The Utilization of Mobile-assisted Gamification for Vocabulary Learning: Its Efficacy and Perceived Benefits

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Abstract

Research revealing the educational values of gamification in English as a Foreign Language (EFL) education has proliferated in the last decade. However, these studies have yielded inconclusive findings of its efficacy. Furthermore, studies on the use of mobile devices have also reported some potential pitfalls when being used for educational purposes. This quasi-experimental study thus set out 1) to evaluate the effectiveness of gamified vocabulary learning in a mobile-assisted language environment on Indonesian adult EFL learners' vocabulary learning outcomes, and 2) to explore their perceptions of its benefits. Two classes comprising 74 first-year students taking a General English course at a state university in Indonesia were selected as the participants in this study and later randomly assigned to experimental and control groups. In addition to pre- and post-tests, online questionnaires were employed to collect data, which were analyzed using the SPSS 20 package. The main findings indicated that the students in the experimental group outperformed their counterparts in the control group. Furthermore, they confirmed the benefits of mobile-assisted gamification for their vocabulary learning in three aspects: learning outcomes, enjoyment, and motivation. In conclusion, these findings confirm the legitimacy of gamification and mobile-assisted language learning to scaffold EFL education.

Keywords: Digital game-based learning (DGBL), Digital native, Mobile-assisted gamification (MAG), *Quizlet*, Vocabulary learning

Introduction

Gamification or gamified learning has paved its way and gained proliferating popularity in EFL education, particularly in the context of vocabulary learning, which is perceived to have a pivotal role in language learning. Since vocabulary knowledge serves the foundation of listening, reading, speaking, and writing (Cameron, 2001), learners' vocabulary mastery positively correlates with their language learning ability (Meara & Jones, 1987). In other words, lack of vocabulary hinders the learning of other language skills (Al-Khasawneh, 2019). Unfortunately, most EFL learners commonly find vocabulary learning very demanding and time-consuming in terms of memorization and retention for a long-term period (Namaziandost et al., 2021; Waluyo & Bucol, 2021), and the utilization of gamification may be an effective solution to solve such issues and alter the perceived tedious learning experience into a fun and delighting one (Kingsley & Grabner-Hagen, 2018).

Regarding the potential benefits that gamification has to offer, a plethora of studies has been conducted to investigate its diverse impacts on EFL vocabulary learning. Employing various research methods, most of these studies have reported the educational benefits of gamified vocabulary learning, which include improvement in learning performance (Chen et al., 2019; Sanosi, 2018; Waluyo & Bucol, 2021), enhancement of motivation (Li et al., 2019; Reynolds & Taylor, 2020; Wu, 2018), increase of interest (Anjaniputra & Salsabila, 2018; Elaish et al., 2019; Wu & Huang, 2017), alleviation of anxiety (Weissheimer et al., 2019; Zou et al., 2019), and encouragement to learning autonomy (Ebrahimzadeh & Alavi, 2016; Korlu & Mede, 2018; Setiawan & Wiedarti, 2020).

However, in contrast with those positive trends, some other studies have found that gamification could neither improve the students' learning performance (Barzilaia & Blau, 2014; Calvo-Ferrer, 2017) nor enhance their motivation (Tanaka, 2017). Furthermore, the utilization of gamified learning through mobile devices may also not be effective due to some potential pitfalls, which include users' preferences of their usage for personal and social rather than educational tools (Stockwell, 2010; Thornton & Houser, 2005), distraction to students' focus (Dahlstrom et al., 2015; Stockwell, 2008), and other constraints related to their affordance (Klímová, 2018 & 2019; Kukulska-Hulme & Shield, 2008; Stockwell, 2010).

Considering the conundrum of gamification efficacy on EFL learners' vocabulary learning and the potential constraints of mobile use which may hinder maximum learning outcomes, more studies are deemed necessary to conduct to provide new insights into the educational values of gamified vocabulary learning in EFL education. Furthermore, studies exploring gamification in EFL contexts have focused only on either the quantitative or the qualitative impacts, despite the belief that 'test scores don't tell the whole story.' This is to say that showing the quantitative effectiveness of gamification for vocabulary learning does not tell us learners' experiences during their utilization. Therefore, in addition to examining students' learning outcomes, it is also important to explore their insights into the utilization of gamification for vocabulary learning. Finally, despite the growing interest in the educational use of gamification or digital games in general, this research field is still underdeveloped, with great potential for further investigation, especially in the context of higher education (Raitskaya & Tikhonova., 2019).

