MOBILE ASSISTED LANGUAGE LEARNING (MALL) AS A FOREIGN LANGUAGE AID: A LITERATURE REVIEW

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Abstract

In recent years, mobile language learning, which can also be defined as mobile-assisted language learning (MALL), is commonly used in a wide range all over the world. MALL is utilized in language learning to foster new possibilities in providing more useful and attractive learning activities. Thus, the current study aimed to identify the effectiveness of MALL as a tool for language learning by examining 10 Ph.D. dissertations (5 from Turkey, 5 from several counties) and 10 journal articles published in different Social Science Citation Index (SSCI) journals between 2013 and 2019. The review was conducted to identify the research domains such as scope, research questions, methodologies, common emergent features and overall implications of those studies. The results showed that while Ph.D. dissertations from Turkey mostly focused on vocabulary learning through several MALL applications, Ph.D. dissertations from other countries had diverse research domains. Further, the article studies vary in terms of scopes, methodologies and contexts, providing insights for context-dependent practices such as restricted settings. Those studies also revealed the pros and cons and suggested employing MALL applications appropriately in facilitating language learning.

Keywords: Mobile assisted language learning, m-learning, mobile devices, language improvement

YABANCI DİL YARDIMI OLARAK MOBİL DESTEKLİ DİL ÖĞRENMESİ: BİR LİTERATÜR İNCELEMESİ

Özet

Son yıllarda mobil destekli dil öğrenimi (MALL) olarak da tanımlanabilecek mobil dil öğrenimi, tüm dünyada yaygın olarak kullanılmaktadır. MALL, daha yararlı ve çekici öğrenme etkinlikleri sağlamada yeni olasılıkları teşvik etmek için dil öğrenmede kullanılır. Bu nedenle, mevcut çalışma, 2013 ve 2019 yılları arasında yazılan 10 doktora tezi (5 Türkiye'den, 5 çeşitli ülkelerden) ve farklı Sosyal Bilimler Atıf Dizini (SSCI) dergilerinde yayınlanan 10 dergi makalesini inceleyerek MALL'un bir dil öğrenim aracı olarak etkinliğini belirlemeyi amaçlamaktadır. Bu çalışma, literatürde sözü edilen bu yayınların kapsam, araştırma soruları, metodolojiler, ortak özellikleri ve genel çıkarımları gibi araştırma alanlarını belirlemek için yapılmıştır. Sonuçlar, Türkiye'de yapılan doktora tezlerinin çoğunlukla birkaç MALL uygulaması yoluyla kelime öğrenmeye odaklanırken, diğer ülkelerde yapılan doktora tezlerinin farklı araştırma alanlarına sahip olduğunu göstermiştir. Ayrıca, makale çalışmaları, kısıtlı ortamlar gibi bağlam-bağımlı uygulamalar için yeni anlayışlar sağlayarak kapsamlar, metodolojiler ve bağlamlar açısından farklılık göstermektedirler. Bu çalışmalar aynı zamanda artıları ve eksileri ortaya çıkarmış ve MALL uygulamalarının dil öğrenmeyi kolaylaştırmada uygun şekilde kullanılmasını önermişlerdir.

Anahtar Kelimeler: Mobil destekli dil öğrenimi, m-öğrenme, mobil cihazlar, dil geliştirme

1. INTRODUCTION

Rapid growth in technology and the development of mobile technologies in recent years are providing space and locations for language learning. Given the impact of these technologies on our lives and the advantages they offer for the community, it is inevitable for them to be used to learn and teach English as well. Mobile devices have gradually been introduced into the educational context over the past two decades (Shuib, Shamshirband, and Ismail 2015). Many students are now familiar with using personally owned, portable digital devices that can connect wirelessly and are "always-on" (Selwyn & Bulfin 2016). As a result, it may be a good idea to use these sophisticated devices in language learning. Ekinci and Ekinci (2017) stated that the use of mobile devices for language learning increases the range of language exposure for the learners and enables learning to become mobile rather than depending just on traditional teaching materials. Mobile technologies provide many benefits for language learners thanks to their flexibility, low cost, small size and user-friendliness (Huang et al., 2012). They also provide numerous opportunities to re-design the way English is taught and learned (Ekinci & Ekinci, 2020). Considering the value of mobile technologies in language education, this study aimed to find out the studies in the related literature focusing on mobile-assisted language learning and the use of mobile devices to improve learners' language development.

2. METHODOLOGY

Mobile language learning, as a broad field, was selected as the target issue for this literature review to be able to reach a wide range of studies. The first focus of the researcher was the Ph.D. dissertations from Turkey. To find those dissertations, National Theses Center (Tez Merkezi) was taken as a source. Afterward, the international database of Open Access Theses and Dissertations (OATD) was utilized to reach Ph.D. dissertations worldwide. On the other hand, research articles were searched within EBSCO Science Direct, ERIC, ProQuest and Routledge databases. The studies were screened through the following criteria to guide the selection: (1) studies that were written in English; (2) studies that were published between 2013 and 2019 (3) studies with a focus on mobile language learning and (4) studies that were published as full text within 10 years, which are related to educational technology and indexed in Social Science Citation Index (SSCI): *Language Learning & Technology, TESOL Journal, British Journal of Educational Technology, Contemporary Educational Technology, System, Asian EFL Journal, Social and Behavioral Sciences, Turkish Online Journal of Distance Education-TOJDE.* As for analysis, coding and categorizing the themes were done in all studies to find common aspects. The emergent themes were discussed, and implications were examined consecutively.

