A Systematic Review of Vocabulary Learning with Mobile-Assisted Learning Platforms

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Abstract
This paper presents a systematic review of relevant published studies on the use of mobile-assisted learning platforms in vocabulary learning. This systematic review aims to explore the effectiveness of the mobile-assisted learning platforms on the vocabulary learning of ESL/EFL learners and the perceptions of students in the learning of vocabulary using mobile-assisted learning platforms. Following a systematic search and application of inclusion and exclusion criteria, twenty studies were retained and subjected to data analysis and synthesis for the systematic review. Google Scholar, ScienceDirect, Educational Resources Information Centre (ERIC), SAGE, Scopus, Springer e-journals, Web of Science and JSTOR databases were searched to identify relevant studies. Results indicate that the mobile-assisted learning platforms aid ESL/EFL learners in vocabulary acquisition, enhance vocabulary retention, increase motivation and provide rich and supplemental language learning materials and experience. The findings of the past related studies also highlight that students perceived vocabulary learning using mobile-assisted learning platforms as efficient, easy to use, flexible and accessible, satisfying, entertaining and interesting. However, there are also some negative perceptions of students towards the use of mobile-assisted learning platforms in the learning of vocabulary. As mobile-assisted learning platforms bring more advantages than disadvantages, educators and teachers shall explore and implement them in language classrooms to engage and motivate students in vocabulary learning.
 Keywords: Vocabulary Learning, MALL, Systematic Review, ESL, EFL

Introduction
        Generally, almost everyone from all walks of life owns a mobile device. Mobile devices have become indispensable in our daily lives that one cannot live without. With the rapid development of mobile devices, functioning from telephone to the camera and even laptop, mobile devices have become efficient learning tools. In fact, mobile devices have changed the way of gaining knowledge, supporting distance learning and e-learning while at the same time fulfilling learners' needs. Mobile-assisted Language Learning (MALL) with the use of mobile

applications has become highly well-known, especially among students at schools and universities. According to Govindasamy et al (2019), Mobile-assisted Language Learning (MALL) is a type of language learning method that is assisted through portable devices such as mobile phones, tablet, and MP3 players, which provide learners access to knowledge and information of any language that can help them in improving their language skills. The best feature that MALL can offer is its mobility and accessibility that allows learning to take place not only in the classroom but also outside of the classroom, which makes learning less formal, spontaneous and more personalised. At present, various mobile applications help learners learn a language more efficiently with better time management (Rahimi & Miri, 2014). Learners can first download relevant mobile applications and access information with Internet browsers. They can learn informally through mobile dictionaries instead of sparing time to attend traditional classroom-based courses.

In Malaysia, English is one of the core subjects and is taught as a second language in all Malaysian schools for both primary and secondary schools. Being able to communicate effectively and efficiently using English in different contexts is the aim of English Language instruction in Malaysian schools. At the university level, undergraduate students are also expected to achieve a minimum level of English proficiency before they graduate (Heng, 2012). This shows the emphasis that has been given to the English language in the Malaysian curriculum. Besides having better advantages in terms of educational opportunities, students with good knowledge of English have higher chances of securing a good job. However, many students have spent years in primary and secondary school learning English but still not fail to master the language by the time they complete secondary education (Hiew, 2012). Many remedial courses were also conducted in Malaysian universities to help students who show poor English proficiency improve their English (Heng, 2012).

To ensure English language learning takes place, Aslan (2016) mentioned that the acquisition of new words or, in other words, vocabulary learning plays an important role. When a student has mastered the vocabulary, he or she will have lesser difficulties in understanding unfamiliar words, and messages could be conveyed effectively. Therefore, vocabulary learning is vital to ensure that students are equipped with sufficient vocabulary knowledge before producing the language. In the learning process of vocabulary, one of the main challenges is retaining newly learned words (Amiryousefi & Ketabi, 2011; Huang et al., 2012). However, it is challenging for language teachers to help students master a new language or second language vocabulary, not to mention identifying the best way to help students of different proficiency levels and needs with the learning of vocabulary. Language teachers have attempted to explore different vocabulary learning strategies to facilitate vocabulary acquisition and retention to address these challenges. With the vast development of mobile technologies, one of the ways is to use mobile-assisted learning platforms, which are proven by Lin and Lin (2019) to affect second language vocabulary learning positively.

Research Objectives and Research Questions
This systematic review aims to present a synthesis of empirical evidence found in the past related studies on the use of mobile-assisted learning to enhance ESL learners' vocabulary learning so that further intervention development and research in this area can be conducted. The purpose of the study is to answer the following questions:
1. How do mobile-assisted learning platforms affect the vocabulary learning of ESL learners?
2. What are the perceptions of students in learning vocabulary using mobile-assisted learning platforms?

Literature Review
Vocabulary Learning in the Second Language/ Foreign Language

Vocabulary is the basis of all four skills. With words mastery, learners can find vast improvements in their language learning process. According to Thornbury (2002), when language learners are trying to understand a second or foreign language, they face challenges to use the correct form of words to fit the intended meaning and it can be frustrating when the store of words of the learners is limited for them to do so. Therefore, to address these challenges, learners must learn as many words as possible to understand and produce the target language. Learners shall also be able to remember words in the long term and recall them anytime. However, in schools and educational institutions, students are asked to memorise word lists, making students feel bored to learn the language. Khansarian-Dehkordi and Ameri-Golestan (2017) agreed with that as the traditional way of teaching is still prevalent in educational institutions. Similarly, Zoghi and Mirzaei (2014) also pointed out that contextualised vocabulary training makes vocabulary learning dull and learners find it hard to learn vocabulary since the vocabulary is learned in isolation.

