A Systematic Literature Review on the use of Mobile-assisted Language Learning (MALL) for Enhancing Speaking Skills in Chinese EFL context

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Abstract: *As the largest market of mobile users, China has great potential for research on mobile-assisted language learning (MALL). However, the number of MALL research in Chinese EFL contexts is limited, especially focusing on a particular skill such as English speaking. The current study provides a systematic review of MALL research within the specific area of spoken English language learning during the period 2017 - 2021 in terms of research designs, theories and frameworks, as well as the characteristics of the included research and their new trends. The findings show that studies of mobile technology use in the aspects of language learning support the hypothesis that mobile technology can enhance learners' speaking skill and other skills. However, most of the reviewed studies are quasi-experimental, at small-scale level, and conducted in higher education contexts. Most theories and concepts are addressed briefly in the papers. And in terms of commonly addressed topics and skills, attention is primarily on learners' perception of MALL, English-speaking progress, and correlation between speaking skill and motor skill. Affective factors such as motivation, speaking anxiety and willingness to communicate are seldom focused.*

Keywords: *MALL, Enhancing Speaking Skills, Chinese EFL context*

1. Introduction

With China's rising role in current globalized era, graduates with well-developed communication skills in at least one additional language to complement their specific knowledge and abilities are sought after by both local and international employers (Ai et al., 2020). Although English courses are at all levels of Chinese education system and the College English Curriculum Requirements emphasize the development of students' speaking skills (Meng, 2009), Lai et al. (2018) argued that the empirical data documenting learners' perceptions and experiences of speaking ESL or EFL in different learning contexts is scarce. Also, statistically, it has always been challenging for Asian EFL students to speak English though intensive efforts and numerous approaches have been tried (Nguyen et al., 2018).

Nevertheless, an approach known as Mobile-assisted language learning (MALL) has integrated mobile learning with language learning and has evolved exponentially in the past decade (Çakmak, 2020). MALL as a research topic has received extensive scholarly attention over the past few decades. However, the participation of China in MALL projects remained low compared with countries such as Japan, USA and UK (Burston, 2014). As a result, this study selects China as the research venue for two reasons: as the largest mobile service subscriber market in the world, China presents a dynamic and complex environment for MALL practice. Second, the need to improve Chinese EFL learners' speaking skills and the limits of traditional large class size remains challenging and unmet to English instructors and scholars. As a result, the overarching goal of this literature review is to provide a holistic and balanced picture of MALL progress in enhancing Chinese EFL learners' speaking skills across the timeline and different contexts by examining empirical evidence.

1.1. Challenges of Teaching and Learning speaking in Chinese Universities

According to Miller & Wu (2018), the Chinese examination-oriented culture has such serious backwash effects on its learners that they are often characterized as passive consumers rather than active producers. A major attribution is that oral English proficiency does not play any significant role in respect to helping students pass English tests, test scope is limited to listening, reading and writing in Chinese EFL context (Xing, 2019). As a result, learners' motivation and practice time on speaking skill

are impeded. External factors include the trivial impact of classroom instruction on students' speaking skills, especially when class size is over 80 students, which is the typical case for university English courses in China (Di, 2018). This hinders students from gaining improvement in the quality of their spoken English (Meng, 2009). Many scholars pointed out that, the limited learning time and lack of English oral environment results in few opportunities for EFL learners to practice their English oral skills in class (Lin et al., 2018).

1.2. Application of MALL in Chinese EFL Contexts

However, the evolving information and communication technologies may provide new opportunities to address the above-mentioned challenges. The rapid advancement in technology has reshaped peoples' living styles and learning habits. Mobile touch-screen smart phones are so popular both in China and the rest part of the world that most undergraduate students are equipped with them (Barrett et al., 2021; Zhonggen et al., 2019). Many studies also showed that MALL is advantageous in creating authentic materials, activities, and environments to promote language learning. Also, Mobile technologies can provide learners with versatile venues and flexible schedules. The rapid advancement of mobile technologies has the potential to resolve some of the aforementioned problems and surpass the classroom-only language learning mentioned in **1.1**. Mobile technologies offer pedagogical affordances that educators can leverage and select to promote meaningful learning among learners, both inside and out of the classroom.