Driven by the existing empirical gap in current literature, this present study intends to fill the void with the focus on the efficacy of gamified vocabulary learning through mobile devices and students' perceptions of its benefits. Specifically, this study aimed to address the following research questions:

1. Does mobile-assisted gamification (MAG) significantly affect the students' vocabulary learning outcomes?
2. What benefits do they perceive of its utilization?

Literature Review

From CALL to MALL to DGBL

The integration of information and communication technologies (ICT) in education has often been justified upon the assumption that today's learners acquire distinctive learning styles which are much different from the conventional one with which most of today's educators are familiar. These learning style differences became the founding argument for Prensky (2001) in creating the prevalent terms 'Digital Natives' and 'Digital Immigrants.' The former refers to younger generations born after the spread of digital technology, and thus exposed to it at an early age, while the latter refers to people who were not born in the digital era and later adopted the new technology. Prensky further opined that the two profoundly differ in thinking and processing information, resulting in differing attitudes and comfort levels towards the adoption of technology for daily tasks. To address these differences, the digital immigrant teachers need to equip themselves with the best pedagogies and teaching methods to cater to the special needs of their digital native students. Although Prensky's dichotomy of digital natives versus immigrants has been much challenged on the argument that age is not the only significant variable influencing one's digital abilities and fluency, the use of technology artifacts as supportive tools for educational purposes nowadays are inevitable.

Within the context of language learning, technology integration could be traced back to the 1960s (Fithriani et al., 2019); however, the term computer-assisted language learning (CALL) was introduced in 1980s (Jarvis & Achilleos, 2013) and has been constantly evolving since then. Early studies have found that incorporating technology into EFL education offers a number of advantages, including increased exposure to authentic materials in the target language and improved learning results (Fithriani & Alharbi, 2021). Parallel with the growing popularity of mobile devices such as smartphones, tablets, and e-readers, a new modified approach called mobile-assisted language learning (MALL) was created to better represent the advanced use of technology in language learning. MALL differs from CALL in that the latter deals with the implementation of language learning theories and approaches by making use of computer desktops and laptops for language teaching and learning, while the former is via handheld devices (Hazaea & Alzubi, 2018). In addition, MALL provides more spontaneous and personal learning experiences to take place both within and outside of the classroom environments (Kukulska-Hulme, 2009; Zain & Bowles, 2021).

Since its emergence, the utilization of MALL has seen enormous growth. Synchronously, it has also become a rising field of inquiry as well as one of the most heatedly debated topics among language educators, researchers, and other stakeholders (Wu, 2019). As a result, in the past decade, the landscape of LTL research has been dominated by MALL-related studies attempting to formulate and investigate innovative ways for its better implementation into classroom practices in various settings, including that in the EFL context (Namaziandost et al., 2021). Arguably, one of the most popular approaches in integrating educational technology into language learning is digital game-based learning (DGBL). In addition to the prevalence of digital gaming as a leisure activity, in the past few decades, digital games have also been integrated into classroom practices for language education (Yang et al, 2020). Studies have attested the affordances of digital games to facilitate language learners in various language skill classes (Chang et al., 2013; Hung & Young, 2015; Wu & Huang, 2017; Zou et al., 2019). With distinctive features such as points, rankings, and rewards that encourage a competitive atmosphere, the use of such digital games for educational purposes is recognized as 'gamification' or 'gamified language learning.' In other words, gamification might be differentiated from

DGBL in general as it integrates game mechanics and dynamics in non-game situations to create enjoyable, fun, and motivating learning experiences (Dehghanzadeh et al., 2019).

Studies on Gamification in EFL Vocabulary Learning

The last few decades have witnessed the burgeoning use of game-based technologies in the education context. As a result, research investigating their potential for educational purposes is also actively evolving, but always offering new green shoots that need to be explored further. Often grounded on experiential learning theory emphasizing learners' autonomy in developing knowledge and skill through direct experiences outside a traditional academic setting, games have been utilized as a tool to support teaching and learning since at least, as far back as the 1970s (Raitskaya & Tikhonova, 2019). Within the context of EFL, games, particularly the digital ones have been adopted in various classes of language skills for diverse age groups of learners. For young learners, digital games make classes entertaining as well as engaging and provide an atmosphere that helps increase their learning motivation and develop metacognitive achievement (Mahayanti et al., 2020) Similar to this, the use of digital games in language classes for adult learners allows them to experience learning in a more energetic yet non-stressful way with a focus on both the message and the language (Fithriani, 2018).

