

A Study on Mobile-assisted Language Learning over Two Decades

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Abstract: *As technology and science developed, people have created different study modes to learn languages with the assistance of mobile devices. This study aims to find out the research trends, perceptions and existing problems toward mobile-assisted learning by analyzing relevant papers based on Web of Science and CNKI. It was suggested to complete theoretical system, enlarge the scale of the themes about language skills and implement teachers-oriented study.*

Keywords: *Mobile devices, Languages, Mobile-assisted language learning*

1. Introduction

Electronic devices involving computers, tablets, and smartphones were widely used in our daily life and played a great role in language learning and teaching. All kinds of intelligent applications simply downloaded in your smartphones were easily used. As mobile technology improved, mobile-assisted language learning (MALL) mode had been independent from traditional language learning and computer-assisted language learning (CALL) which had started an educational reform based on previous outcomes of CALL, second language acquisition theory and mobile learning (M-learning) theories.^[1]

However, there were many challenges in MALL, such as learners' unwillingness to learn, poor learning satisfaction, serious learning interruptions, poor learning strategies, insufficient communication, etc. Therefore, it was necessary to increase the participation in mobile-assisted classrooms and improve the efficiency of MALL. An in-depth understanding of the development, research trends, and problems of MALL would help learner to improve their language performance, strengthen their interests, and provide scientific basis and guidance for teaching and research activities.^[2]

Therefore, the author searched relevant research findings and found that the research of MALL showed an upward trend in different fields and disciplines, aiming to conclude the research status quo and trends of the research on MALL at home and abroad from 2000 to 2022, to find the existing problems, and to make efforts for further development of language teaching and practices of MALL in China. Following research questions guided the study:

- ① What were the trends of researches on MALL?
- ② What perceptions did learners have toward MALL?
- ③ What were the existing problems on the researches of MALL?

2. Theoretical Backgrounds

Before the analysis of literature, we needed to introduce the theoretical basis, definition and features of MALL to make it more clear for subsequent analysis.

2.1. Theoretical Basis

Through the analysis of the theories used in MALL researches, it revealed that the theories about MALL mainly included social and cultural theory, second language acquisition theory, multimedia learning theory and mobile learning related theory.

Socio-cultural theory was more widely applied, emphasizing that learning was the process of constructing knowledge in social communication activities, rather than simply transferring knowledge through minds.^[3] As an important medium, language helped learners construct knowledge and experience

from social communication, and aided individuals internalize and develop constructed knowledge from the cognitive level while mobile devices acted as intermediary tools in this process.

Many papers mentioned second language acquisition broadly without building a strong correlation with MALL researches, and seldom cited Krashen's input and output hypotheses.^[4] In some researches, the double-decoding theory and cognitive load theory in multimedia learning theory were also combined with MALL to jointly explore vocabulary learning design.^[4] To make a broad classification, Duman et al., in his research on trends of MALL from 2000 to 2012, divided the theoretical frameworks into three categories including learning approaches (47.82%), multimedia design and learning approaches (11.59%), and technology-oriented approaches (10.14%), but the real MALL studies followed theoretical framework that was highly agreed with their topic, who provided us a good review of the development of theoretical basis.^[5]

2.2. Definition of MALL

Mobile-assisted language learning came with the popularity of mobile devices and developed in recent years, so it was difficult to define it in an aggregable way. Kukulska-Hulme and Shield defined MALL as formal or informal learning style with portable electronics including smartphones, Ipad, tablets, etc.), which happened anywhere, anytime by anybody and any devices.^[1] MALL was currently defined from technology-oriented and learner-oriented approaches. The former viewed MALL as a method of language learning through the use of mobile devices while the latter regarded it as a pan-learning method featured with learner-mobility and content-mobility.