According to Baidu's (https://baijiahao.baidu) newest analysis of data stream traffic, by the time of October, 2020, the top four mobile applications most frequently used are Baicizhan, Liulishuo, Yingyuqupeiyin and Kouyu100. Three out of these four apps (Liulishuo, Yingyuqupeiyin and Kouyu100) specifically address Chinese learners' English-speaking skills. Chinese EFL learners' growing engagement in spoken English practice in a mobile-mediated environment may be conductive to researches in MALL facilitating Chinese learners' spoken English. However, technical issues such as catering to multiple different operating systems on the mobile devices (e.g. Android, iOS and Windows) could be problematic and no access to some SNS or apps (e.g. Google, google class, You tube) in mainland China should be taken into consideration for further researches integrating MALL into English spoken classes. (Liu, 2016; Zou et al., 2018; Zou et al., 2019).

2. Research Questions

Kashif (Ishaq et al., 2021) contends MALL very active topic. Nevertheless, there is a paucity of systematic reviews done on recent studies to shed some light on how MALL could offer plausible ways in enhancing learners' speaking skills especially in Chinese EFL context. Therefore, the current systematic review aims to fill in the literature gap by synthesizing the findings of recent studies to enhance ESL and EFL learners' speaking skills in MALL environments from the recent 5 years to shed some light on improving English-speaking skill within a Chinese EFL context.

This systematic literature review (SLR) aims to analyze and synthesize research articles on MALL for speaking among ESL and EFL learners in China between the years 2017 to 2021 and synthesize their findings to meet the proposed objectives: 1) to identify the theories and frameworks being used and are constructed for the future use. 2) to discover the most frequently used mobile device tools and digital mobile applications (APPs) that could be used in enhancing speaking skills among Chinese learners.

There are two research questions that have been outlined to direct the SLR and they are:

RQ1. What are the characteristics and new trends of Chinese EFL contexts on MALL-integrated speaking skill projects?

RQ2. What are the widely used theories, models, and frameworks proposed or adopted for MALL research in terms of English-speaking skill enhancement?

By addressing these research issues, this research is expected to provide implications into pedagogical practice and theoretical basis that can enhance EFL learners' English-speaking skills on the mobile-enhanced environment both inside and outside of the classroom.

3. Methods

To conduct this systematic review, PRISMA's principles and guidelines provided by Moher, Liberati, Tetzlaff, and Altman (Moher et al., 2009) are adopted.

3.1. Database and Keywords

In April 2021, the researcher conducted the search process and reviewed the bibliographies of all relevant articles. Various combinations of search terms were tested on a site with access to major educational databases including Scopus, WOS, Wileys, Proquest, ERIC, Jstor, Emerald and Taylors. Results were noted to gain an orientation on the best search terms to use. Since the number of articles in relevance to Chinese EFL students' speaking skills enhancement is so limited, the search term 'oral performance' was added to broaden the scope on speaking skills or speaking performance. It helped to identify studies that were not merely concerned with 'spontaneous speaking', but with grammar and pronunciation which are also important components of both speaking skills and oral presentation (Terrell & Brown, 1981; Chalhoub-Deville, 1995). Eventually this resulted in the following combinations of search terms: 1. Speaking skills (speaking proficiency, speaking performance) AND; 2. Mobile-assisted language learning (m-learning, mobile language learning) AND; 3. Oral performance (pronunciation, oral presentation,) AND; 4. China OR Chinese context (including Taiwan and Hong Kong regions. For findings to be timely and up-to date, the range of years was customized between 2017 to 2021.

3.2. Inclusion and Exclusion Criteria

In order to identify highly relevant articles addressing the research questions, criteria for inclusion and exclusion of the articles are adapted and crafted from two similar systematic literature review on the effects of MALL conducted by Kaliisa & Picard, (2017) and Rajendran & Md Yunus, (2021). (See table 1. below) because of the rapid development of mobile technology (Yurdagül & Öz, 2018), this research explored studies limited to the past 5 years and are published between 2017 and 2021. Journal articles are the main source of this research due to their generally high quality (Chen et al., 2021), however, since studies done on the use of mobile learning to improve English speaking skill in Chinese contexts are scant, this research include conference proceeding publications and is not limited to peer-viewed papers. All studies had to include mobile technology used, ranging from smart phones, smart watches, ipads or tablets, MP3/MP4 players, and other handheld-devices. While computers and other non-handheld devices are excluded. Furthermore, all studies must use built-in features of mobile devices such as text-messaging, voice messaging, broad-cast messaging, photo and picture sharing, group-chat and so on. The mobile devices function either as access to learning resources in a formal setting or 'tool boxes' facilitating students learning or performing a task in informal settings (Wong, 2012). Or else, the mobile language Applications (apps) should be used, including social net-working sites (SNS), digital applications or education applications designed to facilitate learners' English-speaking skill, e-dictionaries which could be downloaded on the mobile devices. Mobile devices or applications not used in the studies are excluded. The field of studies must be the implication of MALL in educational settings. The language skill focused must be speaking skills or sub-skills such as pronunciation, fluency, accuracy, presentation speech, etc. Studies focusing on other language skills-listening, reading, or writing are excluded. Finally, the context of the reviewed studies must be ESL and EFL learners in China, native learners and other contexts outside of China are excluded.

