A Review of Research on Mobile-Assisted Language Learning from 2016 to 2020

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Abstract

This principled review scrutinized recent emerging research trends and issues in mobile-assisted language learning (MALL) in second/foreign language education for the period of 2016-2020. To this end, twenty-five studies fitting the time frame, and review criteria and published in three flagship journals (CALL, ReCALL, and Language Learning and Technology) were examined in terms of research topics, research methodology, and research findings. Results indicate that the studies generally integrated various tools and applications resulting in positive learning outcomes and attitudes from the perspective of learners and mixed method studies also dominated the field in terms of the research designs concerned.

Keywords: Mobile learning; MALL; research trends; review results

Introduction

The advancements in technology have provided a wide range of affordances in education in general and in language education in particular. Mobile-Assisted Language Learning (MALL) has been one of the approaches that use mobile technologies to enhance and

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support language learning. As a successor of Computer-Assisted Language Learning (CALL), MALL is regarded as language learning in both real-world and virtual environments, and it is assisted by highly portable (handheld and wearable) devices as well as communication and social network technologies (Palalas, 2016, p. 5). Mobile phones, smartphones, smartwatches, tablet computers, electronic dictionaries, digital music players, personal digital assistants (PDAs), digital voice recorders, and e-readers have been the most utilized devices in mobile learning. Today, smartphones – thanks to their advanced features – have replaced almost all mentioned devices, and MALL is now closely associated with smartphone applications (Burston, 2014).

Although MALL has some common characteristics with its allied field, CALL, it also differs (Stockwell and Hubbard, 2013) in that it involves the use of personal, portable devices that enable new learning methods that emphasize the continuity or spontaneity of access and interaction in various usage contexts (Kukulska-Hulme and Shield, 2008). Without referring to language education, Pegrum (2016) denotes that mobile learning is intrinsically governed by the principle of mobility that may embrace the movability of the devices, the learners, and the learning experiences (see Traxler, 2009, for a discussion of the theoretical aspect of mobile learning). Mobile technologies allow learners to learn 'anytime and anywhere' (Geddes, 2004). More specifically, the learners are not limited to a specific place at a certain time directed by others (Kukulska-Hulme, 2013) by virtue of the functional affordances of those technologies and devices. Furthermore, the deployment of mobile-oriented learning bestows (a) flexibility in time and place of study and thus (b) continuity of learning out of the classroom, (c) accessibility and diversity of knowledge, (d) spontaneity and authenticity and creativity in learning content, (d) individuality in self-paced learning preferences (e) immediacy of feedback, and (f) social interactivity and collaboration in learning (Stockwell, 2016; Reinders & Pegrum, 2017; Kukulska-Hulme, 2020; Loewen et al., 2020)

Concerning MALL, Kukulska-Hulme et al. (2017) emphasize that mobile technologies are uniquely suited to be tailored to a person's abilities and needs in a range of environments to continually support language learning (p. 217). Being in tune with the aforementioned implications, Godwin-Jones (2018) summarizes the positive outcomes of mobile language learning for both students and teachers as follows:

"1. integrating into instruction multimodal language learning tasks involving the use of images, audio and video;

2. enabling collaborative classroom activities using mobile devices for group writing, listening or speaking;

3. enriching classroom activities with authentic language resources through apps and online sites;

4. leveraging individual preferences on mobile devices to personalize learning and develop learner autonomy;

5. enhancing students' digital literacy and other 21st-century skills needed for the workplace;

6. encouraging out-of-school and lifelong language learning" (p. 2)

Mobile technologies have changed and transformed traditional language learning and teaching practices. There is a growing body of review studies examining the trends and issues in MALL research literature. To exemplify, Burston (2015) provided a comprehensive review of MALL-related studies published from 1994 to 2012 in terms of their experimental design and learning outcomes. Duman, Orhon and Gedik (2015) examined characteristics and general research trends of the published MALL studies from the years 2000-2012. Their review indicated that teaching vocabulary through cell phones and PDAs was the most popular technology application over that period. Shadiev et al. (2017) reviewed the MALL literature in authentic environments in regard to trends in publications, research focus, the technology used, methodology, and current issues. Most of the studies in their review gave prominence to exploring learner perceptions towards MALL and focused on progressing language proficiency. Kukulska-Hulme and Viberg (2018) compiled studies that specifically exploit the potential of mobile technologies for collaborative language learning. More recently, Hwang and Fu (2018) also reviewed the MALL studies published for the period 2007–2016 and analyzed them from various perspectives, incorporating research methods, research issues, language and learner types, and learning outcomes. All aforementioned systematic reviews provided substantial insights into the research trends related to MALL in different time periods.