2.3. Features of MALL

MALL was characterized by individuality, social interaction, and continuity and scientific management, which could enhance the interest of language learners through augmented reality (AR), virtual reality, and text-to-speech communication which were fairly vivid and real.^[6]

2.3.1. Individuality

Mobile devices were personal stuff and users had the right to choose their interested apps and the way to use them.^[7] Since there were no limitations on time and space, learners adapted themselves to different situations and diversify their learning patterns by combining formal and informal learning. More importantly, they can learn at their own speed and schedule their learning tasks by themselves.^[8]

2.3.2. Social Interaction

Mobile devices made traditional classrooms no longer limited by time and space, and the interaction between students and teachers, students and students became more diverse. Classroom group collaboration, communication, and discussion were carried out either synchronously or asynchronously.^[9] Mobile devices not only enhanced the efficiency of group learning, but also provided the quality of interaction.^[10] Learning and teaching activities used to be only carried out in face-to-face scenarios, but now they were extended online, even accompanied with various attracting activities like gamified learning. For example, students use language apps, like Huijiang English which was mainly used for vocabulary learning, to interact or compete with classmates under the supervision of teachers; various word and speaking tests in language learning applications (APPs) drawn a great attention from learners, enhancing the interactivity and enjoyment by completing shared language learning tasks, communicating online and obtaining feedbacks timely.

2.3.3. Continuity and Scientific Management

The development and popularization of mobile learning not only allowed learning to happen anytime, anywhere in fragmented time, but also made learning content designed more continuous and scientific.^[5] We registered a private account through the mobile phone number, which would be logged in and used on other mobile devices. In the process of mobile learning, learners actively download English learning apps mainly including vocabulary and spoken practices with rich content and a huge body of data. Language learners opened these apps anytime, anywhere, and started learning and interactive communication repeatedly, so as to achieve the purpose of one-time investment and unlimited enjoyment.

Learners had many opportunities to access language learning resources on mobile devices. In the process of traditional teaching and learning, whether personal learning or examination tests were difficult to be measured and analyzed quantitatively, and the learning data needed to be manually recorded and counted which was time-consuming and laborious. Through the mobile learning platform, learners could

intuitively and accurately see their daily learning data and the platform automatically kick off statistics analysis. Based on analysis of learning data, learning management became more convenient and scientific.

3. Materials and Methods

The review was conducted to extensively examine past studies on MALL. Its major target was to provide a reference as extensive as possible and to hope that was useful for any interested reader. To achieve this aim, the following methods were used to locate and select studies for the main citation of this review.

Firstly, the online databases, Web of Science and CNKI, were used to search for the relevant studies ranging from 2000 to 2022. The main key word, “MALL” and “M-learning” guided the search. Since a variety of disciplines had done researches on this topic, we must refine the Web of Science and CNKI categories, thus linguistics and language linguistics in Web of Science and in CNKI were selected for the study MALL over two decades. Once an item was located via electronic search, the abstract was perused.

After a rough screening, we checked the abstract of these publications. If the abstract looked promising, then the item was obtained. Another complementary method involved close examination of the references of the selected articles for citations of additional relevant studies. The criteria of selecting previous studies as the main citation of this study were: 1) the paper included had to be published in a peer reviewed journal in edited collections; 2) master’s or doctoral dissertations and short reports were excluded; 3) the paper had to focus explicitly or implicitly on mobile learning; 4) the paper had to provide a sufficient description of data and data analysis from which the results were concluded. Based on these criteria, 15 publications were found to be suitable for inclusion as the main citations (see Table 1).