Table 1: Inclusion and exclusion criteria for this systematic review

Criterion	Inclusion criterion	Exclusion criterion
Focus of study	Mobile technologies used	Mobile technologies not used
Digital devices	Mobile phones, ipads, tablets, smart watches and other handheld or wearable devices	Computers and other non-handheld devices
features	Must have used in-built features of mobile devices	None of the mobile features is used
Field of study	MALL must be applied in education field	MALL is not applied in education field
Language skill	Speaking skill and sub-speaking skill	Listening/reading/writing skill or general English language skills precluding speaking skill

Context of study	ESL/EFL learners in China	Native learners and non-Chinese ESL/EFL learners
Year of Publication	Published between 2017-2021	Not published between 2017-2021

3.3. Data Selection

A PRISMA flow diagram was used (see Fig. 1 below) for the study selection procedure. The data collection and analysis flow chart include data identification, data screening, and data analysis. The primary database used in this research is Taylor & Francis, a highly respected and credible publisher and the other 5 databases are also researched for as other sources. The first searching started on 8th, April and the last try was on 10th, June. During the search, a log was kept by the author, to record dates, databanks, and combined search terms that were used, and numbers of hits for each search. A spreadsheet was kept to list all the articles that were found (N=1390, N=481 from Taylor & Francis and N=909 from other databases). First, duplicates were excluded. Leaving 679 articles for manual screening. Next, a first selection was made, based on title and abstract screening of the exclusion criteria listed above in 3.2. Thus, 513 articles were excluded. Then, 64 full-text articles remained to be assessed by skimming or scanning or even read the full texts if necessary to meet all the inclusion criteria. Rejection reasons range some studies were conducted in other countries instead of China, participants were not Chinese EFL learners or without use of MALL in facilitating English speaking. Moreover, some were about learning Chinese language as a foreign language or non-English foreign language using MALL. Some studies mentioned mobile technologies in their research, while the main research per se was using other pedagogies rather than relying on mobile technologies. Besides, whether these studies used a specific digital application or built-in features of a mobile device to facilitate spoken English were also evaluated. After confirming that the papers were related to MALL and English-speaking skill, whether they were original research article were evaluated and reviews or survey papers were excluded. In this final stage, 49 articles were excluded. The result is a set of 15 full-text eligible articles with open access to be analyzed and reviewed. Fig. 1. Flow diagram of article search and screening steps to identify studies for inclusion in the literature review. Adapted from Moher et al. (2009).
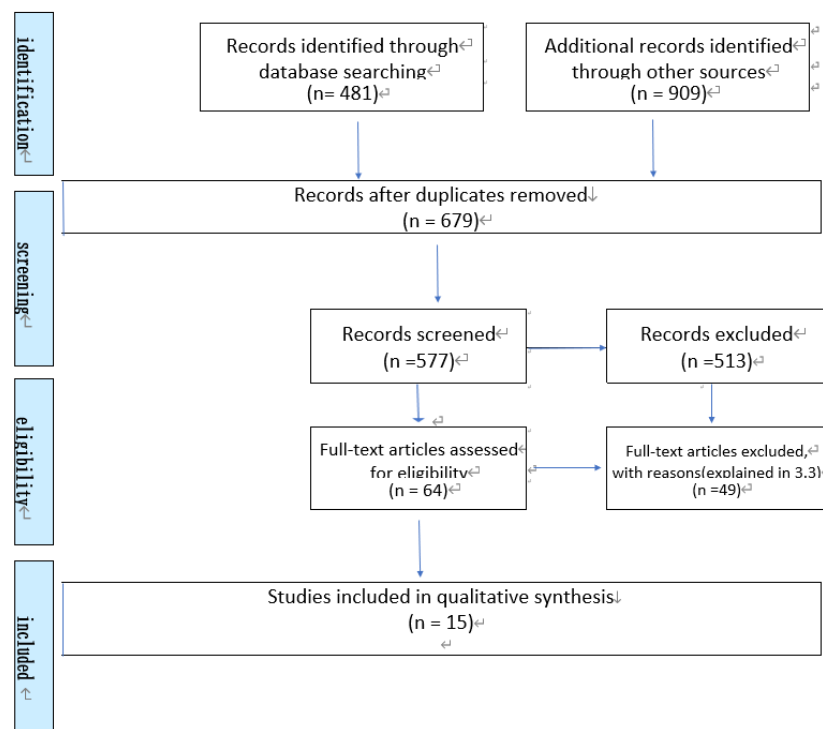

