpoint between free and premium) because no initial cost is needed for downloading the program, but activating some of its features like deactivating its ads, especially in the pro version, demands both subscription and in-app upgrade purchasing. Memrise appeals learners by rewarding their learning in the form of points, resembling vocabulary learning to a game. All this, however, is supposed to be fulfilled in a decontextualized setting which might in itself be bewildering for learners as there are endless vocabulary items to be learned. This premise of Memrise (i.e., memorizing decontextualized vocabulary) is rooted in behaviorism, which contended that learning could take place through habit formation without needing any contextual support (Lightbown, Spada, Ranta, & Rand, 1993). Based on the sociocultural theory of mind, however, language and language learning are socially shaped and reshaped (Poehner & Leontjev, 2018; Vygotsky, 1986). Another drawback which might make users of this app proceed with caution is its lack of clear declaration of maintaining their privacy, sufficing merely to its getting-to-know-you part, where assurance of confidentiality and anonymity is acclaimed.

3.3. Procedure

Before the commencement of the study, the two groups of participants were informed of the purpose and procedure of the study and the

confidentiality of the collected data. During the first session, the vocabulary pretest and SRCVoc were administered to measure the vocabulary size and self-regulatory capacity of the students of both groups prior to the conduction of the treatment. The treatment lasted for 13 weeks. Each session was 90 minutes during which the instructor selected the target vocabulary items from the coursebook and wrote them down on the board for more explanation about their derivations, usage, synonyms, and roots. This procedure was quite identical for both groups. However, the experimental group students were required to download the *Memrise* application program in their personal smartphones and to use this app for their outside-class rehearsal and learning of the target words, whereas the control group students did not use this app for their outside-class learning. It is worth mentioning that the experimental group students were provided with a 30-minute technical training on the use of Memrise with its various functions. The students of both groups were required to self-study at least 65 words per week in order to be able to cover the 800 GRE words included in the textbook by the end of the semester. Three scheduled paper-printed quizzes were given to both groups during the semester.

At the end of the treatment (week 13), to measure the participants' vocabulary learning performance and their degree of self-regulation in vocabulary learning after the treatment, the second multiple choice recognition test of vocabulary as the posttest and self-regulating capacity in vocabulary learning scale were administered.

3.4. Data Analysis

In order to answer the research questions of the present study and to investigate the effects of the MALL program on the students' vocabulary learning and self-regulatory capacity in vocabulary learning, two one-way between-groups analyses of covariance (ANCOVA) were carried out to compare the effects of the two types of L2 vocabulary instructions (i.e., traditional versus Memrise-supported) employed in the control group and the experimental groups on the two dependent variables under investigation. According to Pallant (2013), ANCOVA is used when there is a pretest/posttest design (e.g., comparing the impact of two different treatments, taking before and after measures for each group). Pretest scores serve as a covariate to 'control' for pre-existing differences between the groups. For the two conducted ANCOVA analyses, the type of treatment (i.e., MALL or traditional) was the independent variable, and the scores on the *multiple choice recognition test of vocabulary and SRCVoc* administered after the completion of the study were the dependent variables. Students' scores on the pretests of each scale were considered as the covariate in this analysis.

For either of the conducted ANCOVAs, preliminary checks were carried out to ensure that there was no violation of normality, linearity, homogeneity of variances, homogeneity of regression slopes, and reliable measurement of the covariate.

4. Results and Discussion

4.1. Results

An independent-samples t-test was conducted to compare the OPT scores for the experimental and control groups. As seen in Table 1, the results revealed that there was not a statistically significant difference in the OPT scores for the experimental group (M = 45.13, SD = 12.51) and the control group (M = 47.52, SD = 11.98); t (57) = -.543, p > 0.05), suggesting that the two groups were of the similar level of general English proficiency prior to conduction of the treatment.

Table 1
Results of the OPT for each Group

Groups	M (SD)	t	Sig.
Experimental	45.13 (12.51)	-.543	.472
Control	47.52 (11.98)		

To ensure whether using the Memrise could significantly improve vocabulary learning of Iranian EFL learners, ANCOVA was run. As seen in Table 2, the vocabulary mean score of the experimental group was 31.54 as measured by the pretest and it increased to 43.66 on the vocabulary posttest. In the same vein, the mean score of vocabulary pretest for the control group was 30.07, which raised to 36.61 on the posttest. Therefore, it seems that both treatments have contributed to improving vocabulary learning of the students in the two groups.