3. FINDINGS
3.1. Findings of Ph.D. Dissertations from Turkey

Ph.D. dissertations in Turkey about Mobile Learning comprise of several domains in recent years. The majority of the dissertations mentioned in this study (3/5) are from Middle East Technical University (METU). On the other hand, those studies' research domains consist of vocabulary learning, motivation, engagement and learner autonomy. While most of the studies deal with EFL students in different proficiency levels from different institutions (4/5),

one specific study focuses on prospective teachers. Table 1 displays the descriptive details of studies in reverse chronological order.

Table 1. *Descriptive Details of Ph.D. Dissertations from Turkey*

Name	Focus Domain	Intervention	Design Duration	Participants	Effect
K. O. Dağdeler, 2018. Atatürk University. The Role of Mobile-Assisted Language Learning (Mall) In Vocabulary Knowledge, Learner Autonomy and Motivation Of Prospective English Language Teachers	Vocabulary Motivation Learner Autonomy	CollactApp	Quasi-Experimental 14 weeks	73 EFL teacher candidates	Partly positive
S. Gürkan, 2018. Yeditepe University. The Effects of Hypermedia Annotation Types and Learning Styles On Mobile Assisted Vocabulary Learning, Recall and Retention	Vocabulary Recall Retention	Vocastyle	Experimental 8 weeks	122 EFL High school students	Positive
Ş. Bakay, 2017. METU. Investigating The Effectiveness of a Mobile Device Supported Learning Environment On English Preparatory School Students' Vocabulary Acquisition	Vocabulary Motivation	MeWe App	Mixed method 6 weeks	37 EFL University students	Positive
Ç.U. Bilgin, 2016. METU. Facilitating English As A Foreign Language Learners' Vocabulary Learning, Task Completion and Contextual Vocabulary Exploration Processes in A Mobile Supported Situated Learning Environment	Vocabulary	Mobile System with Tablet Use	Mixed method 5 weeks	25 EFL University students	Positive
Y. Alioon, 2016. METU. An Investigation of Student Engagement, Motivation, and Attitudes Towards Course Content in a Mobile-Learning Enhanced Course	Motivation Engagement	Mobile Devices	Mixed method 12 weeks	63 EFL University students	Positive

In her most recent study, Dağdeler (2018) examines the role of MALL in vocabulary knowledge, learner autonomy and motivation of 73 prospective English language teachers. Participants in this study first took online courses, learned 40 collocations and were asked to prepare lesson plans, including MALL activities discussed in the courses. This study adopted a quasi-experimental design that includes an experimental and a control group through random sampling. The data were gathered through different scales, and Cronbach Alpha values of items were given in detail. As for the findings, the study revealed that there was no difference in terms of productive vocabulary knowledge and autonomy of the participants after 14 weeks of

the treatment period. On the other hand, mobile applications motivated participants and improved their receptive vocabulary knowledge.

The second thesis focused in this study concentrates on the effects of hypermedia annotation types and learning styles on mobile-assisted vocabulary learning, recall and retention (Gürkan, 2018). In this experimental study, the experiment group (49) received Vocastyle Multimedia Vocabulary Learning Application, while the control group received no annotation. The reliability of the achievement test (Cronbach Reliability) was calculated as 0.76. Additionally, in the research design part, it was stated that the study made use of multiple data sources to overcome the deficits of mono-method studies, to increase the amount of research data, to achieve higher levels of validity and credibility and to enrich the nature of research data. After 8 weeks of treatment, pre and post-test findings showed significant differences between mean scores of students in each group, revealing the effect of Vocastyle Application in both vocabulary recall and retention levels of participants.

Bakay (2017) examines the effectiveness of a mobile device supported learning environment on English preparatory school students' vocabulary acquisition. He used the application called MeWe that allows its members to create separate groups for sharing information specific to that group and group members. Quantitative and qualitative research methodologies were used together in the research design. Both the experimentation and the use of semi-structured interviews were carried out to determine whether the mobile device supported learning environment significantly affected the students' motivation and achievement in vocabulary learning compared to the traditional learning environment. After 6 weeks of implementation, the results of the quantitative phase of the study indicated that the mobile device supported learning environment had positive effects on the students' motivation and achievement in vocabulary learning and the qualitative data results revealed that the students favored the use of the mobile device supported learning environment. However, they also mentioned some challenges faced while completing the tasks.