Thus, Pinter (2017) suggested that teachers shall present or introduce vocabulary in various ways. Teachers can start introducing vocabulary that children can see, touch, feel, and experience in their everyday lives using classroom objects, realia, and pictures. Besides, vocabulary can also be presented through translation, actions, definitions and different situations. When teachers find it complicated to explain the meaning of a word in the second language, the translation method can be a quick way to convey meanings to learners and help them learn the words. However, this method should be integrated at a suitable time without being overused. Furthermore, visual aids that help connect the learners' previous knowledge to new knowledge can present vocabulary in the classroom and practice and revision purposes. They are suitable for explaining concrete items of vocabulary and appear to be memorable for students. Rukmini and Sutopo (2013) claimed that using pictures in vocabulary games increased students' motivation gradually, leading to improved vocabulary knowledge. Thus, the use of visual aids increases not only vocabulary retention but also the students' motivation. Besides, previous studies showed that incidental and intentional learning strategies contribute to vocabulary learning (Ahmad, 2012; Meganathan et al., 2019). The study of Karami and Bowles (2019) on a group of students using a mixed method of intentional and incidental vocabulary learning retained the vocabulary for a more extended period. Therefore, teachers and educators should combine intentional and incidental vocabulary learning to increase the effectiveness of the vocabulary learning process.

Mobile-assisted Language Learning (MALL)

A series of studies have indicated the advantages of using technology in the classroom. Technology offers borderless and endless resources to language learners with Internet connectivity. There have been a number of studies regarding MALL to investigate the use of mobile devices to improve different language skills, including an exploration of listening skills (Azar & Nasiri, 2014), speaking skills (Kusmaryani et al., 2019), reading skill (Lin, 2014) and writing skill (Fattah, 2015). Access to MALL applications that provide audio aids can expose learners to listening to the target language more often, even when carrying out their daily routine. Azar and Nasiri (2014) examined the learners' attitudes toward the effectiveness of MALL in second language listening comprehension by comparing the mobile phone-based audiobooks and the CD-ROM or cassette-based audios. Results showed better performance in the experimental group receiving instruction through mobile phone-based audiobooks and

participants agreed that MALL is more effective to help them improve their listening comprehension. Learners can access their topics of interest and listen to them anywhere and anytime. Subsequently, Kusmaryani et al. (2019) also conducted a study of 38 university students on the use of mobile applications to assist their speaking skills and critical thinking in learning the English language. Online and offline mobile applications were used in the study as supplementary outside of the classroom for skills practice, material searching and communication purposes. Positive results were observed and the students gave positive feedback during the interview. MALL can be integrated to support extensive reading to help learners understand texts and increase vocabulary knowledge. Lin (2014) found that learners favour mobile devices over desktop computers for extensive online reading due to mobile devices' mobility and spontaneity. A study was conducted to study the effectiveness of using WhatsApp mobile application as a learning tool in developing the writing skills of students (Fattah, 2015). It developed students' punctuation marks and sentence structure as they used mobile devices to chat with their friends, write comments and send text messages for free. The integration of Mobile-assisted Language learning (MALL) in vocabulary learning has also gained the interest of many researchers lately. Anandha et al (2021) found that the use of Kahoot helped special needs students in learning English vocabulary as students were highly motivated by the leader board of the game and the excitement of the learning activity in Kahoot. A comparison was made in the study of Rahimi and Miri (2014) to investigate the use of mobile dictionaries and paperback dictionaries on language learning. Besides showing better improvement of English language ability in the learners who used the mobile dictionary, the findings proved that mobile dictionary, which offer a variety of learning tools, is portable and practical to be used outside of the classroom when the learning time in the classroom is insufficient. Some mobile dictionaries also come with functions like images, pronunciations and videos to help learners to learn vocabulary effectively.

Despite having good perceptions of the use of mobile-assisted vocabulary learning, some limitations cannot be avoided (Azabdaftari & Mozaheb, 2012; Finardi et al., 2016). Some students faced technical difficulties while the mobile-based vocabulary notebook and no mobile connection coverage might prevent students from reading the SMS vocabulary lessons. The mobile phone screen size can be a limitation in using mobile phones to learn vocabulary (Azabdaftari & Mozaheb, 2012). Some students found it hard to view the vocabulary knowledge when they used smaller size of mobile phones due to poor graphics presentation. For students who have financial problems, buying a mobile phone and subscribing to mobile internet data in mobile-assisted vocabulary learning can be pretty burdensome. In addition, to master a language, learners shall also get the chance to practise using the vocabulary they learned orally in conversation. However, Finardi et al (2016) claimed that the Duolingo mobile application did not give opportunities to learners for social interaction to link learners to different contexts which are helpful for their daily life conversation. Therefore, the limitations of using MALL should also be looked into and taken into consideration in the teaching and learning of vocabulary so that the effectiveness can be maximised.