With the development of advanced technologies, game used in language education has been accelerating and leading to the creation of revolutionary learning models and environments, one of which is gamified language learning or gamification. The possibility of the pedagogical use of gamification has recently become a significant focus of attention in the field of EFL education. A myriad of studies has been conducted to explore the educational advantages and potential of gamification in various areas of language skills, with one area that has received significant attention, namely vocabulary learning. This trend may have occurred because gamification could easily be implemented and measured in vocabulary learning compared to the learning of any other language skills (Thompson & Gillern, 2020). Most of these studies have reported positive findings favoring the adoption of gamification for vocabulary learning in different EFL settings such as China, Taiwan, Korea, Saudi Arabia, Thailand, and Indonesia. However, this should not necessarily be taken at face value since some empirical evidence has also shown repudiation of its beneficial impacts on EFL learning settings.

To begin with, Wu and Huang (2017) conducted a quantitative study investigating whether a mobile game-based English vocabulary practice system was effective to improve EFL adult learners' vocabulary mastery. Recruiting 94 Taiwanese university students taking a basic English course as their participants, they found that mobile game-based learning significantly improved the students' vocabulary knowledge as well as increased their attention and interest. In another study, Wu (2018) experimented with a similar vocabulary practice game on 32 students of a basic English class at a university of science and technology in Taiwan. The findings revealed its efficacy on students' vocabulary learning as the game stimulated their participation and motivation.

The positive effects of gamification on EFL vocabulary learning were further supported in the studies of Sanosi (2018) and Elaish et al. (2019) who reported that DGBL through mobile phone apps was effective to help Arab EFL learners achieve better performance in learning English, even for those with low competence. Sanosi (2018) reported that the use of *Quizlet,* either in an online and mobile phone version, was

effective to improve the vocabulary acquisition of EFL learners at higher education level. Utilizing a mobile game named *VocabGame*, Elaish et al. (2019) found that in addition to enhancement on learning outcomes, mobile game-based learning improved students' motivation level significantly as well as their confidence.

Similar to the findings emphasizing the impact of gamified vocabulary learning on learning motivation, Setiawan and Wiedarti (2020) probed the efficacy of a mobile game adoption in enhancing students' learning motivation and shifting the tedious to fun and exciting class atmosphere. Involving 65 tenth graders in Sragen, Indonesia, the study found that *Quizlet* increased not only students' motivation but also their interest. However, the use of mobile phones in this study distracted students' focus as many of them opened other apps during the learning process involving the use of the mobile game.

In an utterly different vein, Li et al. (2019) inquired how factors attributing to the facilitative effects of digital games and learners' flow experiences contribute to learners' vocabulary learning outcomes. In a study involving 291 Chinese EFL learners who utilized the application *Baicizhan* for exam preparation daily, they disclosed that factors such as the balance of skill and challenge, clear goal, and playability provided a positive impact on concentration, while feedback positively affected intrinsic motivation. Furthermore, they also reported that concentration, intrinsic motivation, and enjoyment positively influence perceived learning, while satisfaction is positively affected only by concentration and intrinsic motivation. Interestingly, perceived learning has also a positive influence on satisfaction.

In the quest to explore students' perception of gamified vocabulary learning, Anjaniputra and Salsabila (2018) conducted a classroom action research study involving 30 Indonesian EFL learners of tertiary level. The findings favored the utilization of digital games in general, and *Quizlet* in particular, for fostering learners' engagement and autonomy. In addition, *Quizlet* was also found to have positive impacts on learning development and enjoyment. Sharing the purpose to shed light on users' perceptions of the application of gamification in vocabulary learning, Weissheimer et al. (2019) investigated Brazilian EFL teachers' and learners' opinions of gamified vocabulary learning using *Vocabox*. In general, both groups reported positive impacts of gamification in boosting vocabulary learning and promoting learning engagement, motivation, as well as enjoyment.

In a recent study by Waluyo and Bucol (2021), gamified vocabulary learning was reported to still have positive impacts on learning outcomes of adult EFL learners with very low proficiency. With a total of 65 participants taking General English in a Thai university, this action classroom research study employed *Quizlet* as a gamification tool for vocabulary learning in in-class and out-class settings. The results showed the significant effects of gamified vocabulary learning on the participants' vocabulary knowledge in both settings. Furthermore, this study also endorsed the beneficial value of gamification in engendering a fun learning atmosphere.