In her study, Bilgin (2016) tries to facilitate EFL learners' vocabulary learning, task completion and contextual vocabulary exploration processes in a mobile supported situated learning environment. Based on situated learning theory (STL) principles, she chose the METU Science and Technology Museum as an authentic learning environment that is a large, open space populated with interactive science exhibits. Participants in the experimental group (n=25) were asked to conduct interactive experiments in an authentic learning environment with the support of the mobile vocabulary learning system. While the quantitative part of the study includes one group pretest-posttest design, the qualitative part includes semi-structured interviews, retrospective reviews, and observation. Triangulation of data collection tools was available in this study to address the validity (trustworthiness) and reliability (dependability) of the data. Observation notes, retrospective reviews, interviews, video camera records and academic achievement tests were administered in this sense. Peer reviews, which were an external check throughout the research process that allowed the researcher to see significant misunderstandings offered by peer debriefers, were also provided. Moreover, to achieve acceptable reliability levels, the inter-coder agreement was used based on engaging a colleague of a researcher in the coding process to analyze transcript data. The study indicated that contextual vocabulary learning could be supported and enhanced with mobile technologies by considering contextual clues, word frequency, and learners' domain knowledge, interest, and

focus. Moreover, the situated learning environment promoted long-term retention and contextual learning of vocabulary.

In his Ph.D. dissertation, Alioon (2016) investigated student engagement, motivation and attitudes towards course content in a mobile-learning enhanced course at METU through mixed-method design. After implementing activities at two subsequent semesters, surveys, a motivation questionnaire and follow-up interviews were conducted to reveal in-depth understandings. For the questionnaire items, Cronbach's score was 0.95. Furthermore, after using the interview protocol, the researcher gave an inter-rater reliability score of 75%. The study's findings highlighted some crucial concepts such as personal development, satisfaction from the course, and collaborative learning acquired thanks to mobile learning.

From the review of Ph.D. dissertations from Turkey, it is clear that the most focused domain of the studies was vocabulary learning, which was followed by the learners' motivation. Generally, all the studies revealed relatively positive results for using several MALL devices. Most of the studies included a specific type of application that can be chosen according to the studies' scope. Moreover, the researchers preferred to conduct their studies with EFL learners. The results of the studies conducted in the Turkish context can be summarized as follows;

• Some mobile applications and systems can facilitate EFL learners' vocabulary learning.

• Even if there is no evidence about mobile technologies' long-term effects in these studies, MALL can offer learners an advantage in achievement tests and vocabulary reception.

• There is strong evidence in these studies that implementing a MALL activity or application to English language learning amplifies learner motivation.

• Further research about the other aspects of language learning, such as skills, should be emphasized in that recent studies conducted in Turkey considerably lack those aspects of English language learning.

3.2. Findings of The PhD. Dissertations Worldwide

This part examines the Ph.D. dissertations worldwide, including different universities such as Newcastle University, Leicester University, Exeter University, and Illinois University. Plenty of different research domains appear among those studies that implement diverse methodologies within several backgrounds. Table 2 illustrates those studies in reverse chronological order below.

Table 2. *Descriptive Details of Ph.D. Dissertations from Different Countries*

Name	Focus Domain	Intervention	Design Duration	Participants	Effect
Albadry, H. F. A. (2018). Newcastle University Using mobile technology to foster autonomy among language learners	Autonomy	iPads Apps E-books	Mixed method 12 weeks	21 EFL university students	Positive
Auer, N. (2016). University of Leicester Scaffolding foreign language learners' reading strategies using tablet computers at two secondary schools in Denmark	Reading Strategies	Tablets iBook Arthur App	Multiple Case 4-6 weeks each case	12 FL High school students	Positive

Cojocnean, D. M. (2015). University of Exeter The vocabulary learning behavior of Romanian high school students ina digital context.	Vocabulary	Any tool	Mixed method 3 months	1239 EFL high school students	No familiarity
Al-Zahrani, A. S. (2015). Northern Illinois University Smartphones wandering at the mall: A case study investigating the use of smartphones on English oral learning skills in a collaborative mobile-assisted language learning environment.	Listening and Speaking	Smartphones WhatsApp	Qualitative Case Study 4 months	10 EFL University students	Positive and Negative
Mthethwa, M. P. (2014). Southern Illinois University at Carbondale. The utility of Mobile-Assisted Language Learning (MALL): ESL students' beliefs about new literacy in Swaziland.	Beliefs	Smartphones	Mixed method	83 ESL High School students	Positive

In her recent study, Albadry (2018) explores whether the iPad's multi-modal functionality and affordances can encourage and motivate students to become more independent learners. The study was carried out for 12 weeks with a group of 21 Saudi university students. Data was gathered from questionnaires, focus group interviews, student diaries, think-aloud protocol, and an online tracker. The findings indicated that students used a wide range of cognitive, metacognitive, and social strategies when working with the iPad, and there was a statistically significant increase in students' reported use of language learning strategies by the end of the project. The study also provides evidence that the use of the iPad, when integrated carefully into a language course and with the teacher's instruction, can have positive effects on students' attitudes and learning. There is evidence that these effects extended beyond the end of the course, as post-course interviews suggest that students continue developing certain types of autonomous behavior.