Method
In order to answer the research questions, this study is conducted following the three basic steps: (1) planning the review, (2) conducting the review, (3) reporting the review. In the first step, the systematic review was carefully planned. The research questions were formulated and the review protocol was developed. A broad search was conducted in the second step to

select studies related to mobile-assisted vocabulary learning based on the defined inclusion and exclusion criteria. Data from the studies were extracted from the different articles for quality assessment before data synthesis. In the third step, a clear and detailed report on the review was written.

Search Strategy

A broad systematic search in the international online databases which contain educational research was conducted. The databases include Google Scholar, ScienceDirect, Educational Resources Information Centre (ERIC), SAGE, Scopus, Springer e-journals, Web of Science, JSTOR. The common search keywords used in the above database were mobile technology, mobile applications, mobile-assisted learning, mobile-assisted vocabulary learning, mobile technology, vocabulary teaching and vocabulary learning, and vocabulary acquisition. The database searches were limited from 2011 to 2021 (researches carried out over the past ten years) and yielded 3232 results.

Selection Process, Inclusion and Exclusion Criteria

After the initial search, the title and the abstract of the search results were screened. Following the title and abstract screening, the articles were assessed whether they were eligible for the systematic review. The following inclusion and exclusion criteria were developed and used in this study to filter further the studies yielded. Through the application of the criteria below, 18 articles were accepted for the systematic review. Figure 1 illustrates the selection process of the study.

Inclusion criteria:
1. Research must be conducted at the primary, secondary, or tertiary level.
2. Research must be conducted to teach English as a second language (ESL) or English as a foreign language (EFL) context.
3. Research must be conducted in the teaching and learning of vocabulary.
4. Research must be conducted on mobile-assisted language learning.
   Exclusion criteria:
1. It involved other settings such as early education settings, workplace and public settings.
2. It involved the teaching of other languages.
3. It involved the teaching and learning of other language skills such as listening, speaking, reading and writing.
4. It involved computer-assisted language learning and digital computer games
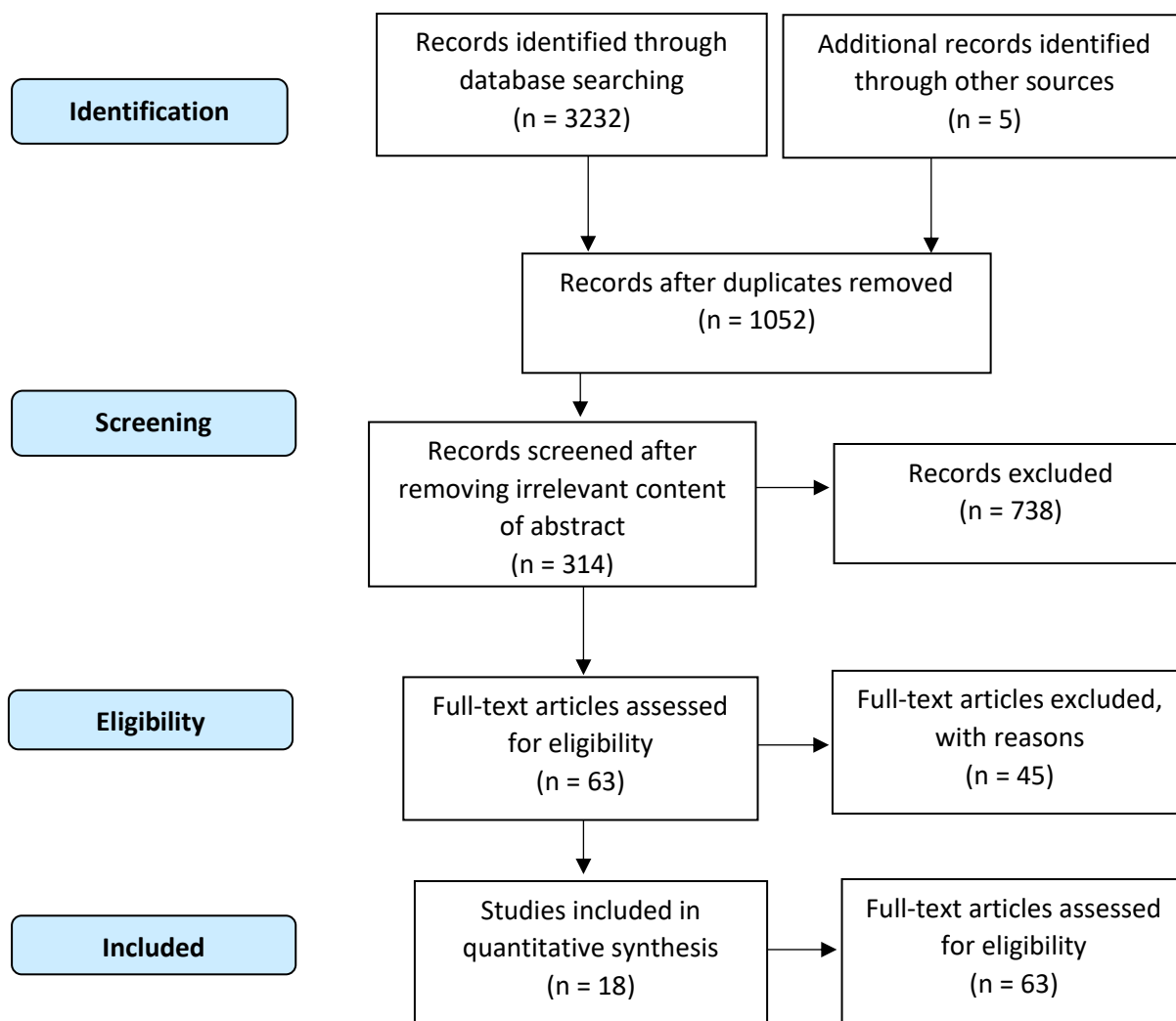
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                           │ eligibility            │   │ reasons              │
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Figure 1
Selection Criteria and Process