Figure 1: PRISMA flow chart

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred

Reporting /terns for Systematic Reviews and Meta-Zlnalyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/iournal.pmed1000097

4. Data Analysis

This section answers the research questions from an overview of the study sample to a in-depth content analysis.

4.1. Description of the Articles

The selection procedures resulted in 15 educational research articles to be included in the literature review. They entail a variety of theories and pedagogical approaches using MALL to facilitate English-speaking skills and formed the basis for answering the proposed research questions in 2.0. Figure 2. illustrates the numbers of publications in the latest 5 years. 14 out of 15 studies provided empirical support on the effective effect of MALL on speaking skill. Overall, MALL projects focusing on speaking skills are scarce in number. Only one article was published in the year 2017. And the year 2018 saw the most of articles about MALL on speaking skill in Chinese EFL context. This finding is in consistent with a similar systematic literature review conducted by Rajendran & Md Yunus, (2021). By the time of conducting this review study, the numbers of articles published in 2021 is 4, it can be easily indicated that there will be more publications which could not be include in the current review study. Figure 3 (see below) demonstrates the numbers of articles published in different databases.
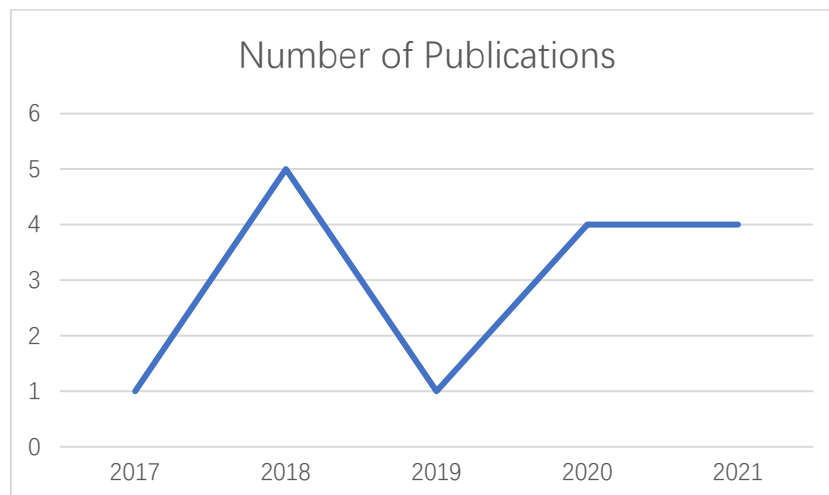

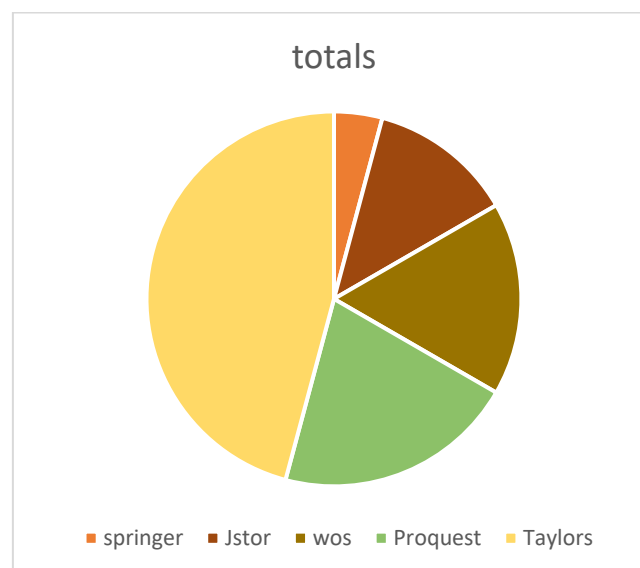*Figure 2: Numbers of publications in the recent 5 years*