However, as has been noted, the latest year embodied in these reviews was 2016. Therefore, considering the rapidly changing nature of mobile technologies employed in language learning and teaching, the current review paper goes beyond the existing literature

and takes a step further to review the MALL-related studies in second/foreign language education for the period of 2016-2020.

To this end, the following research questions are posed:

1. What are the research topics pertaining to the implementation of MALL for the period of 2016-2020?

2. What methodologies are employed in MALL-related studies for the period of 2016-2020?

3. What are the common findings of MALL-related studies for the period of 2016-2020?.

Methodology

This study aims to review the MALL-related studies conducted in the field of second or foreign language teaching and learning between the years 2016 and 2020 in terms of research trends/topics, research methodology, and research findings. For this purpose, the main intention was primarily to search the journals that specifically focus on the integration of technology into foreign/second language education. Secondly, in order to narrow down the selection of articles, the journals that are placed in the Social Sciences Citation Index (SSCI) were embraced since they "adopt stringent criteria in reviewing articles" and "have higher impacts in the field" (Duman et al., 2015, p. 4). On account of these delimitation criteria, three flagship journals encompassed the scope of the current analysis: Computer Assisted Language Learning (CALL), Language Learning & Technology (LLT), and ReCALL. Thirdly, all volumes and issues of the concerned online journals, from 2016 to 2020, were examined one by one by entering the following search terms: 'MALL', 'mobile', 'mobile-assisted', 'mobile learning', 'mobile apps', 'mobile technologies'. These terms were chosen because they are often presented as the keywords in MALL-related studies. Finally, a list of 41 articles matching the search terms was compiled.

Since the focus of this review is on second/foreign language learning and teaching practices, conceptual analysis of research reviews, meta-analysis studies, theoretical formation or discussion/opinion papers were also eliminated from the first list. Subsequent to filtering based on the above-mentioned criteria, a total of 25 articles were selected and reviewed. The

following table provides information with reference to the journals under scrutiny and the number of reviewed articles (25 in total) for each journal.

Table

Journal	Start Date	Publication Frequency	Indexed	Impact Factor	The Number of Reviewed MALL Articles (2016-2020)
CALL	1990	8 issues per year	SSCI	2.642	14
Language Learning & Technology	1997	Triannually	SSCI	2.473	5
ReCALL	1989	Triannually	SSCI	1.842	6

The reviewed articles were organized into three dimensions that examine (a) research trend/topic, (b) methodology, and (c) general findings. These categories provided an organizational framework to grasp the recent research tendency in MALL-mediated second/foreign language education.

Results

Focal Points of Research Conducted in Mobile-Assisted Language Learning

Upon reviewing twenty-five articles meeting the criteria that were specified at the beginning, it was decided to classify these studies into four categories in terms of their topics to answer the first research question. Accordingly, the first category encapsulates studies focusing on the integration of mobile tools into second/foreign language learning. The second one refers to the research concerning the efficacy of mobile-mediated applications in L2 learning. The third one presents the number of studies in relation to four language skills and vocabulary, grammar and pronunciation. The last category, on the other hand, comprises the studies in which views, perceptions or attitudes toward mobile-assisted language learning were the focal points.

Studies focusing on the use of mobile tools in L2 learning

Ten of the twenty-five studies reviewed were found to reveal the effects of integrating mobile tools into the L2 learning process. Some of these studies investigated the effectiveness of using mobile device features in L2 learning. For example, Liu (2016) examined the effects of mobile English vocabulary learning based on concept-mapping strategy, through Short Message Service (SMS) and Multimedia Messaging Service (MMS) facilities of mobile phones, on EFL learners' vocabulary performance and retention. Moghari and Marandi (2017)

analyzed the influence of using text messages via short message service (SMS) of mobile phones on elementary-level EFL learners' grammar knowledge. The researchers additionally interviewed several stakeholders, embracing students, parents, a teacher and the school principal, to find out their beliefs about using text messages for grammar learning. Similarly, Li and Cummins (2019) measured the impact of text messaging through cell phones to enhance English language learners' academic vocabulary acquisition. Finally, with the aim of revealing the advantages of using iPads to promote language learning outcomes, Eubanks, Yeh and Tseng (2018) investigated whether an iPad integrated (iPad recording, iPad camera and the Book Creator App) writing workshop had an influence on the language writing ability and attitudes towards writing.