Findings and Discussion

Eighteen eligible journal articles related to mobile-assisted vocabulary learning from 2013 to 2021 were included in this systematic review. Among them, one was published in 2013, 2015 and 2016 respectively, three in 2018, and four in 2018 and 2019 respectively and five in 2016, which was the peak of the publications. These articles were from Turkey, Taiwan, Thailand, China, Korea, Columbia, Saudi Arabia, Czech, Indonesia, Hong Kong and Malaysia. Nevertheless, the highest number of relevant articles originated from Taiwan. The findings to support the mobile-assisted vocabulary learning of ESL and EFL learners and their perceptions of using the mobile-assisted vocabulary learning platforms are summarised in Table 1, 2, 3 4 and 5 as follows.

Table 1
Overview of Past Related Studies Conducted Using Interactive Mobile Games

	Authors	Tools	Country	Primary data sources	Respondents
1	Kohnke (2020)	Alphabet vs Aliens @PolyU	Hong Kong	interviews	14 undergraduate students
2	Hao, Lee, Chen & Sim (2018)	"Detective ABC"	Taiwan	surveys, interviews, observations and exams	10 seventh-graders

Table 2
Overview of Past Related Studies Conducted Using Commercial Mobile Applications

	Authors	Tools	Country	Primary data sources	Respondents
1	Aslan (2016)	mobile dictionaries	Turkey	structured questionnaire	78 students
2	Guaqueta & Castro-Garces (2018)	Duolingo and Kahoot	Colombia	diagnosis test, development test, a final survey	13 girls and 7 boys from 14 to 17 years old
3	Chen, Liu, Huang (2019)	PHONE Words app	Taiwan	questionnaire, pre-test, post-test, delayed post-test, log files of usage, interview	20 sophomore students
4	Deris & Shukor (2019)	mobile apps	Malaysia	interviews and surveys	33 students
5	Klimova & Polakova (2020)	Angliˇctina (English) TODAY	Czechia	Questionnaire	28 university students
6	Kongcharoen, Prasunpaengsri & Wongmeekaew (2017)	mobile translator app	Thailand	pre-test, post-test, questionnaire	40 third grade primary school students
7	Setiawan & Wiedarti (2020)	Quizlet	Indonesia	Wilcoxon test, observation checklist	65 tenth-grade students
8	Wang & Shih (2015)	The Most Important 2000 TOEIC Words	Taiwan	pre-test, post-tests, questionnaire	93 Taiwanese college students
9	Ali & Ghazali (2016)	VocBlast	Malaysia	Interview	4 female English language teachers

Table 3

Overview of Past Related Studies Conducted Using Social Media Applications

	Authors	Tools	Country	Primary data sources	Respondents
1	Bensalem (2018)	WhatsApp	Saudi Arabia	Pre-test, post-test, post study questionnaire	40 Arab EFL students
2	Ko (2019)	NaverCafe	Korea	Close-ended survey, open-ended surveys	208 undergraduate students
3	Khansarian-Dehkordi & Ameri-Golestan (2017)	Line	Iran	pre-test, post-test, delayed post-test	80 EFL learners
4	Rezaei, Neo & Pesaranghader (2013)	Line	Malaysia	pre-test, post-test, questionnaire	42 Students studying English for Academic Purposes

Table 4

Overview of Past Related Studies Conducted Using Mobile Internet Connection

	Authors	Tools	Country	Primary data sources	Respondents
1	Govindasamy, Yunus & Hashim (2019)	Internet browser	Malaysia	achievement test, pre-test, post-test	50 Form 5 arts stream pupils
2	Lin & Yu (2016)	MMS	Taiwan	Survey, achievement test, questionnaire	32 eighth graders

Table 5

Overview of the Past Related Study Conducted Using Both Mobile Internet Connection and Social Media Application

	Authors	Tools	Country	Primary data sources	Respondents
1	Wang, Hwang, Yin & Ma (2020)	Internet browser & WeChat	China	vocabulary test, survey, interview	55 freshmen students

Among the studies, two articles were identified to use interactive mobile games to enhance students' vocabulary learning (Kohnke, 2020; Hao et al., 2019). In most of the studies, the researchers focussed on exploring the use of commercial mobile applications in learning vocabulary (Ali & Ghazali, 2016; Aslan, 2016; Chen et al., 2019; Deris & Shukor, 2019; Guaqueta & Castro-Garces, 2018; Klimova & Polakova, 2020; Setiawan & Wiedarti, 2020; Wang & Shih, 2015). Other than that, four of the studies were identified to use social media applications in vocabulary learning (Bensalem, 2018; Khabsarian-Dehkordi & Ameri-Golestan, 2017; Ko, 2019; Rezaei et al., 2013). In addition, there were also researchers exploring the

effectiveness of multimedia presentations on learning second language vocabulary using mobile phones (Lin & Yu, 2016) and the effectiveness of word search using mobile phones for vocabulary learning (Govindasamy et al., 2019). On the other hand, a study conducted using the mobile internet connection and social media application WeChat (Wang et al., 2020) was included.