Figure 3: Numbers of publications in different databases

RQ1. **What are the characteristics and new trends of Chinese EFL contexts on MALL integrated speaking skill projects?**

Table 2: distribution of educational context

Distribution of different educational contexts			
	Primary School	Secondary school	University
Mainland China	1		5
Taiwan District		1	6
Hong Kong District			1

4.2 Sources, Duration and Types of Research

As for the first research question, the articles were reviewed in regard to the distribution of different educational contexts, duration of MALL projects, and distribution of research designs. Contexts displayed the sources where EFL learners' English-speaking skills are addressed in a mobile environment. The findings were elaborated as below in Table 4. Taiwan region represents the greatest locations of MALL projects focusing on speaking skills. This is consistent with Burston's finding that Japan and Taiwan accounting for the largest proportion in MALL literature (Burston, 2014). The majority research sites are in university contexts, only two researches were conducted in primary school and secondary school respectively. Indeed, the use of educational technology varies from institution to institution, country to country (West et al., 2018). Salient ethical issues arise when studying young children (Flewitt & Flewitt, 2006) which may make it difficult for researchers to have access to primary and secondary schools. The significant numbers of studies are on a university level may be due to the ownership of college students and their capabilities to learn through mobile devices (Shadiev et al., 2017).

Table 3: Duration of MALL projects and student numbers involved. Adapted from (Burston, 2014)

Duration of MALL project		
Categories	Numbers	%
up to 1 weeks	1	7.14
up to 4 weeks	4	28.57
up to 9 weeks	2	14.29
1 term/semester	6	42.86
More than one semester	1	7.14
Number of Students Involved in MALL Implementations	Numbers	%
up to 10	1	7.14
up to 25	2	14.29
up to 50	4	28.57
up to 100	4	28.57
up to 200	2	14.29
up to 300	0	0
over 300	1	7.14

Surprisingly, the longest duration of MALL projects on English speaking skill last for 1 semester (42.86%), although the majority of such studies are less than 9 weeks (50%). This is in accordance with the finding that content learning and incorporating MALL into curriculum are two of the common topics addressed in the included studies. Miller & Wu (2018) claimed that content learning usually sustains over a full academic year However, it should be noted that learners may be initially interested and engaged in using mobile technologies for their L2 learning due to the novelty effect and their enthusiasm and engagement will decrease over time (Stockwell, 2013). Therefore, when conducting longitudinal studies, future research efforts should be either on investigating how learners use the same MALL app over a long periods or the process of language development which is mediated by the use of various technologies and resources (Peng, 2021).

Table 4: Types of research designs by year. Adapted from (Duman, 2014)

research design	Distribution of research designs by year					total	
	2017	2018	2019	2020	2021	N	%
Quantitative experimental							
Pre-experimental				1	1	2	13.3
Quasi-experimental	1	4	1		1	7	46.7
Ture-experimental							
None-experimental							
survey							
correlational							
Qualitative							
case study		1		1		3	20
Ethnography							
Phenomenology							
Mixed							
Explanatory							
Triangulation		1		1	1	3	20

Quantitative experiments (70%) are the most prominent, and quasi-experimental research are dominant (46.7%) in quantitative designs. It can be elicited that Chinese EFL contexts, especially the higher education contexts could render the conveniences to conduct MALL projects which are conducive to the development of learners' English-speaking skills. However, the small scale and the nonprobability nature of such research limit the generalization of the findings. Meanwhile, the research on primary and secondary school levels are in paucity.