Contrastive findings were reported by some studies delineating either insignificant or negative impacts of gamification in vocabulary learning. Young and Wang (2014) investigated the possibility of combining game strategies with automatic speech recognition technology to improve learners' vocabulary acquisition and pronunciation. The findings indicate that gamified vocabulary learning could improve learners' pronunciation, however, it was less effective than other approaches. A study by Reynolds and Taylor (2020) reported an insignificant effect of gamification on students' vocabulary

learning outcomes. Conducting their pilot study in a medium-sized university in central Korea, with 24 student- and eight instructor-participants, they found that despite its beneficial impact in making the learning atmosphere more enjoyable and exciting, gamified vocabulary learning through the utilization of Kahoot! failed to significantly improve students' vocabulary knowledge in a short duration. Meanwhile, deHaan et al. (2010) identify certain disadvantages of incorporating games into vocabulary learning, such as the lower capacity to recall novel words and perceived difficulties as a result of the extraneous cognitive burden created by the game's interaction.

Taking everything into account, despite much research into the utilization of gamification in EFL vocabulary learning, relatively little empirical evidence reports both its statistical and perceptual efficacies. To put it another way, few studies conducted in the EFL context have looked into how MAG affects learners' vocabulary learning outcomes and how learners perceive its impacts on their learning. In addition, the current literature reflects inconclusive findings of its potency and fruitfulness on EFL learning. Thus, this current research intends to draw further attention to the significance of utilizing gamification for educational purposes as well as to contribute to the burgeoning research on gamified EFL teaching and learning.

Method

This paper reports on a quasi-experimental study with two *General English* classes for first-year students at a state university in the Eastern part of Indonesia. The two classes were randomly assigned to experimental and control groups. However, the members did not go through random selection for their assignment to join either group. White and Sabarwal (2014) mentioned the lack of random assignment as the main characteristic of a quasi-experimental design. Therefore, due to the researcher's limited control to randomly assign participants to the two groups, this design was deemed suitable for the current study.

Participants

This study concentrated on the population of Indonesian higher education EFL learners. Through the *Convenience Clustered Sampling* technique, 74 freshmen students from two classes in the department of English Education voluntarily participated in this study. For the consideration of the ethics, all interested students who wanted to participate were asked to complete the consent form before the pre-test. They were also informed that they could drop their participation at any point of the research process and if doing so, all the data associated with them would be then deleted.

The two classes were later randomly assigned as the experimental group (EG) and the control group (CG). This particular sampling technique was deliberately chosen to meet the assumption of randomization. The students were enrolled in a General English course delivered in two parallel classes taught by the same lecturer. The objective of this course is to introduce basic English language skills, which include vocabulary knowledge. One class was assigned as the control group (CG) comprising 38 students (22 females and 16 males) and the other as the experimental group (EG) comprising 36 students (21 females and 15 males). The students in the EG learned vocabulary through *Quizlet* as the

gamification tool which was downloaded on their mobile devices (smartphones and tablets) while those in the CG learned through regular drill practice techniques.

Research Procedure

This study was conducted in seven class meetings over seven weeks (approximately 11 hours). Prior to the treatment, members of both groups were given a pre-test to measure their vocabulary knowledge. In the first meeting, the EG students learned how to download and play *Quizlet* on their handheld gadgets. *Quizlet* is a mobile and web-based application designed for learning purposes in various subjects including Arts and Humanities, Languages, Math, and Science. The app could be freely downloaded on Android and iOS smartphones. For this study, the researcher along with the lecturer created five learning modules or study sets which could be assessed by the EG students through five modes: 'learn,' 'flashcard,' 'write,' 'match,' and 'test,' as seen in Figure 1. At week seven, the post-test was administered to members of both groups. In addition, the students in EG were asked to complete the questionnaire exploring their opinion of the adoption of mobile-assisted gamification (MAG).