Another study by Auer (2016), a longitudinal qualitative one, examined cognitive and metacognitive foreign language reading strategies that students employ when using tablets and how digital features may support reading comprehension. 12 EFL university students were participated in the study in Denmark setting. iBook Author application on the iPad was implemented to study the prompts in the texts. Students' logs, semi-structured interviews, and a researcher's log were used as the primary data collection tools, and coding was administered through thematic analysis to triangulate the data. The findings indicated that students used a variety of metacognitive and cognitive reading strategies. Students engaged in higher-order thinking skills by following the scaffoldings provided by the iPads' features. All in all, the study suggested that, when employed effectively, the applications available on tablets might provide scaffolding for the reading process.

The third Ph.D. thesis reviewed in this study is from Exeter University by Cojocnean (2015), investigating Romanian high school students' vocabulary learning behaviors in a digital

context. The study analyzed how students' choice of technology-enhanced tools and their attitudes vary across the four independent variables: age, gender, academic profile (math-ICT, humanities, science and economic-technical) and language programs (intensive English, bilingual, regular). A mixed-method was employed with 1,239 participants in total who filled in the self-reported questionnaire, and 43 of them participated in focus group discussions before the administration of the questionnaire. The quantitative data were analyzed using descriptive and inferential statistics procedures, whereas the qualitative data were analyzed thematically. The study mainly revealed that students prefer social, determination, metacognitive, cognitive and memory strategies. The results showed that overall Romanian students were not very familiar with computer and mobile assisted language learning tools; their attitudes towards using digital tools for vocabulary learning were neutral.

In another case study, Al-Zahrani (2015) focused on the practical uses and supportive features of smartphones to improve English language learners' learning skills, mainly listening and speaking. The participants in this study were 10 EFL university students, and a WhatsApp group was created to include the participants in the study. The data collection methods were interviews, surveys, the WhatsApp group chat log and observation. The researcher established a collaborative tryout example in class, in which students originated, simulated, and role-played real-life scenarios by calling each other to have a job interview, order from a restaurant, pay a utility bill, call 911, book a plane ticket and a hotel room, or just simply call an old friend. Then the same activities were carried out with WhatsApp afterward. The findings of this research study showed that there were benefits and advantages as well as drawbacks and obstacles of using smartphones to enhance language learning skills, mainly listening and speaking.

In the last Ph.D. thesis from abroad, Mthethwa (2014) investigated the utility of mobile-assisted language learning in Swaziland, mainly the use of smartphones for learning English. Students' beliefs about the potential benefits of MALL were also examined. In this mixed-method study, a 23-item Likert scale was used to collect quantitative data, which were analyzed using both descriptive and inferential statistics, while telephone interviews were done to collect qualitative data, which were analyzed using both inductive analysis and creative synthesis. The participants were 82 ESL high school students, 20 of whom also participated in the interviews. Plus, Cronbach's alpha score of the instrument was revealed to be reliable, and the other researchers did peer reviews to justify validity. The results revealed the benefits of using smartphones in class for the same reason.

Unlike the Ph.D. dissertations from Turkey, which mainly focus on vocabulary learning by MALL practices, studies around the world adopted several aspects of English language learning within different backgrounds. Not just vocabulary learning, but student autonomy, beliefs, strategies, and different skills like listening and speaking were also among the topics that have been examined through those studies. Even if most of those studies' participants were on a small scale, they considerably applied methodological triangulation to provide more valid results. It might not be erroneous to claim that recent studies' overall findings encourage MALL settings and practices in several contexts. However, a need for more longitudinal studies that can uncover in-depth understandings of these issues is obvious.

3.3. Findings of Research Articles

In this part, 10 journal articles published among several Social Science Citation Index (SSCI) journals between 2013 and 2019 were examined in terms of their research domains,

methodologies, strengths, and weaknesses. Table 3 elicits the main characteristics of these articles in reverse chronological order.

Table 3. *Descriptive Details of Articles*

Name	Focus Domain	Intervention	Design Duration	Participants	Effect
Maulina, Noni, Basri (2019). **Asian EFL Journal** WhatsApp Audio and Video Chat-Based in Stimulating Students' Self-Confidence and Motivation to Speak English	Speaking Self-confidence Motivation	WhatsApp	Mixed method 14 weeks	27 Indonesian EFL students	Positive
Huh and Lee (2019). **TESOL Journal** Fostering creativity and language skills of foreign language learners through SMART learning environments: Evidence from fifth-grade Korean EFL learners	Speaking Writing Creativity	SMART tools	Case Study Mixed-method 12 weeks	27 5th Grade Korean EFL learners	Positive
Gonulal (2019). **Contemporary Educational Technology** The use of Instagram as a Mobile-Assisted Language Learning Tool	Attitude Experiences	Instagram	Mixed-method 8 weeks	97 ELL students	Positive
Samaie, Nejad, and Qaracholloo (2018). **British Journal of Educational Technology** An inquiry into the efficiency of WhatsApp for self and peer-assessments of oral language proficiency	Speaking Self and peer assessment	WhatsApp	Multi-Case Study Mixed-Method	30 Iranian EFL learners	No effect
Perez-Paredes (2018). **System** Mobile data-driven language learning: Affordances and learners' perception	Writing Perception	TELL-OP App	Multi Case Mixed method 4 weeks	130 International university students	Positive
Hilao and Wichadee (2017). **Turkish Online Journal of Distance Education-TOJDE** Gender Differences in Mobile Phone Usage for Language Learning, Attitude, and Performance	Attitude Gender	Mobile Phones	Quantitative 14 weeks	122 Tai EFL University students	No difference