Table 1. Foci and major findings of main citations in MALL study

N	Authors	Foci	Major findings
1	Kukulaska-Hulme and Shield (2008) ^[11]	To examine how mobile devices can assist learners’ listening and speaking activities.	Students using mobile devices made more contributions in listening and speaking classes.
2	Kukulaska-Hulme (2009) ^[6]	To discuss whether mobile devices alter language learning.	Mobile devices brought benefits and some learning choices for learners.
3	Godwin-Jones (2011) ^[7]	To find out the state and development of language learning apps and mobile devices they use.	iPhone and Android provided many supporting language learning apps for all languages or specific language.
4	Cheon et al. (2012) ^[8]	To explore college students’ perceptions and attitudes toward MALL.	Students hold a positive attitude toward the mobile-assisted mode.
5	Yang (2012) ^[4]	To investigate vocabulary learning modes through the use of mobile devices.	There were four vocabulary modes via messages, database, portable devices, and interactive communication.
6	Kondo et al. (2012) ^[11]	To find out whether MALL can facilitate self-regulated learning.	MALL encouraged learners to self-study without teachers’ interruption.
7	Duman et al. (2015) ^[5]	To trace the development of mobile assisted language learning (MALL) in recent years.	Vocabulary teaching with mobile devices remained very popular, and a great body of researches failed to study from any theoretical framework.
8	Dashtestani (2016) ^[12]	To investigate students’ use of mobile devices and their attitudes toward MALL.	Students were positive toward MALL but they mainly used mobile devices for non-academic activities.
9	Sung et al. (2015) ^[9]	Effects of learning language with mobile devices.	MALL generated more learning achievement to students.
10	Gangaiamaran and Pasupathi (2017) ^[13]	To classify language apps according to the different levels of learners.	Listening skills were better acquired through using language apps.
11	Loewen et al. (2019) ^[14]	To explore the effectiveness of large-scale L2 learning apps, such as Duolingo.	More time they spent on Duolingo, the more learning achievements they gained.
12	Chen and Jia (2020) ^[15]	To conclude the status quo, trends and problems of MALL in China.	Various themes were investigated and most researches employed quantitative and non-empirical methods.
13	Xi et al.(2020) ^[16]	The characteristics and mechanism of multiple intelligence on the acceptance and engagement of mobile foreign language learning.	Mobile foreign language learning effectively promoted learners’ linguistic and musical intelligence.
14	Zeng et al. (2020) ^[17]	To compare effects between one-way peer feedback and conversational peer feedback on spoken output of second language in MALL environments.	Conversational feedback promotes the accuracy of spoken output.
15	Burston and Giannakou (2022) ^[18]	To overview the language learning outcomes with meta-analysis.	There were more positive language learning conclusions than negative one.

It was worth mentioning that the included research resources were limited to the author's own ability. The author could only reach the resources within his own scope. There may be other publications out of the author's reach.

4. Discussion

After the collection and analysis of a large number of literatures from CNKI and Web of Science, the paper used descriptive methods to analyze these researches objectively and reasonably, and concluded three major topics which were presented below in order, which were language skills involving listening, speaking, writing, vocabulary, grammar, phonetics, etc., effectiveness of MALL and perceptions toward MALL, and language learning apps. There were some overlapping and disagreement with this classification since different disciplines, theories and technologies were entwined with each other to complicate MALL researches.

4.1. Language skills

Regarding the study of language skills, there was a difference in the research direction at home and abroad. Chen and Jia, through quantitative research, concluded that among the researches on language skills in China, the number of studies on comprehensive language skills was ranking the first, followed by speaking and listening then the vocabulary skills.^[15] In terms of the speaking skills, conversational feedback in a mobile-assisted language learning environment could promote the accuracy of spoken output.^[17] In terms of vocabulary skills, Yang referred to the previous studies and concluded four vocabulary modes through different ways.^[4]

However, the most concerned MALL researches about language skills were vocabulary skills in foreign studies, followed by listening skills and pronunciation.^[5] It was worth noting that learners acquired their listening skills more easily by using mobile devices. Combining the domestics and foreign studies, we found that MALL researches about grammar, writing skills, and phonetics were neglected over these twenty years.

4.2. Effectiveness of MALL and perceptions toward MALL

A large number of studies focused on effectiveness of MALL and explored learners' perceptions toward MALL. The use of mobile devices had a moderate effect on language learning,^[9] and domestic studies had also proved that mobile learning had a positive effect on language learning, and on the enhancement of language skills.^[15] Also, Burston and Giannakou found there were more positive effects than negative one by analyzing literature about MALL over two decades.^[18] Students assisted by mobile devices performed better in spoken classes than those who did not, then Kukulska-Hulme proved that mobile devices exerted a great positive impact on language learning which offered more choices for learners to suit their own habits and actual situation.^[6] Besides these linguistic effects, learning assisted with mobile devices promoted the development of non-linguistic ability. By investigating students' self-regulated ability, Kondo discovered that mobile devices aroused students interests and promoted their self-study even when teachers were not around them and MALL also played a positive role in students' musical intelligence.^[11]