Figure 1
Quizlet Interface on Mobile App
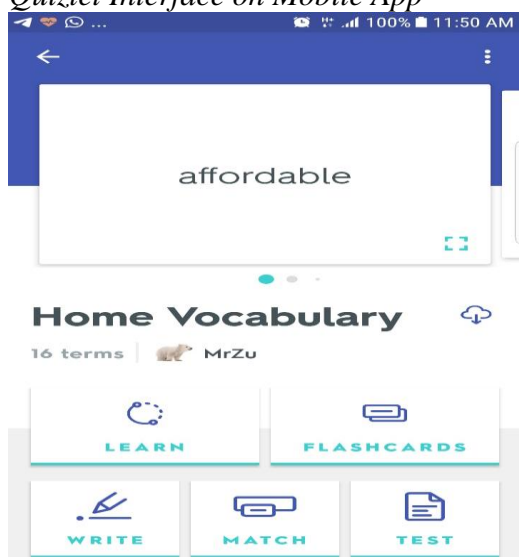
Research Instrument

In line with the research questions, two instruments—vocabulary tests and questionnaires—were used to collect the data. The vocabulary tests modified from the course textbook were administered twice (before and after the experiment) to the students in both groups to measure their vocabulary knowledge. Each pre- and post-test contained 30 questions, which were different in terms of vocabulary content yet similar in composition and characteristics. The questionnaire containing nine 5-point Likert items (with scores ranging from 5 to 1: 5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree) was designed via Google Form and sent to the EG students to elicit their opinion concerning the benefits of mobile game utilization in three aspects: learning

outcome, motivation, and enjoyment. The questionnaire was adapted from Abdul and Talib's (2017) and Vahdat and Behbahani's (2013) studies and later modified to fit this study.

Data Analysis

The data obtained from the vocabulary tests were analyzed through several steps. First, each of the students' answer sheets was manually scored and then analyzed with the SPSS 20 statistical software package to gain Mean (M), Median (Md), Mode (Mo), and Standard Deviation (SD). Second, to ensure that the data were suitable for the next test, the normality and homogeneity of variance assumptions were examined using the crucial significance value of $p < .05$. As the sample size for each group was smaller than 50, the Shapiro Wilk test was used to validate the presumption of normality. The normality assumption can be confirmed when the Sig. value of the *Shapiro-Wilk* test is greater than 0.05. A *Levene*'s test was used to ascertain the equality of variances in a test of the presumption of homoscedasticity. When the test result exceeds the critical value, the assumption of homogeneity of variance is met. Once all assumptions were assumed to be tenable, the third stage of data analysis using a paired-sample *t*-test was conducted with the level of significance set to 0.05 ($p < .05$) to assess the significance of discrepancies within each group between the pre-test and the post-test. Finally, to determine whether there were significant differences between the results of the EG and the CG students, an independent *t*-test was performed at the same level of significance. Meanwhile, the EG students' responses to the questionnaire were manually recorded in an Excel file. The recorded data were later analyzed with the SPSS 20 statistical software package and converted into statistical results to gain the mean score (M) and the standard deviation (SD) of each aspect of benefits.

Results

Efficacy on Vocabulary Learning Outcomes

The first research question pertains to the effectiveness of MAG utilization on EFL learners' vocabulary learning. To answer this question, both descriptive and inferential statistical analyses were conducted through four steps. First, a descriptive analysis was performed to obtain the mean (M), the median (Md), and the mode (Mo) scores and the standard deviations (SD) of vocabulary test of the students in experimental (EG) and control groups (CG). As presented in Table 1 Columns 4 and 7, the CG students obtained a mean score (M) of 6.48 with an SD of .56 in pre-test and M of 6.5 with an SD of .57 post-test. Meanwhile, the mean scores of the EG students were 6.48 and 7.46 with SDs of .63 and .49 respectively in the pre-test and the post-test.

Table 1
Result of vocabulary test and paired-sample t-test

Group	N	Test	M	Md	Mo	SD	t	df	p
1	2	3	4	5	6	7	8	9	10
EG	36	Pre-test	6.48	6.35	6.1	.63	37.17910	35	<.00001
		Post-test	7.46	7.4	7.3	.49			
CG	38	Pre-test	6.48	6.45	6.7	.56	.94140	37	.35261
		Post-test	6.5	6.5	6.6	.57			

A glance at the results of the descriptive statistic computation gives an impression that both groups show improvement of vocabulary knowledge in the post-test. However, a paired-sample *t*-test was conducted to evaluate differences between the pre- and post-tests results within each group. Prior to conducting this analysis, assumption testing was carried out to validate the normality and the constant variance of the data. A Shapiro-Wilk test was used to validate the tenability of the assumption of normality. As shown in Table 2 Columns 5, the test results of CG pre- and post-tests are .304 and .0721, while those of EG are .887 and .999. Since all the test results are greater than .05, it could be concluded the data in both groups were normally distributed. To test for homogeneity of variance, Levene's test was performed. Table 2 Column 9 shows that the significance of the pre-test homogeneity result between EG and CG is .819. Meanwhile, the significance of the post-test results between the two groups is .479. Since both results are above the threshold of .05, the equality of variance could be assumed.