To answer research question 1 and 2, themes were coded from the 18 journal articles to shed light on the ways mobile-assisted learning platforms affect the vocabulary learning of ESL learners and students' perceptions on the use of mobile-assisted learning platforms in vocabulary learning.

The Ways Mobile-assisted Learning Platforms Affect the Vocabulary Learning of ESL Learners

Aid Vocabulary Acquisition

Many studies have proven that the use of mobile-assisted learning platforms aided vocabulary acquisition by showing promising post-test results after the intervention through mobile-assisted learning platforms (Chen et al., 2019; Govindasamy et al., 2019; Guaqueta & Castro-Garces, 2018; Hao et al., 2019; Rezaei et al., 2013; Wang et al., 2020). The positive results of the post-test in the study of Chen et al (2019) were due to the gamified vocabulary assessment, which promoted exciting competition among students that aided vocabulary acquisition. Besides, the detailed information of vocabulary that the mobile-assisted learning platform provided and the search engine in the mobile devices allowed students to better understand the meaning of the target vocabulary and pronounce and spell out the words accurately (Aslan, 2016; Chen et al., 2019).

The relationship between vocabulary acquisition and the multimedia aids in the mobile-assisted learning platforms is always discussed in past studies and cannot be ignored. Rezaei et al. (2013) emphasised that multimedia is an excellent tool in vocabulary development as mobile-assisted learning platforms provide a variety of multimedia aids that cannot be assessed through traditional learning methods. The researchers further stated that multimedia aids in the mobile-assisted learning platforms could also enhance incidental vocabulary learning. When students could not understand the meaning of words, images helped to provide a more explicit meaning of words (Deris & Shukor, 2019). Audio pronunciation provided by the mobile-assisted learning platforms was also helpful in vocabulary acquisition (Aslan, 2016; Guaqueta & Castro-Garces, 2018; Hao et al., 2019). One of the famous mobile-assisted learning platforms that provide audio pronunciation or didactic tools was Duolingo. It was used to conduct the study by Guaqueta & Castro-Garces (2018), which helped students acquire vocabulary. Furthermore, Klimova & Polakova (2020) study provided corrective feedback to students through the mobile-assisted learning platform and notifications were also sent to students at least twice a week as a reminder for them to study regularly which could enhance students' acquisition of words for better communication skills.

Enhance Vocabulary Retention

With the help of mobile-assisted learning platforms in vocabulary learning, students have better vocabulary retention (Chen et al., 2019; Khansarian-Dehkordi & Ameri-Golestan, 2017; Ko, 2019; Lin & Yu, 2016; Wang & Shih, 2015; Wang et al., 2020; Ali & Ghazali, 2016). Ali and Ghazali (2016) found out that pictures as clues in the mobile-assisted learning platform were helpful for the students to recall the technical vocabulary, which resulted in vocabulary retention. Pictures could also be presented with sounds and meaning to help with the

vocabulary retention of students (Lin & Yu, 2016). Similar findings were found in the study of Wang et al. (2020), as students had better memory retention of the targeted vocabulary with sounds and pictures.

Gamification is one of the exciting features found in mobile-assisted learning platforms. According to Chen et al (2019), gamified features in mobile-assisted learning platforms were conducive to vocabulary learning as the exciting, fun, attractive, interactive and authentic gamified assessment features and game competition mechanism contributes to better word retention and enhanced learning outcomes. In Wang & Shih (2015) findings, the researchers used the free mobile application with three difficulty levels in their study. The experimental group studying vocabulary using the targeted application managed to significantly recognise and recall more words when given a test right after completing the mobile vocabulary learning treatment.

Social media as mobile-assisted learning platforms could help enhance students' vocabulary retention. In the study of Ko (2019), students used Navercafe, to help them recall word meanings. Besides improving themselves by using the target language for sentence construction accurately in grammar and punctuation, students were better and precise in vocabulary usage, especially when it comes to different parts of speech in vocabulary. Khansarian-Dehkordi & Ameri-Golestan (2017) also discovered that the usage of Line mobile application improved students' ability in remembering target words over time and detected the errors they made in the Line group chat they had created.

Increase Motivation

Increasing students' motivation is another crucial role of using mobile-assisted learning platforms in vocabulary learning (Bensalem, 2018; Chen et al., 2019; Deris & Shukor, 2019; Hao et al., 2019; Kongcharoen et al., 2017; Rezaei et al., 2013; Wang et al., 2020). With the help of mobile-assisted learning platforms, students would be motivated to learn more. Kongcharoen et al. (2017) discovered that the participants in their study were satisfied utilising the Camera instant translator mobile-assisted learning platform in learning vocabulary as their motivation level increased with the use of the mobile applications. Bensalem (2018) also supported the statement as students in his study indicated that WhatsApp mobile application motivated them to complete their vocabulary tasks given, utilising the convenience of flexible settings in terms of time and place available at their tempo.