Undeniably, every emergence of technology cut two ways in society and schools. MALL mode depending on the mobile devices distracted students easily with shallow communication, inadequate teacher training, and incomplete feedback.^[9] The majority of students who were interested in mobile learning often engaged in non-academical activities with their devices.^[2] Though students had a positive attitude toward MALL, a great effort needed to be made to increase their interests by utilizing available meaningful information, building a user-accepted M-learning system, and improving faculty's instruction.^[8]

4.3. Language learning apps

Researches about language learning apps were popular these days with the growing number of Apps for all languages, specific language or certain language skills thus the themes about language apps are ranging from specific language apps to design of a language app.

In terms of specific language apps, Duolingo, as one of the most popular apps, helped students to practice their speaking skills. Loewen et al. argued that students made more academical gains as they

spend more time in Duolingo.^[14] In terms of the design of an app, Liu aimed to improve students' listening and speaking skills by creating an app called HELLO with handheld augmented reality which stored with numerous authentic language materials to help students to develop targeted language skills, proving that students gain more achievements by employing this app.^[19]

Godwin-Jones reviewed the development of language apps on mobile devices such as IOS, Android, and Web, and proposed to enhance the mobility, the function of emerging mobile devices since mobile devices featured individuality and customization.^[7] Gangaamaran and Pasupathi collected all kinds of language apps in app store, classified these apps into three categories from primary to secondary and tertiary learners respectively, and labeled each app with name, suitable device, trained language skills, and paid or unpaid, who suggested that off-line apps should be promoted to help students in poor areas access to the learning resources and we need to conduct more teacher training on MALL and assist them to overcome the challenges in employing mobile-assisted language teaching.^[13]

5. Conclusion

Through the collection and analysis of literature, the paper displayed relevant articles and discussed three popular themes about MALL including language skills, effects of MALL and perceptions toward MALL, and language apps. This study only analyzed and discussed papers based on Web of Science and CNKI, so the number of papers was insufficient, and the listed papers were selected with personal thought and justification without following strict criteria. It was necessary to enlarge the number of papers, to enrich the themes of the research, and to conduct more comprehensive and detailed analysis in the future. Based on these discussions on MALL, the author put forward some existing problems and implicated the future development of MALL to provide a reference for the later researchers.

Firstly, there was no complete theoretical system about MALL. Since MALL, as an assistant of language teaching, developed for a short time, many studies tended to refer to previous theories and few explored new theories to complete the theoretical system of MALL.^[5] Considering MALL combining the mobile devices and language teaching system, it was featured with diversity and complexity whose researches were extended to a wide range of fields and disciplines making it harder to form a unified theoretical foundation. In addition, the theoretical basis of MALL altered as the form and content of mobile devices altered so it was necessary to follow the trace of time and to add new theories and improve the old one.

Secondly, the themes about language skills were not widely ranged. From the review of the studies on language skills of MALL at home and abroad, researches on one language skill were insufficient while there are many comprehensive studies. Also, there were few researches on phonetics, grammar which needed to be more observed and carried out more exploration.

Finally, teachers-oriented study needed to be implemented. Currently, scholars were more likely to investigate from the students' perspectives because of its availability to the experimental data and a great number of students. MALL, as an assisted instructor, needed to be implemented by teachers and students together. More researches on MALL needed to be directed to study from teachers' perceptions which had a long way to go.

As artificial intelligence technologies such as text recognition, speech recognition, natural language processing, and data annotation evolved, language learning supported by artificial intelligence technology will be a new research field waiting to be explored. Language learners' linguistic and non-linguistic skills will change dramatically in form and content with the help of intelligent applications. Researchers need to keep up with the change of technologies, learn to understand emerging science and technology, and effectively combine it with language learning to promote the vigorous study of language learning.

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