Table 2
Results of normality and homogeneity tests

Test	Group	Shapiro Wilk			Levene			
		Statistic	df	Sig.	Statistic	df1	df2	Sig.
1	2	3	4	5	6	7	8	9
Pre-test	EG	.985	35	.887	.052	1	74	.819
	CG	.966	37	.304				
Post-test	EG	.993	35	.999	.506	1	72	.479
	CG	.947	37	.0721				

After the Normality and Homogeneity assumptions had been validated, the next stage of data analysis employing a paired-sample *t*-test was conducted to assess significant differences between the pre- and post-tests results within each group. As it could be observed in Table 1 Columns 8, 9, and 10, the results showed that for the CG students there was no significant improvement in vocabulary learning outcome ($t37 = .94140$, $p = .35261 > .05$). On the contrary, the EG students demonstrated a significantly improved performance in their vocabulary learning after the utilization of MAG ($t35 = 37.17910$, $p = <.00001 < .05$).
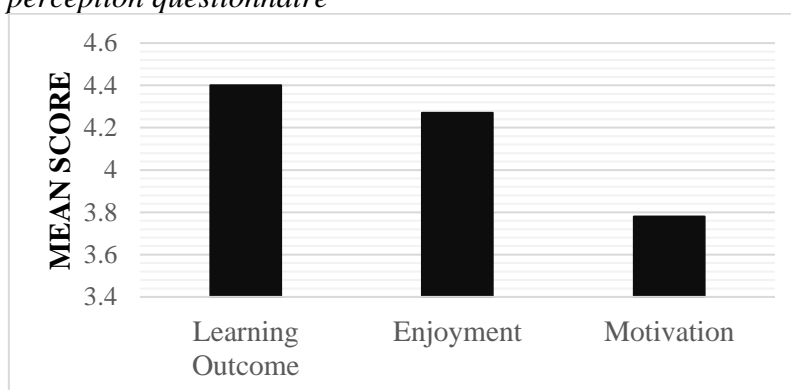
Table 3
Result of independent t-test

Test	Group	*M*	*SD*	*t*	*df*	*p*
1	2	3	4	5	6	7
Pre-test	EG	6.48	.63	-.01157	74	.99080
	CG	6.48	.56			
Post-test	EG	7.46	.49	-7.72083	74	<.00001
	CG	6.5	.57			

The last step of data analysis employed an independent-sample *t*-test to determine whether the differences between the pre- and post-test results of the EG and the CG students were significant. As presented in Table 3, the mean pre-test score of the CG students was 6.48, which is the same as that of the EG student. In line with this sheer discrepancy of mean scores, the results of the independent t-test also revealed similar findings emphasizing no significant difference between the two groups ($t74 = -.01, p = .99 > .05$). Contrary to the pre-test results, the EG and the CG students' post-test results showed a visible distinction between mean scores, with the former attaining 7.46 while the latter 6.46. The results of the independent t-test confirmed this claim of significant difference between the two groups ($t74 = -7.72083, p =< .00001 < .05$). To sum up, in regards to the first research question, these findings demonstrated that MAG utilization significantly affected the EFL learners' vocabulary learning outcomes.

Perceived Benefits

The second research question deals with the benefits that the students perceived by utilizing MAG for vocabulary learning. The statistical results of the data collected from the questionnaire indicated positive responses from the students (mean score 4.15). As presented in Figure 2, the students opined that the utilization of gamified vocabulary learning through mobile devices was most useful in improving their learning outcomes (mean score 4.40). followed by better learning enjoyment (means score 4.27). Meanwhile, the least benefit from the students' perspectives deals with their learning motivation (mean score 3.78).

Figure 2
Results of perception questionnaire

A closer look at the results reveals the degrees of agreement towards the perceived benefits in those three aforementioned categories: learning outcome, enjoyment, and motivation. As can be seen in Table 4, for the benefits related to learning outcomes, the students reported that mobile-assisted gamification was most useful in helping them improve their overall vocabulary mastery (mean score 4.51). In addition, they showed strong agreement regarding the use of digital games on mobile devices to help them understand and practice new words. The students reported that they could learn new words in an easier and faster way via MAG (mean score 4.37), and once they acquired the new words, they used them to practice those words for fluency development (mean score 4.33).