Multimedia, which offers pictures and animation, increases the motivation of students to learn vocabulary. The study of Rezaei et al (2013) found the definitions of vocabulary that were visualised in a meaningful manner in the mobile-assisted learning platform made the students more motivated to learn vocabulary. In the study of Wang et al (2020), students created their own vocabulary illustrations and shared them in the WeChat group chat, which benefited and motivated them to continuously improve and produce a better quality of vocabulary illustration for their peers. This study is in line with Krashen (1988), who mentioned that higher motivation levels of students lower the affective filter of students in second language acquisition.

Besides, students' motivation, both typically and naturally, is closely related to the student's enthusiasm for learning. Chen et al (2018); Deris & Shukor (2019) conjectured that mobile-assisted learning platforms' fun and exciting elements make vocabulary learning favourable. This is because the game features in the mobile-assisted learning platforms trigger students to learn more and participate in the learning process. Besides game features,

Hao et al. (2019) found that students were more motivated when they had more opportunities to speak English and compete with their friends.

Provide Supplemental Language Learning Materials and Rich Experience

Beyond the delivery of lessons and lectures, mobile-assisted learning platforms provide students with supplemental language learning materials which are effective in helping students learn vocabulary (Aslan, 2016; Govindasamy et al., 2019; Guaqueta & Castro-Garces, 2018). Besides learning the vocabulary from the textbook in a conventional way, students can use mobile technology to search for supplemental materials, promoting independent learning. For instance, Govindasamy et al (2019) found that students searched on the image, vocabulary pronunciation, vocabulary usage and origin as additional knowledge that usually cannot be found in the textbook. These additional language learning materials act as catalysts in empowering the teaching and learning vocabulary in traditional ESL classrooms. Aslan (2016) also discovered by browsing the Internet, participants acquire extra vocabulary knowledge which helped them better understand the learning content in their textbooks or coursebooks. With mobile technology, students can improve their English and be more active when they can access vocabulary knowledge easily. The students in the study of Guaqueta and Castro-Garces (2018) believed that technology eased their vocabulary learning process as they managed to do self-correction and actively participated in the learning process with the help of supplementary vocabulary knowledge using their mobile devices.

Learning vocabulary through mobile-assisted learning platforms was also found to provide students with rich learning experiences (Chen et al., 2019; Rezaei et al., 2013; Ali & Ghazali, 2016). Gamification is one of the techniques used to provide students with rich learning experiences. Chen et al (2019) stated that The PHONE Words learning app provides the experience of taking vocabulary assessment via games in a competitive manner, improving learning outcomes. The researchers further agreed that game-related features provide students with different learning experiences that enhanced interaction and participation and eliminated boredom and drilling. Ali & Ghazali (2016) suggested that VocBlast helped players use their deductive and inductive thinking to determine each game's answers.

The Perceptions of Students in the Vocabulary Learning using Mobile-assisted Learning Platforms
Efficiency

The efficiency of the mobile-assisted learning platforms is one of the aspects students looked into when they gave their feedback. Govindasamy et al. (2019) compared using a mobile device and a printed dictionary to look for the definitions of vocabulary involving 50 secondary ESL students. The results showed that mobile phones promoted a deeper understanding of vocabulary knowledge than printed dictionaries due to the faster learning of words via mobile phone than the conventional way. Using a printed dictionary to learn the word's pronunciation is less efficient as students who have not mastered the phonetic symbols find it difficult to comprehend the phonetic symbols in the dictionary. In the findings that mirrored Govindasamy et al (2019), the results from the study of Lin and Yu (2016) and Deris and Shukor (2019) revealed that most of the students gave positive feedback on the efficient use of mobile-assisted learning platforms due to the benefits of media or multimedia aids in helping them to learn new vocabulary. The set of target words presented in text-

picture, text-sound and text-picture-sound aids in the study of Lin and Yu (2016). The audio input of the new words using MMS was able to help in the retention of definitions and reduced the cognitive load. Some students might have forgotten some words that they had learned. However, with the help of audio clues and pictures, they could recall the definitions even after two weeks. Similar findings were found in Deris and Shukor (2019) study as students loved media such as images and audio pronunciation in the vocabulary learning mobile learning platforms. The audio recording served as a guide in the pronunciation of words, while the images helped them understand new words better and remember the words. This proves that the use of images and audio was effective in helping students to learn new vocabulary better than learning vocabulary only with text or text with pictures.

Ease of Use

Findings showed that students have positive acceptance towards mobile-assisted learning platforms due to ease of use of the mobile-assisted learning platforms (Aslan, 2016; Deris & Shukor, 2019; Ko, 2019; Kongcharoen et al., 2017; Wang et al. 2020). Most students in the study of Aslan (2016) loved the mobile dictionaries applications as they made the information easy to access and easy to be used. Students in the study of Kongcharoen et al. (2017) also perceived that the Camera instance translator in mobile devices was easy to use. It helped them to translate English vocabulary and the meaning into Thai words instantly that saved students' time and energy. This was supported by Deris and Shukor (2019) study, as students also thought the use of mobile-assisted learning platforms helped them save their time and energy in learning vocabulary since they could be downloaded to their mobile devices easily and not difficult to be accessed and used. Ko (2019) studied the students' reactions in using mobile devices and the NaverCafe social media for vocabulary feedback using a similar focus. Giving vocabulary feedback using mobile devices and social media allowed students to actively participate in the learning process because it was convenient to type using their mobile devices, which have been a routine for them. Students felt comfortable and less nervous using the mobile devices during vocabulary lessons, which helped them pay attention and increase participation. Wang et al (2020) found that easy access to mobile devices and mobile applications could affect the possibility of students using the mobile-assisted learning platforms in the future.