Table 2
Descriptive Statistics for Pre- and Posttest Scores

Groups	Scales	Pretest		Posttest	
		M	SD	M	SD
Experimental	Vocabulary	31.54	10.76	43.66	11.01
	Self-regulation	60.39	21.15	75.42	21.35
Control	Vocabulary	30.07	9.52	36.61	12.40
	Self-regulation	63.05	21.12	64.15	20.37

Nevertheless, after adjusting for the pretest scores of vocabulary, a statistically significant difference existed between the two groups on posttest scores of L2 vocabulary, $F_{(1, 56)} = 5.63$, $p = 0.021$, partial eta squared = 0.091) (see Table 3). This finding reveals that the participants in the experimental group improved their L2 vocabulary significantly more than the

participants in the control group, suggesting that using Memrise app has contributed to improving the vocabulary learning of the EFL students.

Table 3
The Results of ANCOVA on Vocabulary Learning

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Covariate (pretest)	2318.795	1	2318.795	23.999	.000	.300
Between-subjects	544.818	1	544.818	5.639	.021	.091
Within-subjects	5410.692	56	96.620			

With regard to the second research question and the effect of the MALL program on the self-regulating capacity in vocabulary learning, the descriptive statistics (see Table 2) shows that the mean score of the control group for vocabulary self-regulation was 63.05 in the pretest and increased to 64.15 on the posttest of SRCVoc. Likewise, the vocabulary self-regulation mean score for the experimental group was 60.39 on the pretest and this value raised to 75.42 on the posttest. As a result, it appears that both treatments helped students enhance their self-regulatory capacity in vocabulary learning. Nevertheless, upon adjusting for the pretest scores of SRCVoc, the results of ANCOVA (see Table 4) indicated that there was a statistically significant difference between the two groups on posttest scores of vocabulary self-regulation, $F_{(1, 56)} = 9.12$, $p = 0.004$, partial eta squared = 0.140). This finding showed that using Memrise app significantly enhanced self-regulating capacity in vocabulary learning of Iranian EFL learners.

Table 4
The Results of ANCOVA on Vocabulary Self-regulation

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Covariate (pretest)	10068.617	1	10068.617	37.835	.000	.403
Between-subjects	2427.104	1	2427.104	9.120	.004	.140
Within-subjects	14902.829	56	266.122			

4.2. Discussion

The results of the present experimental study, which was an attempt to unpack the effect of using Memrise on Iranian EFL learners' vocabulary learning and their self-regulating capacity, revealed that taking advantage of Memrise, EFL learners in the experimental group improved their vocabulary

knowledge. The findings are in line with numerous research studies on the potentiality of mobile-based instruction of vocabulary. For instance, they echo those of Gooniband Shooshtari, Jalilifar, and Khazaie (2013) who examined the impact of mobile apps and devices on teaching English vocabulary and found that the use of apps was fruitful in improvement of the semi-illiterates. In the same manner, the results lend support to Mashru and Upadhyay (2015) who focused on enriching vocabulary knowledge through innovative approaches like WhatsApp. The results of their study indicated that the learners improved in their vocabulary repertoire through the use of WhatsApp groups. Moreover, the learners found such an approach more interesting and effective since they could learn autonomously and with their own pace and convenience. Furthermore, the results are compatible with those of Tabatabaei and Heidari Goojani (2012) who investigated the efficiency of using mobile phone low-priced apps and SMS in learning vocabulary among Iranian EFL students. The results of t-test indicated that the learners in the experimental group outstripped those in the control group, which signifies the usefulness of using the aforementioned digital tools.

The results are also in tune with various studies which explored the impact of Telegram as another common mobile app on EFL learners' vocabulary skill. For example, in their recent study, Heidari Tabrizi and Onvani (2017) found that learning vocabulary through Telegram was more effective than the traditional approach among the beginner EFL learners. Similarly, Ghobadi and Taki (2018) argued for the positive effect of Telegram app on EFL learners' vocabulary and attitude to learn.

A possible justification for the improvement of EFL learners' vocabulary level through the use of Memrise might be the accessibility of mobile devices and their apps to language learners. With the rapid advancement of technology, all language learners are now able to learn subjects without time and place constraints. Another reason for the significant enhancement of EFL learners' vocabulary knowledge in the experimental group can be the inherent motivation that technologies (Memrise in the case of the present study) create for learning. Such a claim is best substantiated by Stockwell (2013, p. 157) who maintained that "introducing new technologies into language learning environments has the potential to boost learner motivation."