Azar and Nasiri (2014). **Social and Behavioral Sciences** Learners' Attitudes toward the Effectiveness of Mobile Assisted Language Learning (MALL) in L2 Listening Comprehension	Listening Attitude	Cell phone-based Audio	Mixed method 16 weeks	70 Iranian EFL university students	Positive
Soleimani, Ismail, and Mustaffa (2014). **Social and Behavioral Sciences** The Acceptance of Mobile Assisted Language Learning (MALL) among Post Graduate ESL Students in UKM	Attitude Acceptance	Mobile Phones	Quantitative Questionnaire	25 Malaysian ESL students	Positive
Li and Hegelheimer (2013). **Language Learning & Technology** Mobile-Assisted Grammar Exercises: Effects on Self-Editing in L2 Writing	Writing Grammar	Mobile Grammar App	Mixed method 16 weeks	19 ESL learners	Positive
Smith and Wang (2013). **Language Learning & Technology** Reading and Grammar Learning Through Mobile Phones	Reading Grammar	Mobile Phones	Mixed method	208 Japanese EFL university students	Partly Positive

The first of the articles is by Manula, Noni and Basri (2019) that intended to describe EFL students' day-to-day English-speaking skills via WhatsApp group set as a platform for audio and video chat-bases for a semester. Through these chat-bases, students were expected to solve problems in terms of self-confidence and motivation to speak English. By following a mixed-method, the data was gathered in the form of WhatsApp group's day to day observation and close-ended questionnaire with 27 participants selected purposively. These data were analyzed descriptively. The results revealed that students showed progress in English speaking. Students with low self-confidence and motivation were also engaged with the help and inspiration from peers and lecturers as WhatsApp group members.

The second article belongs to Huh and Lee (2019) that explored how SMART learning environments affect elementary EFL students' creativity and English ability. 27 fifth-grade EFL students participated in this study and were involved in creativity-enhanced English activities for 12 weeks. The researchers disclosed why they chose fifth-grade students, stating that their cognitive development is closely related to creativity development (Ahmad et al., 2016). Data include the results of students' Torrance Test of Creative Thinking, English tests, and a perception survey. Paired-samples *t*-tests were exploited to compare the pretests and post-tests for students' creativity and English ability scores, without any control group. The researchers

referred to the reliability of the test they used by explaining that the reliability of TTCT-Verbal scores was reported to be above 0.90 (Torrance, 2000). When it comes to data analysis, they used SPSS 22 to compare pretests and post-tests, and they used two strategies for analyzing the survey: counting percentages and coding. This study's results unearthed that SMART learning environments reinforced the participating elementary EFL students' creativity as well as their English language learning. This study suggested that language teachers and researchers can effectively apply the SMART learning environment to modify them within their own context.

The third article was from Turkey, in which Instagram was governed as a Mobile-Assisted Language Learning Tool by Gönülal (2019). The primary purposes of the study conducted with experienced Instagram end-users were (a) to reveal students' Instagram use habits for educational purposes and identify any distinct profiles among students when using Instagram as a MALL tool, and (b) to investigate students' opinions and experiences regarding the employment of Instagram as a MALL tool. Thus, the researcher implemented a mixed-method to the study, including a comprehensive online survey adapted from Kabilan et al.'s (2010) and Gamble and Wilkins' (2014) questionnaires. According to the researcher, Cronbach's alpha level was 0.94, which was relatively high and suitable for data collection. Participants were 97 university students from 42 different countries such as Brazil, Turkey, Finland, Germany, Azerbaijan, Indonesia, Iran, Spain, Ukraine, China, India, Russia, France, Hungary, and Italy. To identify the potential participants, the researcher used a convenience sampling strategy by employing several tags (e.g., #englishlanguage, #learnenglish, #englishlesson) on Instagram. Then, the link to the online version of the survey was sent to the participants. To identify any distinct Instagram user profiles, a cluster analysis was run, the purpose of which is "to create a new categorical variable that minimizes the amount of variation within categories, while maximizing the differences among categories" (Staples & Biber, 2015, p. 243). The results showed a relationship between the use of technology and the increased language learning motivation and between the high language learning motivation and the increased use of technology. Moreover, the results also illustrated that participants' overall attitudes towards using Instagram for language learning purposes were mostly positive due to its suitability for sustained English language learning.