On the other hand, some others compared the implementation of certain language learning activities on mobile devices with their implementation on computers or with traditional methods. In this context, Hwang et al. (2016) looked into the feasibility of mobile game-based activities in enhancing learners' performance in EFL listening and speaking skills when compared with traditional activities. They also investigated learners' perceptions of engaging in game-based learning activities supported by a mobile system. Also, Ko (2017) made a comparison between 167 Korean university learners' perspectives on using personal computers (PCs) and smartphones as language learning devices after completing online reading passages for a semester on a PC or a smartphone. Another comparison of computer and mobile phone use in language learning was conducted by Andujar and Salaberri-Ramiro (2019). The researchers evaluated factors such as students' perceptions, engagement, timing, perceived value of the interaction, participation, speakership roles or average message length in a computer-mediated (Facebook) and mobile-mediated (WhatsApp) chat-based communication platform so as to apprehend their potential to promote overall language development. In addition, one of the reviewed studies was seen to compare the effects of mobile-supported Task-Based Language Teaching (TBLT) with scaffolds and traditional paper-based TBLT without scaffolds on vocabulary, grammar, conversation comprehension and self-perceived use of oral communication strategies (Fang, et al., 2020).

Finally, of the ten studies in this category, one of them was seen to have specifically aimed to explore learners' views towards employing their smartphones in learning English as a foreign language (Şad, et al., 2020). Likewise, Lai and Zheng (2018) conducted research to

understand language learners' self-directed experiences in connection with the use of mobile devices outside of the classroom.

Studies on the use of mobile-mediated Apps in L2 learning

Results of the review put forward that most of the studies (n=15) investigated the effectiveness of certain applications used in mobile devices on learners' L2 performance or views, perceptions or attitudes towards the implementation of these applications. Upon reviewing these studies, it was discovered that all of them but three (Duolingo, WhatsApp, and WeChat were used twice) focused on the use of a distinct mobile-mediated application in second-language learning. Below, table 1 presents the findings regarding the focal points of research in this category.

Table 1. *Research concerning the use of mobile applications in L2 learning*

Author, Year	Mobile Application (Independent Variable)	L2 skills or Views, Perceptions, Attitudes (Dependent Variable)
1. Castaneda & Cho, 2016	*Conjugation Nation* (a game-like mobile App)	L2 vocabulary (conjugating verbs), Learners' attitudes
2. Yen, Chen & Huang, 2016	*Phone Words* A mobile game-based learning App)	L2 vocabulary performance
3. Chen, Carger & Smith, 2017	*Penultimate* (A narrative writing App through tablet PC)	L2 writing performance, Learners' attitudes
4. Sun, Lin, You, Shen, Qi, & Luo, 2017	*Papa* (A mobile social networking site)	L2 speaking (accuracy and fluency), L2 pronunciation, Learners' attitudes
5. Xu & Peng, 2017	*WeChat* (Mobile-assisted oral feedback)	L2 speaking ability, Learners' perceptions towards mobile-assisted oral feedback
6. Grimshaw & Cardoso, 2018	*SpaceTeam ESL* (A mobile gaming app requiring fluent oral speech)	L2 speaking fluency, Anxiety and willingness to communicate in L2
7. Rachels & Rockinson-Szapkiw, 2018	*Duolingo* (A mobile gamification App)	L2 vocabulary and grammar achievement, Learners' academic self-efficacy
8. Cheng & Chen, 2019	*Happy 2* (A mobile-assisted English learning system involving interactive games)	L2 vocabulary knowledge, Motivation towards learning English, Learners' English anxiety and perceived usefulness

9. Chen, Chen, & Yang, 2019	*EVLAPP-SRLM* (A English vocabulary learning app with a self-regulated learning mechanism)	L2 vocabulary knowledge, Learners' self-regulated learning abilities, Motivation
10. Jia & Hew, 2019	*WeChat,* (Dictation activity)	L2 listening skills, Learners' perceptions
11. Loewen, et al., 2019	*Duolingo* (A gamification App used for L2 learning)	Overall L2 achievement Learners' perceptions
12. Zhonggen, Ying, Zhichun & Wentao, 2019	*College English IV* (A mobile language learning platform)	English overall performance Learners' satisfaction Learners' cognitive loads
13. Andujar, 2020	*WhatsApp* (A mobile instant messaging App -used as a dynamic assessment tool in this study)	L2 grammar and vocabulary gain
14. Fouz-González, 2020	*English File Pronunciation App*	L2 pronunciation skills (production and perception of sounds
15. Seibert Hanson & Brown, 2020	*Anki* (A mobile-assisted spaced-repetition flashcard application)	L2 grammar and vocabulary knowledge