Table 5: Distribution of commonly investigated topics in the MALL studies from 2017 to 2021

Topics	2017	2018	2019	2020	2021	total
integrated skill		2				2
assessment-evaluation						
dictionary use					1	1
multimedia use/design						
instructional design		1				1
Sense of community		1				1
interaction/collaboration		3		4		7
perception/attitude	1	2	1	3	2	9
Learning outcomes	1	4	1	2	3	11
usability (affordances)				1	1	2
potential uses/drawbacks					1	1
Affective factors in speaking a second/foreign language						
confidence						0
motivation		2				2
speaking anxiety	1	1			1	3
Other topics						
culture				1		1
authentic contexts	1	2				3
content learning			1	1		2
multimodal language learning				1		1
peer feedback				1		1
design-based learning						0
action learning						0
inquiry-based learning						0
learner autonomy		2			1	3
informal learning		1			1	1
learners' needs				1		1
MALL integration with curriculum				2	1	3
integrated skill		2				2
assessment-evaluation						
dictionary use					1	1

multimedia use/design					
instructional design		1			1
Sense of community		1			1
interaction/collaboration		3		4	7
perception/attitude	1	2	1	3	2	9
Learning outcomes	1	4	1	2	3	11
usability (affordances)				1	1	2
potential uses/drawbacks					1	1
Affective factors in speaking a second/foreign language					
confidence						0
motivation		2				2
speaking anxiety	1	1			1	3
Other topics					
culture				1		1
authentic contexts	1	2				3
content learning			1	1		2
multimodal language learning				1		1
peer feedback				1		1
design-based learning						0
action learning						0
inquiry-based learning						0
learner autonomy		2			1	3
informal learning		1			1	1
learners' needs				1		1
MALL integration with curriculum				2	1	3

Distribution of commonly investigated topics. Adapted from (Duman, 2014)

4.3 New Trends: Healthy and Enjoyable Learning

Although positive learning outcome, mobile-aided collaboration and student perception still remain highlighted, participating in language learning in a more flexible manner has growing in interest in the volumes of research. The mobile devices are not limited to smart phones, ipads and tablets. Wearable device such as smart watch was found to be effective in facilitating integrated skills. Integrated skills hereby refer to English speaking skill and motor skill. To estimate the correlation between better English language proficiency with active physical activity and positive emotion, two studies were conducted using smart watches. See (Shadiev et al. (2018) and Nguyen et al., (2018)

Table 6: Use of Mobile devices and language learning applications

social networking sites(SNS)	Numbers of studies
Wechat	2
Line	1
Facebook	1
QQ	1
Language learning application	
commercial app	8
self-developed app	3 (ez-translator; EOPA; College English IV
wearable devices	
mobile watch	1
built-in features of mobile devices/apps	
voice-recording feature	1
translation feature	1
automatic-voice recognition	2
speech to text recognition	1
notifying	1
real-time corrective feedback	1

In conclusion, the above-mentioned aspects can help to better understand the various applications of MALL and for future improvements from either educators or MALL researchers to refer to. Although

MALL has provided positive effect on enhancing EFL learners' speaking skills and online collaboration, pending issues were also identified such as small screen size of phones and the limitations, malfunctions, even faults on the features of APPs (Di, 2018; Wu & Miller, 2020; Huang & Studies, 2021). Difficulties of using some APPs, (Zhonggen et al., 2019) and problems of data over-loading, distractions such as pop-up notifications may all impede students' motivation and the whole learning process. The fact that many mobile applications are not available in mainland China and the difference of learner styles leading to elective use of MALL to practice their speaking skills should all be taken into consideration when develop, adopt, or contextualize a mobile-mediated pedagogical approach to suit a Chinses English learning context.

4.4 Theoretical Basis: Innovative and Impairment

RQ2. **What are the widely used theories and frameworks proposed or underpinned for MALL research in enhancing English speaking skills?**

This section identified the widely-used theories/framework identified in the included literature. The synthesis of the results is summarized in table 7.

The sample addresses a wide range of theoretical frameworks. The studies that did not specify any theoretical framework constituted 13.3% (n=2) of the MALL studies. The remaining 86.7% were classified into three categories: (i) learning approaches, (ii) multimedia design and learning approaches, and (iii) technology-oriented approaches (Table 7). The categories are adapted from Duman's review work (Duman, 2014), and Peng and his colleagues also adapted the such category (Peng, 2021).