Another study executed by Samaie, Nejad, and Qaracholloo (2018) focused on WhatsApp use for self and peer-assessments of oral language proficiency. 30 Iranian English learners doing self- and peer-assessments on WhatsApp were selected as the participants of the study. The researchers adapted a questionnaire from Burnett and Cavaye (1980) and open-ended interviews as instruments. Each question in the interview was centered on one of the questionnaire themes: (a) practicing, (b) assigning grades, (c) feeling comfortable and (d) being fair in mobile-assisted self- and peer-assessments. Moreover, the researchers practiced Bonk and Ockey's (2003) rating scale to assess students' own and their peers' oral language proficiency to yield more reliable results. A think-aloud protocol accompanied the assessment to gather data on the assessment procedure. The analysis of think-aloud data would show the particular issues involved in mobile-assisted self- and peer-assessments reflecting the procedures of the two assessment types. The study demonstrated that although there is a statistically significant difference between self-and peer-assessment in terms of the final score, think-aloud data indicate no noticeable difference in the procedure of the two types of assessments. Mobile-assisted involvement in assessment generally has adverse effects on the

participants' attitudes. Additionally, the participants gave various reasons for their negative attitudes towards mobile-assisted self- and peer-assessments.

In their study, Perez-Paredes et al. (2019) focus on Data-driven learning (DDL) as a learner-focused approach that promotes language learners' discovery of linguistic patterns of use and meaning by examining extensive samples of attested uses of language. They designed and implemented TELL-OP application to the language learning process to improve the writing skills of learners. They set out to look into the language learners' perceptions of mobile DDL and the digital literacy skills needed to use the app and explore how DDL can best seize mobile learning affordances. To this end, the study adopted a non-sequential mixed-method survey research design to explore the learning process and address the users' perceptions, and online surveys and focus group interviews with 130 EFL learners in total were used to collect the intended data. The researchers expressed that a convenience sampling strategy was assigned. The study suggested that DDL and mobile devices have the potential to allow learners to learn languages anytime and anywhere by obtaining personalized and immediate feedback on their own production. Within the study framework, the users appreciated the personalized feedback they were provided straight after completing the task and the corresponding feedback whenever and wherever needed.

In another article, Hilao and Wichadee (2017) compared how male and female students perceived mobile phones as a language learning tool and used mobile phones to learn English and develop their learning performance. As an instrument, they utilized a five-point rating scale questionnaire to collect data from 122 students, comprising 65 females and 57 males. The researchers stated that they conducted a pilot study, and the results were calculated using Cronbach's Alpha. Two parts in the questionnaire yielded acceptable coefficient-alpha estimates with the reliability value of .92, and .87 warranted the use for this research study. On the other hand, to answer the last research question, the researchers employed open-ended questions categorized and counted. The participants mentioned some vital points as obstacles such as the small screen and keyboard, limited memory, the university's Wi-Fi service's ineffectiveness, inadaptability to this learning process, too many activities to be done on a mobile phone. In the end, the study did not find any differences in males' and females' learning performance and attitudes.

Azar and Nasiri (2014) conducted research dealing with learners' attitudes toward the effectiveness of Mobile Assisted Language Learning (MALL) in L2 listening comprehension in the Iranian setting with 70 EFL students. They used the MALL questionnaire, but we cannot find any source or score about the instrument's reliability. The results of this study indicated that mobile learning is an effective way of improving listening comprehension. Furthermore, this research showed that cell phones are an effective and innovative way of learning a new language. The participants said that MALL has a significant impact on language learning. They believed that cell-phone based audiobooks are more effective than CD-ROM based audiobooks in their listening comprehension.

In another study, Soleimani et al. (2014) examined the acceptance of Mobile Assisted Language Learning (MALL) among 25 ESL Malaysian postgraduates at the university level, employing a Technology Acceptance Model (TAM) questionnaire, which was adapted from Clark et al. (2007). It was elucidated that the model has based its origins on a theory called Theory of Reasoned Action (TRA) (Davis, 1989), based on the beliefs, attitudes, intentions,

and behaviors of individuals. Moreover, they conducted quantitative research through a questionnaire, but the number of participants was small for such a study, making it hard to generalize the results. According to the researchers, the study's findings illustrated that participants positively perceive MALL in enhancing their English. Also, it provides them with the opportunity to access various useful materials, carry out different English activities, and communicate and interact with their friends and lecturers using English.

Zhi Li and Hegelheimer (2013) used a web-based mobile application, *Grammar Clinic*, for an ESL writing class in their study. They constructed their study on the interactionist approach to Second Language Acquisition (SLA), the Noticing Hypothesis, and mobile-assisted language learning (MALL). In a mixed-method design, they aimed to answer such questions as (a) the effect of Grammar Clinic on the efficacy of ESL students' self-editing as well as (b) their perceptions of this mobile application as a tool to improve their English writing. In line with their research questions, they implemented the ESL writing class application for 16 weeks with 19 participants. There were no control groups. They used grammar pre and post-tests, writing assignments and a questionnaire as instruments. The results showed that students' performance on *Grammar Clinic* assignments reflects their self-editing progress and a reduction in errors in the final drafts of two major paper assignments. Moreover, the application was perceived by students as a useful learning application in an ESL writing class, which was regarded as beneficial in helping learners raise their metalinguistic awareness and improve their self-editing ability in English writing.