As seen in Table 1, the results revealed that a variety of applications used in mobile devices have attracted researchers' attention recently. It can be clearly observed that all of these studies questioned the influence of certain mobile-mediated Apps such as Conjugation Nation, Anki, Phone Words, Penultimate or Papa on L2 skills. In the same vein, besides concerning L2 development, several researchers tended to practise mobile Apps to examine learners' or other stakeholders' views, attitudes or perceptions towards their implementation in the language learning process (Castaneda & Cho, 2016; Chen, Carger & Smith, 2017; Jia & Hew, 2019 and the others presented in the table). Additionally, anxiety (Grimshaw & Cardoso, 2018; Cheng & Chen, 2019) and willingness to communicate in L2 (Grimshaw & Cardoso, 2018), motivation towards L2 learning (Cheng & Chen, 2019; Chen, Chen, & Yang, 2019), self-

regulated learning abilities (Chen, Chen, & Yang, 2019), learners' academic self-efficacy (Rachels & Rockinson-Szapkiw, 2018), learners' satisfaction and cognitive loads (Zhonggen, et al., 2019) were among the focal points in some of the studies implemented with a mobile-mediated App.

On the other hand, a few mobile applications were seen to have attracted interest more than once. Two of the reviewed studies investigated the effects of Duolingo, a mobile gamification App, to reveal its impacts on L2 vocabulary, grammar or overall achievement and learners' attitudes toward its implementation (Loewen, et al., 2019). Besides concerning its potential to increase L2 performance, it was also aimed to understand whether it is beneficial to promote learners' self-efficacy in foreign language learning (Rachels & Rockinson-Szapkiw, 2018). Another App that was encountered twice is WeChat, used as a dictation tool to improve L2 listening skills (Jia & Hew, 2019) and an oral feedback tool to develop L2 speaking ability (Xu & Peng, 2017) through mediation of a mobile device. The researchers also analyzed learners' perceptions and attitudes toward using this App in language learning. Finally, WhatsApp was seen to be preferred for the second time in the relevant literature, being used as a dynamic assessment tool for L2 grammar and vocabulary improvement (Andujar, 2020).

Studies focusing on four language skills or grammar, vocabulary and pronunciation through mobile-assisted language learning

The focal points of the 25 studies reviewed have already been specified and explained under two separate headings so far. This section, discrete from the others, will present information on how many of the reviewed studies were related to four language skills (reading, writing, listening, speaking) or three language components (vocabulary, grammar, pronunciation). In parallel with this purpose, the number of existing studies focused on L2 skills and components was designated in the figure below, providing each separately.
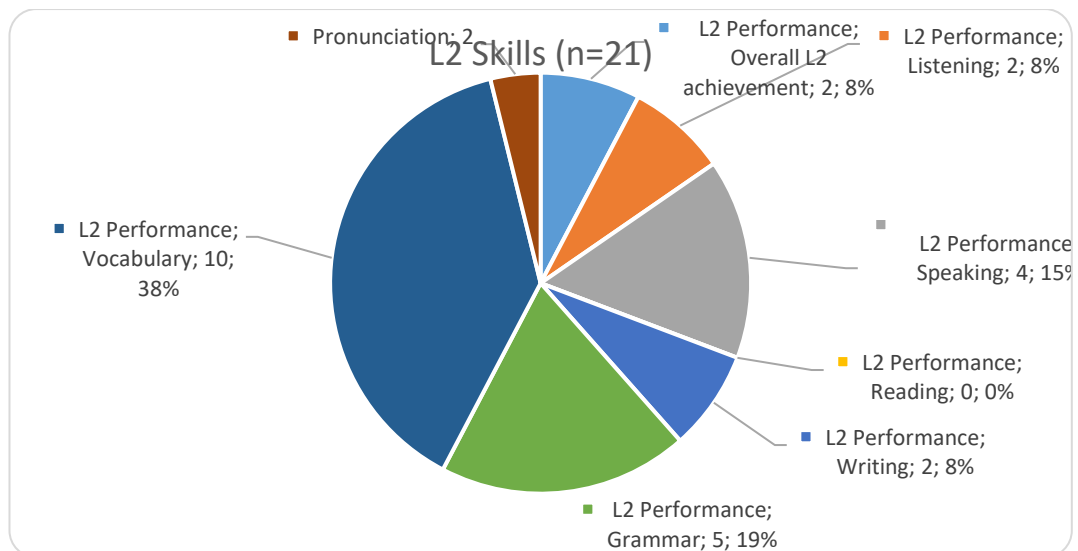
Figure 1. *MALL studies in relation to four language skills or vocabulary, grammar and pronunciation*