In this study, it was also found that, the utilization of Memrise has contributed significantly to the improvement of Iranian EFL learners' self-regulated capacity in vocabulary learning as the experimental group outdid the control group in the posttest phase. This finding is best echoed by Zhang, Song, and Burston (2011) who argued that mobile phones are able to increase learners' efficiency, self-regulated learning, and automaticity. Moreover, the results are consistent with those of Khezrlou and Sadeghi (2012) who found

that the learners' use of self-regulated strategies is much greater in technology-based environments than in paper-based environments. Furthermore, the results are in tune with Ma (2017) who investigated the self-regulation of university students' vocabulary learning mediated by mobile technologies in China. The analysis of the data in this case study revealed that the integration of technology improved Chinese learners' self-regulated capacity in vocabulary learning.

A reason for the improvement of EFL learners' self-regulated capacity in learning vocabulary items in the experimental group might be that technology in general and mobile apps in particular create autonomy on the part of the learners and consequently bring about a rise in their self-regulation and management of learning. Likewise, IT-oriented instruction might have motivated the growth of collective self-regulatory system which may ultimately assist learners to use their limited self-control resources to become autonomous and self-regulated in their learning process (Fitzsimons & Finkel, 2011). Yet another justification for this finding can be the personalization and reachability that Memrise created for the learners to use their mobile phones and the app whenever and wherever they wished.

In sum, it can be argued that the integration of technologies and mobile apps, especially Memrise, has the potentiality to improve EFL learners' different language skills and sub-skills owing to its encouraging and self-directed nature. In this borderless era, EFL learners welcome those instructional methods which can be used with their own pace (Steel, 2012) and whenever they want the learning to happen (Rachels & Rockinson-Szapkiw, 2018).

5. Conclusion and Implications

Undertaken as an endeavor to uncover the impact of Memrise on learning vocabulary of Iranian EFL learners and also their self-regulating capacity, this study revealed that learners can self-regulate their own pace of learning vocabulary through making use of Memrise which enables them to customize their own learning and have access to its materials anywhere and anytime. The findings showed that learners' self-regulated capacity in vocabulary learning improved through Memrise. This, in itself, is indicative of granting more learning autonomy to learners which, based on Kumaravadivelu (2012), is deeply connected to learner motivation and plays a great role in making releasers self-regulated. Therefore, it is suggested that mobile apps be introduced into and supplemented to learning vocabulary items because they deal with autonomy and motivation of learners. The findings of the study also proved the effectiveness of this innovative way of learning over the traditional one which should be considered by policy makers in charge.

The results of this study have some insightful implications for EFL teachers, learners, and curriculum designers. As for the teachers, they can integrate mobile apps like Memrise into their teaching when it comes to language sub-skills such as vocabulary and pronunciation. Being under time constraint, most teachers do not have enough instructional time to teach vocabulary during their class hours. Therefore, they can take advantage of mobile apps to reimburse this dearth of time and to add some variety and excitement to their vocabulary instruction. As for the learners, they can learn autonomously (Chen & Kessler, 2013) and become self-regulated in their learning (Guirguis & Antigua, 2017). As learners are rarely away from mobile devices in this technology-overwhelmed era, the use of apps can help them extensively due to the personalization and motivation that technology adds to the learning process. Finally, curriculum developers can pay more attention to the integration of mobile apps like Memrise in their plans for different programs.

Similar to other studies, this study suffered from some limitations that need to be mentioned. First, the number of the participants was limited to 59 EFL learners which prevents making generalizations to other contexts. Secondly, the treatment phase of the study was only 13 weeks despite the fact that longer time span would incur different results. Finally, other mediating variables like gender and attitude which can affect the perception of the learners in the two groups about Memrise and technology were not taken into consideration in this study. Focusing on these shortcomings, future studies can be carried out to check if EFL learners with different genders would perform differently under a Memrise-based instruction. Future researchers can use other research tools like interview to examine the reasons why some students are more prone to use mobile apps while others get away from IT-based instruction. It is also a good idea to integrate the perceptions of EFL teachers about using Memrise for teaching different skills. Future studies can also be conducted to reassure if the use of Memrise is of help in developing EFL learners' grammar, reading, writing, and speaking skills.

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