Table 4
Mean score value for benefits on learning outcomes

Num.	Benefit on Learning Outcome	Mean	Standard Deviation
1A	Learning through mobile-assisted gamification (MAG) improves my vocabulary mastery	4.51	0.66
1B	MAG helps me learn new vocabulary faster and more easily	4.37	0.65
1C	MAG helps me develop fluency with known vocabulary	4.33	0.52

Table 5 showcases students' perceptions of mobile game benefits in terms of enjoyment. In general, they strongly agreed that learning vocabulary became more enjoyable with the utilization of mobile games (mean score 4.40). In particular, the students reported enjoying practicing the words they had already known (mean score 4.27) more than learning new ones via mobile games (mean score 3.98).

Table 5
Mean score value for benefits on enjoyment

Num.	Benefits on Enjoyment	Mean	Standard Deviation
2A	MAG makes vocabulary learning enjoyable	4.40	0.62
2B	I enjoy learning new vocabulary via MAG	3.98	1.10
2C	I enjoy practicing known vocabulary via MAG	4.27	0.65

The last benefit of MAG utilization affirmed by the students was motivation. The students showed strong agreement on the beneficial value of MAG in motivating them to learn vocabulary (mean score 4.00), as seen in Table 6. However, for learning and drilling purposes, the students showed different degrees of agreement on their motivation-related benefits, with a higher degree of agreement towards the letter (mean score 3.92) compared to the former (mean score 3.42). In other words, the students reported being more motivated when using MAG for practicing the words they had already known compared to using them for learning new ones.

Table 6

Mean score value for benefits on motivation

Num.	Benefits on Motivation	Mean	Standard Deviation
3A	I'm so motivated to learn vocabulary via MAG	4.00	0.86
3B	MAG motivates me to learn new vocabulary	3.42	1.35
3C	MAG motivates me to practice known vocabulary	3.92	1.10

In brief, to address the second research question, these results revealed two main findings. First, the students affirmed three benefits of the utilization of MAG for vocabulary learning: learning outcome improvement, enjoyable learning experience, and motivation enhancement. Second, MAG utilization had the most benefit for learning outcomes and the least on motivation. Finally, since the statistical results of the data from the vocabulary tests and the online questionnaires yielded similar findings emphasizing the positive impacts of MAG on learners' vocabulary learning, this study, therefore, concludes that the effectiveness of MAG for vocabulary learning synchronizes the students' insights into their beneficial values.

Discussion

In this study, the use of MAG has been unsurprisingly effective in helping EFL learners gain new vocabulary knowledge and recall their knowledge of known vocabulary test content. In addition, it equipped them with the opportunity to extrapolate further with new content than their peers who learned vocabulary without MAG. Synchronized with the quantitative result, the self-rated assessment of learning outcomes mirrors this result. The students believed that the use of *Quizlet* as a gamified vocabulary learning tool in this study helped them improve their learning performance, confirming the legitimacy of mobile games for educational purposes. The success of MAG utilization for language learning can be attributed to the increased role that information technology plays in all facets of life. It might also be related to Prensky's (2001) theory claiming that the current generation of learners is digital natives who are attuned to using handheld devices to perform the majority of their daily tasks. However, it is important to note that this claim associating the success of MAG integration in this study with the digital native/immigrant theory is not readily interpreted to the validation of age as the only key variable to determine one's digital capability and fluency. To put it in other words, these positive results probably pertain to some other reasons such as access to technology, personal interest and adaptation, and other socio-economic and cultural factors. All in all, whichever comes to hand as the reason, the findings of this study validate the efficacy of mobile-assisted gamification (MAG) as one ideal educational tool for vocabulary learning, which allows EFL learners to continuously acquire new words and practice using them in and out of the classroom.

The efficacy of mobile games in enhancing vocabulary learning outcomes has also been reported in some other studies (Sanosi, 2018; Waluyo & Bucol, 2021; Wu, 2018). Sanosi (2018) found that *Quizlet* significantly improved vocabulary acquisition of Saudi

Arabian adult EFL learners with low proficiency. The efficacy of *Quizlet* in enhancing vocabulary learning outcomes of low-proficient adult EFL learners was also supported by Waluyo and Bucol (2021) who conducted their study in a Thai EFL setting. Working with EFL learners in Taiwan, Wu (2018) and Wu and Huang (2017) discovered that a mobile game-based English vocabulary practice system enhanced students' familiarity with vocabulary and consequently improved their learning outcomes.