As seen in Figure 1, 21 of the articles were found to have related mobile-assisted language learning with the development of overall L2 knowledge or separate L2 skills and components. Among these studies, vocabulary (n=10) was seen to be the most investigated language component (Castaneda & Cho, 2016; Yen, Chen & Huang, 2016; Liu, 2016; Rachels & Rockinson-Szapkiw, 2018; Cheng & Chen, 2019; Chen, Chen, & Yang, 2019; Li & Cummins, 2019; Andujar, 2020; Fang, et al., 2020; Seibert Hanson & Brown, 2020). Grammar was the focal point of five studies, taking the second place in the most researched L2 components (Moghari & Marandi, 2017; Rachels & Rockinson-Szapkiw, 2018; Andujar, 2020; Fang, et al., 2020; Seibert Hanson & Brown, 2020). Speaking was investigated in four studies (Hwang, et al., 2016; Sun, et al., 2017; Xu & Peng, 2017; Grimshaw & Cardoso, 2018), while listening (Hwang, et al., 2016; Jia & Hew, 2019), pronunciation (Sun, et al., 2017; Fouz-González, 2020) and writing (Chen, Carger & Smith, 2017; Eubanks, Yeh & Tseng, 2018) were seen to have been examined in just two of the reviewed studies. In addition, analyses demonstrated that two studies focused on the improvement of general L2 performance through mobile assistance in L2 learning (Loewen, et al., 2019; Zhonggen, et al., 2019). However, no study was found to concern the association between mobile-assisted language learning and L2 reading skills.

Studies on views, perceptions or attitudes toward mobile-assisted language learning

With respect to the final concern of the first research question, the number of reviewed studies conducted to investigate views, attitudes or perceptions toward the use of

mobile devices or mobile-mediated applications in language learning can be clearly explored in the figure below.
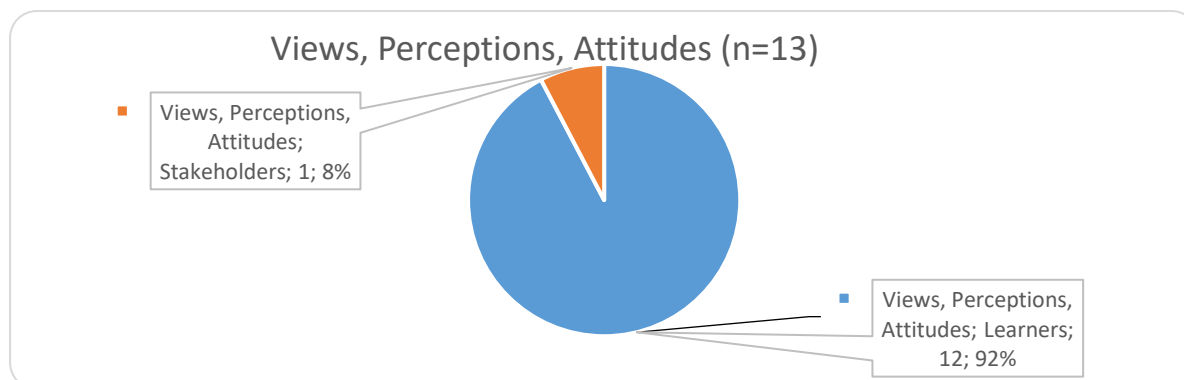

Figure 2. *Studies focusing on views, perceptions and attitudes toward mobile-assisted language learning*

As Figure 2 shows, a total of 13 studies were encountered with the purpose of investigating views, attitudes or perceptions regarding mobile-assisted language learning. Of these studies, 12 were concluded to have specifically focused on learners (Castaneda & Cho, 2016; Hwang, et al., 2016; Chen, Carger & Smith, 2017; Ko, 2017; Sun, et al., 2017; Xu & Peng, 2017; Eubanks, Yeh & Tseng, 2018; Lai & Zheng, 2018; Andujar & Salaberri-Ramiro, 2019; Jia & Hew, 2019; Loewen, et al., 2019; Şad, et al., 2020). On the other hand, one study carried out by Moghari and Marandi (2017) enlarged the scope of participants and investigated stakeholders' (students, parents, the teacher and the school principal) beliefs regarding the use of cell phone text messages to enhance L2 grammar skills.