Flexibility and Accessibility

The mobile-assisted learning platforms students use to learn vocabulary shall be flexible and accessible according to the convenience of the students. Students in the studies of the chosen articles reported positive acceptance towards the use of mobile-assisted learning platforms. Students claimed that the mobile applications saved their time and they could use the mobile-assisted learning platforms everywhere (Deris & Shukor, 2019; Wang et al., 2020). Students even accessed the mobile-assisted learning platforms and practised vocabulary while travelling to university (Kohnke, 2020). They loved the ubiquitous nature of the vocabulary apps. During the Covid-19 pandemic, flexibility and accessibility of the mobile-assisted learning platforms eliminated the factor of time and place from education restrictions. Mobile-assisted platforms serve as indispensable tools for online learning as learners can access the online library resources, lecture notes and assignments from mobile-assisted learning platforms at their own pace which makes vocabulary learning at home possible. Students are in charge of their own learning space and they can pick their free time to assess their learning materials and do revision as often as they want via multimedia usage

(Rezaei et al., 2013). Other than that, Bensalem (2018) insisted that the flexibility and accessibility features are significant for students to submit assignments amid learning vocabulary. When students found the convenience in terms of the time and place, they were more enthusiastic to complete their given vocabulary assignment. Students in this study also loved the function of sending and receiving messages in the application by constructing and sending their sentences using target vocabulary in the WhatsApp group and getting quick feedback for corrective purposes. According to Klimova & Polakova (2020), students preferred learning vocabulary via mobile-assisted learning platforms compared to textbooks and coursebooks because they could quickly get the resources via Internet access. In addition, Aslan (2016) also found out that the portability and the accessibility of the mobile dictionaries are the features favoured by the students as compared to the giant dictionaries because learning opportunities are not restricted when students could learn vocabulary instantly and carry out the learning activities at any moment. Govindasamy et al. (2019) shared the same opinion as students in their study who have improved their vocabulary knowledge with the help of mobile dictionaries where the resources can be accessed and searched at any point in time.

Entertaining and Interesting

Students and teachers felt tired of the conventional ways of teaching vocabulary (Rezaei et al., 2013). With the introduction of mobile-assisted platforms, this problem was rectified as students found learning vocabulary with mobile-assisted platforms entertaining and interesting (Chen et al., 2019; Deris & Shukor, 2019; Guaqueta & Castro-Garces, 2018; Ko, 2019; Kohnke, 2020; Lin & Yu, 2016; Rezaei et al., 2013). The element of games in the mobile-assisted learning platform was students' favourite (Chen et al., 2019; Deris & Shukor, 2019; Kohnke, 2020). Students felt relaxed while learning as they did not feel pressured to study a textbook. They also loved the idea of a ranking system and competing against their friends on the mobile-assisted platforms. Some students claimed that they did not realise the time pass once they started playing the activities in the mobile-assisted platform. It means that when students learn using mobile-assisted learning platforms, they learn in a stress-free and enjoyable environment (Deris & Shukor, 2019). Furthermore, when the tasks become challenging, interesting and exciting, it helps with vocabulary retention (Chen et al., 2019). With technology, students also found mobile-assisted learning platforms come with multimedia aids, making vocabulary lessons interesting and enjoyable (Lin & Yu, 2016). Students in Klimova and Polakova (2020) also preferred learning using mobile-assisted learning platforms than textbooks since it was more fun and less stressful. Guaqueta & Castro-Garces's (2018) study remarked that students pointed out that the use of Duolingo and Kahoot changed their English learning experience as students were allowed to have more didactic activities, which led to students having fun while learning and increasing vocabulary knowledge. The students were even interested to learn other topics using mobile-assisted learning platforms due to the fun and interesting ways of learning.

Satisfaction

Satisfaction shows students' acceptance in using the mobile-assisted learning platforms to learn vocabulary. Findings showed that students were willing to continue using the mobile-assisted learning platforms to learn vocabulary and other skills or courses in the future (Deris & Shukor, 2019; Klimova & Polakova, 2020; Wang et al., 2020). Students in Deris & Shukor (2019) study were satisfied with learning vocabulary through mobile-learning

assisted platforms because those platforms provide guidance to complete their tasks. They expressed continuous support to the mobile-learning assisted platforms and would recommend others to use them for vocabulary learning. Klimova & Polakova (2020) thought that students who would implement the mobile-assisted learning platforms in future courses might because they liked the new learning way and were familiar with the platforms, and treated them as inseparable learning tools. Students in the study of Wang et al. (2020), on the other hand, loved the collegiality sense when using the mobile-learning platform. It also reduced boredom and repetitiveness of the traditional way of learning (Chen et al. 2019). Having the opportunity to receive teacher's comments and feedback, students showed satisfaction learning vocabulary using social media (Ko, 2019). They also felt a sense of accomplishment when they could improve and complete the vocabulary activity in the mobile-assisted learning platform. Furthermore, some mobile-assisted learning platforms provide immediate corrective feedback and report analysis. These functions favoured the students in Wang and Shih (2015) study as they could learn vocabulary intentionally on their own mobile devices, which helped students understand their learning status and enhance learning motivation.