Table 7: Distribution of commonly addressed theoretical frameworks (adapted from (Duman, 2014) and (Peng, 2021)

Distribution of commonly addressed theoretical frameworks in the MALL studies		
categories of theoretical framework	total	%
Learning approaches	8	53.3
Task-based learning	2	
flipped learning	2	
seamless learning	2	
digital game-based learning	1	
The learning-oriented assessment (LOA) framework (Carless, 2007)	1	
multimedia design and learning approaches	4	26.7
Herrington, et al. (2009)'s 11 design principles for mobile learning in higher education circumstances	1	
A technology-mediated pedagogical framework combining Content, Collaborative Learning, and Learner Autonomy	1	
Krashen's Affective Filter hypothesis	1	
Cognitive loads of mobile learning	1	
Technology-oriented approaches	1	6.7
Technology Acceptance Model (TAM)	1	

The theories and models addressed in the MALL studies often originated from general second language learning theories, including socio-cultural theory, cognitive motivational theories (such as task-based language learning (TBLT), constructivism, and situated learning theory. Among the included MALL studies, 8 (53.3%) based their research on learning approaches that included task-based learning, flipped learning, seamless learning, digital-game based learning, multimodal learning, and peer-assisted learning. They echo with the literature that task-based language learning, authentic language learning, communicative language learning and seamless language learning have been successfully adopted in MALL research (Kukulska-Hulme and Viberg, 2018). Two other widely referred approaches, situated learning and authentic contexts/learning are frequently collocated in several studies referring to the use of MALL in talking about daily life or familiar 'suitable materials at home in their neighborhoods or at school' (Sun et al., 2017). However, although 80% of the studies are guided by theories, these theories were not referenced explicitly or comprehensively. For instance, as essential constructs of socio-cultural theory, scaffolding and Zone of Proximal Development (ZPD) are mentioned once only in one of the studies included. In other words, authors of the theory-based studies presented a theory somehow related to their experiments, but did not address all the essential constructs in their experiments. In a similar sense, Nguyen et al., (2018) based their study on a seamless learning

perspective, stressing the important role of mobile-mediated authentic context in enhancing learners' speaking skills. However, they did not touch upon other important components of seamless learning such as a supportive community of learners, teachers, and domain experts. This finding is in line with Peng' s (2021) review that commonly there is a lack of a clear connection between the theory and the experiments in MALL research. Meanwhile, although inquiry-based learning was briefly mentioned in the literature review part of Miller & Wu 's (2018) study as a successful attempt in MALL project, they themselves adopt action learning based on their self-proposed pedagogical framework. Apart from inquiry-based learning, design-based learning, which is also compatible with MALL, is mentioned in only one pilot study. It can be concluded that studies in Chinese EFL context tend to adopt task-based learning and flipped learning in a mobile-mediated spoken discourse, other approaches remain underexplored. As a new trend, digital game-based learning is also addressed in one of the studies.

In 4 studies (26.7%), multimedia design and learning approaches were employed, including cognitive loads of mobile learning theory, design principles for mobile learning in higher education circumstances. Noticeably, Miller & Wu, (2018) proposed a technology-mediated learning framework which promotes language learning from both structured and unstructured facets. Another innovative effort is based on Herrington et al.'s design principles, upon which based a framework of multi-modal language mobile-learning platform proposed by Lei & Liu (2020). It addresses with interactive input and output of multi-modal language in forms of voices, texts, audio and video resources, etc. based on the We-chat terminal.

Only one of the studies explicitly draw on Krashen' affective filter hypothesis to suggest that the complexity and difficulty of teaching material design may result in learners' lowered self-confidence and increased anxiety (Huang & Studies, 2021). The use of mobile learning apps could reduce speaking anxiety was briefly mentioned in two studies (see Sun et al., 2017 and Barrett et al., 2021).In conclusion, affective factors such as motivation, foreign language speaking anxiety and confidence are generally or briefly mentioned but not focused or addressed in depth in any of the included researches. The majority of the studies investigate the effect of MALL on the learning outcomes or learners' perceptions, collaboration and needs rather than on motivation, attitudes, and enjoyment in the learning. Thus, affective variables are called on into consideration for future research.

To investigate various user reactions towards mobile technology, the technology acceptance model (TAM) was applied in one of the studies (6.7%) to investigate users' perceived ease of use, resistance to change, or attitudes. Users' perception can also be addressed in the Learning-oriented Assessment Framework (Carless, 2007). It was underpinned in one study (6%) to construct feedback from self-, peers and teachers, and use the feedback in a feed-forward process (e.g. use it to improve speaking) (Wu & Miller, 2020). Learners' satisfaction could also be measured by Stokes's (2001) The satisfaction scale.