Research Methodologies in the MALL Studies

In order to respond to the second research question, twenty-five studies selected for this review were examined in terms of their general tendencies toward research design and data collection tools. It was found that the majority of the studies were conducted in mixed method design, followed by quantitative and qualitative designs, respectively. Results pertaining to these variables are presented in the figure below.

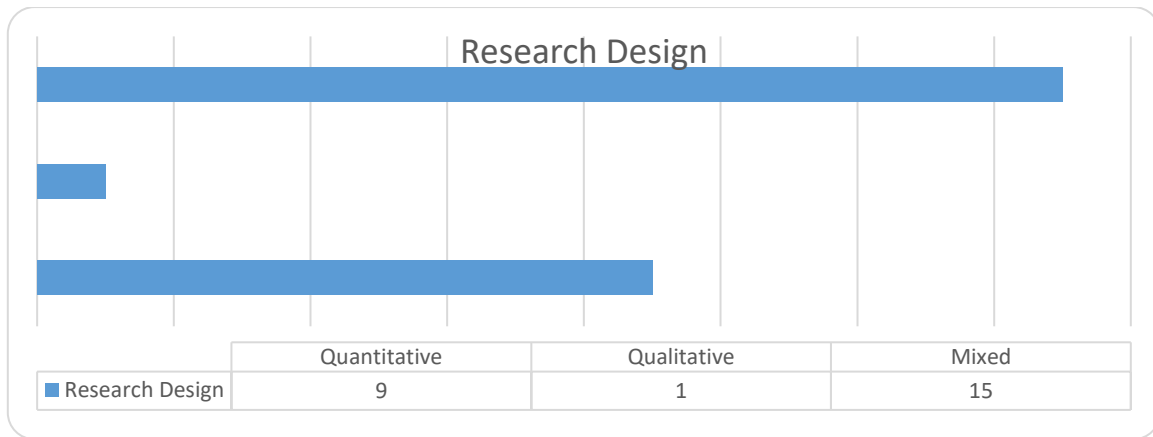| Research Design	Quantitative	Qualitative	Mixed
■ Research Design	9	1	15

Figure 3. *S Research designs of the reviewed MALL studies*

According to figure 3, mixed method (n=15) and quantitative (n=9) studies are dominant in the MALL research. As clearly seen, only one study was found to have been conducted in pure qualitative design.

In terms of data collection techniques used in the studies, the analyses have yielded that scales (satisfaction, anxiety, motivation, engagement, cognitive load, academic self-efficacy, strategy, etc.), interviews (semi-structured, focused-group), survey questionnaires involving open-ended and close-ended questions, pre-post language tests and observation (field notes) were commonly used data collection instruments. Additionally, screenshots, audio recordings, log files gathered by the Apps, inventory of teacher prompts, home visits, students' journals or text messages were among the preferred data collection tools in the reviewed studies.

Findings of the MALL Research

The vast majority of the reviewed studies were conducted at universities (n=17); other settings can be listed in order of frequency as follows: elementary schools (n=6), and high schools (n=2), 25 in total. Based on the findings, the focal points of the studies could be listed as below: the effect of mobile-assisted language learning on language skills (reading, listening, speaking, writing) and on language components (phonetics, pronunciation, grammar, vocabulary); learners' perceptions and attitudes towards mobile-assisted learning, mobile applications and devices.