Limitations of Mobile-assisted Learning Platforms

Nevertheless, there were also negative perceptions of the mobile-assisted learning platforms on the vocabulary learning found in the articles chosen. The necessity of an Internet connection when using the mobile-assisted learning platforms was the major critical drawback (Aslan, 2016; Deris & Shukor, 2019). The students showed dissatisfaction in using mobile technology in language learning, especially when they struggled from slow or poor internet connectivity (Deris & Shukor, 2019). Without a stable internet connection, students are unable to view content such as HTML web pages, pictures or videos (Aslan, 2016). Besides, some commercial mobile-assisted learning platforms were designed for students who will take international preparation examinations. When teachers use it as an intervention for vocabulary learning on students who are not prepared for these examinations, low proficiency level students might find it challenging to learn the complicated vocabulary. This situation could demotivate the students as they could easily give up when they find the words are too hard for them to understand (Deris & Shukor, 2019). Wang et al (2020) agreed that the mobile-assisted learning platforms did not categorise the vocabulary according to the difficulty levels that the students perceived. In addition, it was sometimes a distraction for students to use mobile devices and applications in the classroom as students sometimes logged into other applications such as Facebook and would quickly switch it back to the targeted mobile-assisted learning platform when teachers found out (Ko, 2019; Setiawan & Wiedarti, 2020). Students in the study of Ko (2019) further pointed out that they felt a little ashamed to receive negative feedback when they posted their sentences using the vocabulary learnt in the mobile-assisted learning platform. Wang & Shih (2015) also argued that some students did not show much interest in vocabulary learning with a mobile phone. This is further supported by the limitations reported in the findings of Lin and Yu (2016); Kohnke (2020), such as the difficulty of studying vocabulary on limited screen size, phone memory, screen display quality and poor sound play quality. Aslan (2016) also stated the problems such as alignment in word display, small screen and keyboard sizes as limitations but were minor concerns of students that did not affect much of the vocabulary learning.

Conclusion and Implications

The findings of this review have shed light on the most noticeable impact of mobile-assisted learning platforms on the vocabulary learning of ESL learners. Vocabulary learning is made favourable as the fun and entertaining elements in the mobile-assisted learning platforms can trigger students to be active learners. Students can learn in a stress-free environment as gamified features make them relax while learning. Competing with friends to collect points in the mobile-assisted platforms gives students excitement and motivates them to achieve better in their vocabulary learning. Students also perceived that mobile-assisted learning platforms with gamified features provided them with varied learning experiences which catered for their needs and reduced boredom. Multimedia aids also play an essential part in vocabulary learning using mobile-assisted learning platforms as videos, images, animation and sound provide the more precise meaning of words. Vocabulary with pronunciations and pictures can increase vocabulary retention better than words introduced with only definitions and those with definitions and pictures. Besides, multimedia aids serve as great tools to increase students' motivations in learning vocabulary due to the definitions being visualised meaningfully and students are involved in the learning. Thus, students perceived that they loved the multimedia aids that helped them learn new vocabulary effectively.

Generally, students have positive acceptance towards the use of mobile-assisted learning platforms due to the efficiency, ease of use, flexibility and accessibility of the mobile-assisted learning platforms. Students found most mobile-assisted learning platforms work efficiently, making information and vocabulary knowledge easy to access at the tips of fingers. Whenever students cannot understand a word, they can use the mobile dictionary application or even a translator application to help them understand the meaning. It saves a lot of time and energy in learning vocabulary as students can also learn anywhere and anytime at their convenience and pace. Students who need to complete specific tasks or assignments in the mobile-assisted learning platforms would not feel stressed as they can pick their free time to assess learning materials and complete their given tasks. From the findings of this systematic literature review, most of the students were keen to show their continuous support in mobile-assisted learning platforms in the learning of English vocabulary as well as other skills and even other subjects.

In conclusion, the findings of the past studies, which integrated different mobile-assisted learning platforms, indicated that mobile-assisted learning platforms aid ESL/EFL learners in vocabulary acquisition, enhance vocabulary retention, increase motivation and provide rich and supplemental language learning materials and experience. The findings of the past related studies also highlight that students perceived vocabulary learning using mobile-assisted learning platforms positively even though some limitations were found in using mobile-assisted learning platforms for vocabulary learning. Therefore, the research questions are answered and that this study proves that mobile-assisted language platforms are indeed beneficial towards vocabulary learning of all ages. Mobile-assisted language platforms are the current trend of learning which manage to eliminate time and space for learners to acquire knowledge. They are worthy of being explored, followed and implemented in language classrooms to enhance the engagement and enthusiasm of students. Despite some limitations of the mobile-assisted learning platforms shown in the findings, educators shall continue to explore and utilise these platforms to make language learning, inclusive of vocabulary learning, fun and meaningful. However, it is vital that language teachers also consider the mobile-assisted learning platform design and hardware limitations, learners'

experience with mobile devices, and their attitude on mobile learning to maximise the benefits of using mobile-assisted learning platforms in vocabulary learning and language learning. In order to make full use of these applications, the Internet infrastructure must be set up to complement mobile-assisted learning platforms in one's learning. The mobile-assisted learning platforms developers shall also design different groups of vocabulary for high, intermediate and low proficiency students respectively, to benefit the students.

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