In the last research article reviewed in this paper, Smith and Wang (2013) examined both the feasibility and the limitations of developing English reading and grammar skills through mobile phones' interface. Alongside the reading text, including a short story, a joke or an anecdote, two types of grammar materials were provided: grammar knowledge and grammar quizzes. Online surveys, server log analysis, and interviews were the study instruments in which 208 Japanese EFL students participated. Indeed, the researchers explained that because the response rate was low (27%), they utilized other means of data collection tools to support the questionnaire results. The study demonstrated that mobile phone-assisted learning is perceived positively by students as an effective method for improving reading and grammar ability. On the other hand, the data also indicated that the success of any mobile learning project could be limited unless specific criteria are applied, including (a) providing engaging learning materials that are neither too long nor overly-demanding; (b) a proper degree of teacher monitoring; (c) student involvement; (d) the need for incentives; (e) a respect for privacy; and (f) a safe and secure mobile-learning technical environment.

The article studies diversify in terms of scopes, methodologies and contexts, providing insights for context-dependent practices such as restricted settings. However, most of them tend to have a larger sample size and have been carried out following a mixed-method design. Despite all the diversity in methodological parts, it is apparent that more detailed longitudinal studies are needed for long-term effects. On the other hand, the studies generally reveal the pros and cons and suggest using MALL applications to facilitate language learning. Among several themes that those articles mentioned, the ubiquitous nature of MALL practices and communicative aspects were the most common themes shared by almost all the studies.

4. DISCUSSION AND CONCLUSION

In this paper, 20 studies in total were reviewed to reveal MALL tools' effectiveness by a detailed examination of their methodologies, findings and implications. 10 of those studies were Ph.D. dissertations, including 5 from Turkey and 5 from different countries. The other 10 studies were the research articles published in different Social Science Citation Index (SSCI) journals between 2013 and 2019. It was revealed in this study that Ph.D. dissertations from Turkey mostly focused on vocabulary learning through several MALL applications, while other Ph.D. dissertations and published articles from different countries had diverse research domains. Generally, some essential characteristics of MALL practices and substantial implications are suggested within these studies. It is essential to summarize the most prominent ones here. Firstly, today students believe in extended knowledge acquisition domains, where technology tools and the internet are routes through which they access knowledge. Thus, they create individualized learning spaces using technology, and they develop their academic identity. While doing so, they need proper assistance from both teachers and institutions. Institutions should provide courses on educational technology for teachers, including an awareness of the teacher's role as a designer. As suggested by Al-Zahrani (2015), with mobile technology, the teacher becomes a designer. The teachers have to design the scaffolds in the digital environments so that their students can construct meaning from them. The instructions in the scaffolds about the use of MALL practices will provide students with knowledge and practice, and in this way, they will be able to self-regulate.

Parallel to those suggestions by Al-Zahrani (2015), teachers should design the learning tasks that will suit the capability of the technological devices of the students when mobile devices are implemented in class. For instance, some students may not carry advanced mobile phones or may not have specific applications. Hence, it is the teachers who will explore the readiness of the learning environment before real implementation. It is better to check the availability of applications or services on their cell phones. Running certain activities might not be possible if students do not have applications on their cell phones. Plus, students may not know how to take full advantage of mobile technology for language learning. It is crucial to train students in using mobile devices so that they benefit from them. Otherwise, students may develop a negative attitude toward using mobile technologies for educational purposes. Realizing the role technologies are playing in the teaching and learning process, the administrators should give more importance to the combination of mobile technologies and content in language classes. To achieve the role of a guide successfully, teachers should have more training to update their knowledge of how to implement those technologies into their teaching. This will help them to arrange the learning tasks more effectively with the support of mobile technologies.

Finally, instead of producing a model or method that prescribes practice, researchers should offer guidelines so that teachers can select and apply the most appropriate knowledge to the complexities they encounter in this new technology-infused learning environment. Studies, including these guidelines, can offer practitioners an account to help them understand digital behavior patterns in learning a foreign language.

REFERENCES

Ahmad, S., Hussain Ch, A., Batool, A., Sittar, K., & Malik, M. (2016). Play and cognitive development: Formal operational perspective of Piaget's theory. *Journal of Education and Practice*, 7(28), 72-79.

Albadry, H. F. A. (2018). *Using mobile technology to foster autonomy among language learners* (Doctoral dissertation, Newcastle University).

Alioon, Y. (2016). An Investigation of Student Engagement, Motivation and Attitudes Towards Course Content in A Mobile-Learning Enhanced Course (Doctoral dissertation, Ph. D. thesis. Middle East Technical University, Ankara).

Al-Zahrani, A. S. (2015). Smartphones wandering at the mall: A case study investigating the use of smartphones on English oral learning skills in a collaborative mobile-assisted language learning environment. (Doctoral dissertation, Northern Illinois University)

Auer, N. (2016). *Scaffolding foreign language learners' reading strategies using tablet computers at two secondary schools in Denmark* (Doctoral dissertation, University of Leicester).

Azar, A. S., & Nasiri, H. (2014). Learners' attitudes toward the effectiveness of mobile-assisted language learning (mall) in L2 listening comprehension. *Procedia-Social and Behavioral Sciences*, *98*, 1836 1843.