Studies investigating the relationship between MALL and four language skills

When the studies were examined in general, it was noticed that one of the most studied points was the effect of mobile learning on language skills (speaking, n=7; writing, n=4;

listening, n=4; and, reading, n=3). Some of the studies focused on only one skill individually, while some worked on more than one skill. If the findings of the articles on speaking skills are examined, it can be easily remarked that mobile applications and devices have positive effects on the development of this skill. Hwang et al. (2016), in their study examining the effect of mobile games on speaking skills, reported that game-based learning activities significantly improve students' speaking skills if driven by a mobile system and foster students to practice speaking English as a foreign language more frequently. Findings also suggest that learners participate more in speaking practices, they use their mobile devices to engage in extensive speaking activities or to speak to foreigners in English on social media and this has led them to practice speaking EFL in an authentic context (Andujar& Salaberri-Ramiro, 2019; Şad et al., 2020; Castaneda& Cho, 2016; Xu& Peng ,2017; Rachels& Rockinson-Szapkiw, 2018; Sun et al., 2017; Seibert Hanson& Brown, 2020; Jia, & Hew, 2019; Chen, Chen & Yang , 2019; Hwang et al., 2016; Eubanks, Yeh& Tseng, 2018; Lai& Zheng, 2018; Loewen et al., 2019; Yen, Chen& Huang, 2016; Andujar, 2020; Moghari& Marandi, 2017; Fang et al., 2020).

Speaking was not the sole skill focused on in the articles reviewed; the effects of mobile-assisted learning on writing skills were also investigated. Most of the studies were conducted to examine the effects of mobile devices or applications being used on writing skills. Eubanks, Yeh & Tseng (2018) integrated a writing workshop into the regular curriculum where a story map, recording technology (iPad recording app), an iPad camera, and the Book Creator App were employed for three weeks. The purpose of the study was to investigate whether a technology-integrated twenty-first-century writing workshop had an influence on the ability and attitude toward writing in Chinese. The results suggested that the writing workshop improved students' writing ability as well as their interest in it. Chen, Carger & Smith (2017) implemented an instrumental case study approach to explore the learning effects of scaffolding young English language learners' narrative writing skills through the use of tablet computers (iPads) and a digital handwriting app (Penultimate). The findings reflected that using technological devices and apps enhanced the learners' narrative writing abilities and their learning motivation. They also demonstrated an improvement in organization, language production and mechanics of writing.

Similar results were obtained in studies revolving around listening skills. In Jia & Hew's (2019) experimental study, WeChat, which is a widely used instant messaging application in China, was integrated into dictation practice as a supplement to an in-class

listening course to investigate its outcomes on listening proficiency. One experimental (EG) and one control group (CG) were formed out of two randomly selected classes at the lower intermediate level. Members of the EG were asked to participate in a WeChat group of 8–10 students to complete daily dictation, while the CG did the practice individually. The participants were expected to respond to a pre-test and a post-test at the beginning and after the process; the results showed that the EG's improvement in listening was significantly greater than that of the CG. Other benefits reported in the article comprised increased confidence and greater initiative in English listening. Participants in EG were found to spend more time on listening, develop good daily practice habits, and gain confidence in listening. Similarly, Eubanks, Yeh & Tseng (2018) concluded that use of mobile devices and apps improved learners' listening skills.

Looking at the focal points of the articles examined, it is understood that the least studied skill among the four is reading; none of them has taken it to the center of investigation, however, reading and MALL relationship is established in studies examining the contribution of mobile devices to language development and in studies conducted to determine the purpose for which these devices are used in language learning. For instance, in the findings of the study examining the effect of technology integration into writing skills Eubanks, Yeh & Tseng (2018) state that this application also evolves students' reading skills too. Or, Şad et al. (2020) in their study to determine for what purpose participants use mobile devices related with language learning reported that participants were found to hardly use their smartphones to engage in rather extensive reading.

Studies investigating the relationship between MALL and language components

Vocabulary learning plays an important role in foreign language learning and has an important role in all skills as inadequate vocabulary knowledge hinders communication in all forms. For some, vocabulary learning is one of the foremost needs for foreign language learners and researchers are interested in how much mobile devices and applications can help to meet this need. Yen, Chen & Huang (2016) assessed the effects of a novel mobile English vocabulary learning app (PHONE Words) designed with game-related functions and without game-related functions on learners' perceptions and learning performance. The study revealed that the experimental group that used the game-related learning app outperformed learners using the non-game-related app in terms of vocabulary acquisition and vocabulary retention. The results proposed that the game-related functions were conducive to vocabulary learning. They

concluded that strong correlations existed between vocabulary learning performance and several gamified functions. Fang et al. (2020) also followed a similar procedure using a mobile-supported task-based language teaching (TBLT) app with an experimental group and compared their vocabulary test performance with the control group and presented that this group outperformed the traditional TBLT group on the vocabulary test. The findings also revealed that the app used in the study appeared to provide supportive learning conditions for students to achieve pronounced gains in vocabulary (54%) and receptive knowledge to comprehend newly learned vocabulary. There are two more studies reviewed the results of which are consistent with these two studies mentioned above (Li& Cummins, 2019; Liu, 2016).