Although the majority of the studies (80%) are underpinned with theories or frameworks, there are still 20% of them lack a theoretical framework. This implies that these studies lacked a connection to theory and may suggest possible methodological weaknesses in the studies.

5. Discussions

Previous studies reviewed highlighted the positive impact of MALL on the development of English speaking skills among Chinese EFL learners, which echoes the findings of Rajendran & Md Yunus, (2021) in the other parts of the world. New trends such as the use of wearable mobile devices may inspire more researches concerning the combination of English-speaking skill and other skills. Similarly, game-based language learning is a currently increasingly active field in MALL to enhance many language skills. By providing a tool for self-regulated speaking practice, positive effects of a digital game-based language learning application on the improvement of monologic oral production were revealed in terms of complexity, accuracy, and fluency (Wang & Id, 2021). More empirical studies may be conducted for further investigation on the correlation between game-based language learning and conversational speaking skills and spontaneous speaking.

However, a stronger link between theoretical constructs and experiments should also be called for. Other pragmatic issues are explored as followed.

First, given that the access to some resources (e.g., Google+, Facebook, Twitter, YouTube) is limited in Mainland China, many researches have to rely on contextualized learning resources such as College English curriculum and commercial mobile applications accessible in Mainland China.

However, the use of authentic English in such contextualized apps is unclear.

Second, the use of MALL has also promoted collaboration among Chinese EFL learners. They become engaged in exchanging information (Miller & Wu, 2018) and mobile-assisted peers' feedback are valued (Wu & Miller, 2020). However, some pending issues were not identified in the studies reviewed. Such as security and privacy, connectivity restrictions, equipment cost, Internet access speed. For the educators and language instructors, issues such as difficult understanding and use, discomfort of use, culture of rejection of change, extra workload, updating of knowledge, etc. need to be considered in the future research (Criollo-C et al., 2021). In addition, Barrett et al., (2020) suggests the distinction of students' learning style needs to be paid attention by instructors. It is in line with Kabilan, Ahmad, and Zainol Abidin's study (2010) that instructors need to be aware of students' preference for social interaction in language learning, and should seek to accommodate this style in their courses. That is, social-cultural theory may not fit all MALL research since some participants may prefer to work on their own rather than working on a task with their peers. Also, teachers play a role in creating a learning environment, negotiating and encouraging knowledge construction. Digital pedagogy emphasizes learner-centered orientation; whereby the pedagogical role of the teacher is somehow weakened by technology adoption (Jie & Sunze, 2021).To achieve potential pedagogical outcomes, innovative pedagogies are necessary to address the new situations.

Generally, MALL can help the EFL learners become more competent using technologies in this globalized era, especially in the aspect of English-speaking skill if being used effectively and with appropriate strategies. Besides, the collaborative skills, ICT and digital literacy are all the add-value by-products when using MALL to improve EFL learners' English-speaking skills. More innovative and propriate use of MALL could promote Chinese EFL learners' speaking skill and effectively changed the situation of "dumb English" and "no chance to speak" (Lei & Liu, 2020).

6. Conclusion

This systematic literature review aimed to understand research patterns in MALL to enhance English speaking skills in Chinese EFL context. A comprehensive analysis of literature was undertaken to ensure a detailed discussion of the problems and their remedies. It was searched with as many known terminologies associated with MALL and then analyzed the results accordingly. The search was ended in June 2020, which would not have comprised studies that were carried out after the date. Journal articles from 6 credible databases were analyzed, and 15 out of 1390 publications were selected. The two primary forms of research designs adopted in these studies were "pre-experimental research" and "quasi-experimental research". The majority of the chosen researches were evidence-based and could lead to the full advantages of MALL to teachers and students. The most frequent theories of MALL in facilitating speaking skills were task-based learning, flipped learning and social-cultural theories. In line with Ishaq's findings, specific frameworks and theories focusing on speaking skill are less addressed aspect of MALL (Ishaq et al., 2021). And the impact of gender difference in MALL was hardly investigated in any of the research.

More empirical research needs to be conducted including focusing on primary or secondary school students and digital game-based learning approach fit in Chinese context to enhance learners' speaking skills. Mobile technologies can be good mediators to improve EFL learners' speaking skills, other issues such as how to increase speaking confidence and motivation, how to reduce foreign language speaking anxiety are also worth exploring in a mobile-mediated environment.

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