A more enjoyable learning environment is another advantage of MGBL confirmed by the students. Enjoyment is indeed one of the main factors behind the adoption of games in classroom practice (Sweetser & Wyeth, 2005). When learners enjoy playing the games, their attentive, persistent, explorative, and competitive instincts through which learning takes place are assumed to increase. This finding reinforces those of previous studies highlighting that enjoyment may be a factor in the effectiveness of gamification for EFL learning (Ebrahimzadeh & Alavi, 2016; Hung & Young, 2015). Ebrahimzadeh and Alavi (2016) affirmed that "enhancing enjoyment through DVGs (digital video games) … may help students keep up through the long, time-consuming effort of second language learning" (p. 9). In line with this finding, Hung and Young (2015) argued that game-embedded handheld devices positively favor learner enjoyment.

The last perceived benefit of utilizing MAG for vocabulary learning is motivation enhancement. Among the inherent characteristics of digital games is competition, which drives a player to exhibit a sense of accomplishment and triumph while utilizing them. Thus, it is not surprising that the EFL learners in this study who reported enjoying *Quizlet* also found it motivating due to the sense of competitiveness while using it for learning and practicing vocabulary. They would try their best to memorize the words displayed on the app with the purpose to accomplish the highest score. However, it is also worth noticing that among the three perceived benefits, motivation enhancement was named the least useful. This might be caused by the students' different preferences regarding its aforementioned characteristics because, for some people, being in a competitive situation could be stressful and demotivating. This finding regarding motivation enhancement echoes that of Anjaniputra and Salsabila's (2018) study showing the adoption of *Quizlet* improved learners' motivation as well as attention span in vocabulary learning. Much the same as reported in Setiawan and Wiedarti's (2020) work, the students in their study gained higher learning motivation after the adoption of *Quizlet* However, a totally different result in terms of students' attention was reported in their study because of the utilization of mobile devices appeared to be a distraction from their focus.

Despite its positive results, this study has some limitations which, on one hand, restrict its generalizability, but, on the other hand, provide the potential for future research. Firstly, the sample size was relatively small; further studies involving larger sample sizes may generate more robust results. Secondly, this current study involved only two groups of EFL learners and was conducted in a seven-week duration. Therefore, future research needs to include more groups of students over a longer period for more comprehensive findings. Finally, this study employed only pre- and post-tests to measure the efficacy of MAG on vocabulary learning. Further studies using pre-, post-, and delayed post-tests are deemed necessary to examine whether its efficacy promotes short-term as well as long-term vocabulary learning.

Conclusion

This study utilized *Quizlet*, as a gamification tool that was accessed through mobile devices, for adult learners' vocabulary learning in the Indonesian EFL context. During seven weeks, the students participating in this study learned and practiced three sets of vocabulary, which were purposefully designed by the researcher in collaboration with the course lecturer. The findings revealed significantly improved learning outcomes for the students in the experimental group. Hence, it confirmed the effectiveness of MAG in scaffolding EFL teaching and learning. Regarding students' insights into the benefits, the results indicated that the utilization of MAG was useful in three aspects: improved learning performance, a more enjoyable environment, and increased learning motivation. To conclude, the effectiveness of MAG utilization in vocabulary learning positively correlates with its benefits as perceived by the students.

One important point of which all teachers in this digital era should be aware is that their learners are digital natives, who have a close attachment to portable tech gadgets. Hence, the use of educational technologies is inevitable. The results of this study offer some pedagogical implications suggesting the utilization of games and mobile technology for EFL teachers and learners. For teachers, the adoption of mobile games in their classroom practices may minimize issues related to limited teaching time and provide students with more opportunities to self-learn, practice, and produce language outputs. However, it is suggested that the adoption of MAG be modified to meet the curriculum. Furthermore, in selecting the ideal digital games to use in class, the variety of features and modes should be considered since they may facilitate students' different learning styles and encourage learning autonomy and self-regulation. For EFL learners, it is advised to explore various mobile game-based learning applications to broaden as well as to develop English language skills for an individual as well as collaborative learning. Furthermore, as digital natives, they need to be aware of the potential of game apps available on their gadgets to facilitate learning and the function of mobile devices beyond their entertaining and networking purposes. Finally, smartphone use in educational settings may become a source of distraction. Thus, it is strongly advised for both teachers and learners to set class regulations prior to the adoption of MAG to minimize the negative impacts.

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