Mobile devices and apps were also spotted as effective in the teaching of grammar and pronunciation. Moghari & Marandi (2017) inspected the impact of using cell phones, specifically text messages as supplementary tools, on Iranian elementary-level EFL learners' grammar learning. Language learners participating in this study believed that receiving grammar points via their cell phones helped them better learn English grammar. The participants who practiced grammar through text messages significantly outperformed and they tried to answer as quickly and correctly as possible. The other studies which used mobile apps as teaching tools also reported linear findings (Xu& Peng, 2017; Fang et al., 2020). Grimshaw & Cardoso (2018) claim that pronunciation anxiety impedes willingness to communicate and to minimize the impact of this limitation is to motivate students to speak intelligibly and fluently, preferably beyond the constraints of the language classroom. They investigated the pedagogical use of Spaceteam ESL, a mobile game that requires intelligible and fluent computer-mediated oral exchanges among players and revealed that learners who played Spaceteam ESL outperformed the control group and the participants expressed that the game reduced feelings of anxiety, allowing them to practice their pronunciation with peers. In other words, the game was perceived as a means to lower anxiety and encouraged pronunciation practice. The effectiveness of WeChat feedback and the use of Papa, a China-based social networking site in enhancing pronunciation was also cited. (Xu& Peng, 2017; Sun et al., 2017).

Studies investigating the relationship between MALL and views, perceptions and attitudes

While discussing the effectiveness of a teaching method, technique or technology, the attitudes, views and perceptions of the parties have always been within the research topics of scientific studies. Considering that mobile-assisted foreign language learning is a relatively

new subject and that mobile applications are frequently used to support language skills and/or components recently, we may find it reasonable to investigate the interests and attitudes of parties towards them. 10 of the 25 studies investigated the motivation changes of the participants after the related implementation, while only one of these studies (Jia & Hew, 2019) reported the loss of motivation caused by the complexity of the application; in all other studies, the motivation of the participants increased in a positive way(Zhonggen et al., 2019; Sun et al., 2017; Seibert Hanson& Brown, 2020; Chen, Chen & Yang, 2019; Hwang et al., 2016; Eubanks, Yeh & Tseng, 2018; Yen, Chen & Huang, 2016; Moghari & Marandi, 2017; Chen, Carger& Smith, 2017).

Learners' attitudes were also investigated in a number of articles and the great majority of which revealed positive attitudes toward mobile apps or devices. Zhonggen et al. (2019), employing a university-developed platform, aimed to identify whether that platform helped learners reduce their cognitive load in EFL classes and whether it yielded learner satisfaction. Two third of the participants expressed their beliefs that the mobile learning platform reduces their brain burden, and 69% of interviewees reported that they were satisfied with the mobile learning platform. Similarly, Xu & Peng (2017) revealed learners' positive attitudes toward the use of WeChat and mobile-assisted feedback; in Hwang et al. (2016), most students had positive perceptions toward learning activities that are supported by a mobile system; Li & Cummins (2019) reported the results to reinforce active engagement and positive perceptions of the intervention; and lastly, Eubanks, Yeh & Tseng (2018) indicated that the students enjoyed the writing workshop, which the researchers ran, with the integration of iPads and apps. The students demonstrated positive/motivated attitudes and reactions to learning.

In contrast to these positive findings, Jia & Hew (2019) explored that one-fifth of the participants reported that the WeChat dictation program is inefficient and inadequate in supervision and it is too demanding and has lack of variety. Thus, they lost their patience and motivation because dictation texts were too long.

Conclusion

In this review article, 25 studies investigating issues in mobile-assisted language learning (MALL) in second/foreign language education and published in three leading journals in the field for the period of 2016-2020 were reviewed. Some momentous findings were obtained as the results of this review. Firstly, these studies mainly focused on the effects of MALL on language skills. Secondly, the majority of the studies were conducted in mixed

method design (n=15), followed by quantitative (n=9), and qualitative (n=1) designs, respectively. Thirdly, unlike many other review articles, the Western (n=11) and Eastern context (n=14) distribution of the studies was found to be very close to each other. Finally, the use of MALL in ESL/EFL environments is beneficial for the development of the ESL/EFL learners' language skills and language components; and, the learners generally have positive perceptions and attitudes toward learning a foreign language through using mobile-assisted apps and devices.

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