Bakay, Ş. (2017). Investigating The Effectiveness of a Mobile Device Supported Learning Environment On English Preparatory School Students' Vocabulary Acquisition (Doctoral dissertation, Middle East Technical University, Ankara).

Bonk, W. J. & Ockey, G. J. (2003). A many-facet Rasch analysis of the second language group oral discussion task. *Language Testing, 20*, 89–110.

Burnett, W. & Cavaye, G. (1980). Peer assessment by fifth-year students of surgery. *Assessment in Higher Education, 5*, 273–278.

Clark, S., Taylor, L. & Westcott, M. 2007. Using short podcasts to reinforce lectures. UniServe Science Teaching and Learning. *Research Proceedings,* 22-27.

Cohen, L., Manion, L., & Morrison, K. (2002). *Research methods in education*. Routledge.

Cojocnean, D. M. (2015). The vocabulary learning behavior of Romanian high school students in a digital context. (Doctoral dissertation, University of Exeter)

Davis, F. D. 1993. User acceptance of information technology: system characteristics, user   perceptions and behavioral impacts. *International journal of man-machine studies, 38* (3):   475-487.

Dağdeler Okumuş, K. (2018). The Role of Mobile-Assisted Language Learning (Mall) In Vocabulary Knowledge, Learner Autonomy and Motivation of Prospective English Language Teachers (Doctoral dissertation, Atatürk University, Erzurum).

Ekinci, E., & Ekinci, M. (2017). Perceptions of EFL Learners about using Mobile Applications for English Language Learning: A Case Study. *International Journal of Language Academy, 5,* 5.

Ekinci, E., & Ekinci, M. (2020). VoScreen As a Listening Aid: A Digitalized Learning Experience. *International Journal of Languages' Education and Teaching, 8,* 3.

Gürkan S. (2018). The effects of hypermedia annotation types and learning styles on mobile assisted vocabulary learning, recall and retention (Doctoral dissertation, Ph. D. thesis. Yeditepe University, Istanbul).

Gonulal, T. (2019). The use of Instagram as a mobile-assisted language learning tool. *Contemporary Educational Technology*, *10*(3), 309-323.

Hilao, M. P., & Wichadee, S. (2017). *Turkish Online Journal of Distance Education*, *18*(2), 68-79.

Huang, Y. M., Huang, Y. M., Huang, S. H., & Lin, Y. T. (2012). A ubiquitous English vocabulary learning system: Evidence of active/passive attitudes vs. usefulness/ease-of-use. *Computers & Education, 58*(1), 273-282.

Huh, K., & Lee, J. (2019). Fostering creativity and language skills of foreign language learners through SMART learning environments: Evidence from fifth-grade Korean EFL learners. *TESOL Journal*.

Li, Z., & Hegelheimer, V. (2013). Mobile-assisted grammar exercises: Effects on self-editing in L2 writing. *Language Learning & Technology*, *17*(3), 135-156.

Maulina, Noni N., & Basri M. (2019). WhatsApp Audio and Video Chat-Based in Stimulating Students' Self-Confidence and Motivation to Speak English. *Asian EFL Journal, 23(6.3),* 181- 203.

Mthethwa, M. P. (2014). *The utility of Mobile-Assisted Language Learning (MALL): ESL students' beliefs about new literacy in Swaziland*. Southern Illinois University at Carbondale.

Pérez-Paredes, P., Guillamón, C. O., Van de Vyver, J., Meurice, A., Jiménez, P. A., Conole, G., & Hernández, P. S. (2019). Mobile data-driven language learning: Affordances and learners' perception. *System*, *84*, 145-159.

Samaie, M., Mansouri Nejad, A., & Qaracholloo, M. (2018). An inquiry into the efficiency of WhatsApp for self-and peer-assessment of oral language proficiency. *British Journal of Educational Technology*, *49*(1), 111-126.

Selwyn, N., & Bulfin, S. (2016). Exploring school regulation of students' technology use–rules that are made to be broken? Educational Review, 68(3), 274-290.

Shuib, L., Shamshirband, S., & Ismail, M. H. (2015). A review of mobile pervasive learning: Applications and issues. Computers in Human Behavior, 46, 239-244.

Smith, S., & Wang, S. (2013). Reading and grammar learning through mobile phones. *Language Learning & Technology*, *17*(3), 117-134.

Soleimani, E., Ismail, K., & Mustaffa, R. (2014). The acceptance of mobile-assisted language learning (MALL) among postgraduate ESL students in UKM. *Procedia-Social and Behavioral Sciences*, *118*, 457-462.

Staples, S. & Biber, D. (2015). Cluster analysis. In Plonsky, L. (Ed), *Advancing quantitative methods in second language research*. New York: Routledge.

Torrance, E. P. (2000). *Research review for the Torrance Tests of Creative Thinking, figural and verbal Forms A and B*. Bensenville, IL: Scholastic Testing Service.

Uz Bilgin, Ç. (2016). Facilitating English as a foreign language learners' vocabulary learning, task completion and contextual vocabulary exploration processes in a mobile supported situated learning environment (*Doctoral dissertation, Ph. D. thesis. Middle East Technical University, Ankara*).