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## Research Paper

# Fostering Academic Vocabulary Learning: Opportunities for Explicit Learning through a Mobile-Assisted App in the Field of Applied Linguistics

Zeinab Abdollahpour<sup>1\*</sup>, Nafiseh Asadzadeh Maleki<sup>2</sup>

<sup>1</sup>Department of English Language, Naghadeh Branch, Islamic Azad University, Naghadeh, Iran  
[zeinab.abdollahpour@iaun.ac.ir](mailto:zeinab.abdollahpour@iaun.ac.ir)

<sup>2</sup>Department of English Language, Malekan Branch, Islamic Azad University, Malekan, Iran  
[nafiseh.asadzadeh@iaun.ac.ir](mailto:nafiseh.asadzadeh@iaun.ac.ir)

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## Abstract

In recent years, Mobile-assisted Language Learning (MALL) has led to an authentic and contextual language learning process across the globe (Kukulska-Hulme, 2009). It has played a pivotal role in language learning on the whole and vocabulary learning particularly as a building block of academic writing. This study examined the effect of a mobile application (i.e. AWL builder) on academic vocabulary learning among sophomore university students in applied linguistics. The study also focused on measuring students' perceptions and problems in utilizing mobile-assisted applications in acquiring English academic vocabulary. Accordingly, the participants were divided into experimental (N = 36) and control (N = 36) groups, according to convenience sampling procedures. The participants in the treatment group used a mobile application, while those in the control group used a traditional approach. Furthermore, academic vocabulary pre-and post-tests and a MALL questionnaire were utilized to examine research questions. The findings show that the AWL group showed prominent performance in academic vocabulary tests. The current study concludes that instructors should take into account mobile devices as useful supplementary tools to enhance L2 retention of academic words and include them in the regular language curriculum.

**Keywords:** Academic vocabulary learning; Mobile-assisted language learning; Mobile application; Vocabulary learning

تقویت یادگیری واژگان آکادمیک: فرصت هایی برای یادگیری صریح از طریق یک برنامه به کمک موبایل در زمینه زبان شناسی کاربردی در سال های اخیر، یادگیری زبان به کمک موبایل (MALL) منجر به یک فرآیند یادگیری زبان معتبر و متنی در سراسر جهان شده است (Kukulska-Hulme, 2009). نقش اساسی در یادگیری زبان به طور کلی و یادگیری واژگان به ویژه به عنوان بلوک سازنده نوشتار دانشگاهی ایفا کرده است. این مطالعه تأثیر یک برنامه کاربردی تلفن همراه (یعنی سازنده AWL) را بر یادگیری واژگان آکادمیک در بین دانشجویان سال دوم دانشگاه در زبان شناسی کاربردی بررسی کرد. این مطالعه همچنین بر اندازه گیری ادراک و مشکلات دانش آموزان در استفاده از برنامه های کاربردی موبایلی در دستیابی به واژگان آکادمیک انگلیسی متمرکز بود. بر این اساس، شرکت کنندگان بر اساس روش نمونه گیری در دسترس به دو گروه آزمایش (N = 36) و کنترل (N = 36) تقسیم شدند. شرکت کنندگان در گروه درمان از یک برنامه تلفن همراه استفاده کردند، در حالی که افراد گروه کنترل از رویکرد سنتی استفاده کردند. همچنین برای بررسی سوالات پژوهش از واژگان تحصیلی پیش و پس آزمون و پرسشنامه MALL استفاده شد. یافته ها نشان می دهد که گروه AWL عملکرد برجسته ای در آزمون های واژگان تحصیلی از خود نشان داد. مطالعه حاضر نتیجه می گیرد که مربیان باید دستگاه های تلفن همراه را به عنوان ابزار مکمل مفید برای افزایش حفظ L2 کلمات دانشگاهی در نظر بگیرند و آنها را در برنامه درسی زبان عادی بگنجانند.

واژگان کلیدی: یادگیری واژگان دانشگاهی؛ یادگیری زبان به کمک موبایل؛ اپلیکیشن موبایل؛ یادگیری لغات

## Literature Review

Given the globalization of English as the key language of education and communication, technological grounds have been open to further improvements, mainly including language learning mobile applications that are accessible worldwide (known as *technologia franca* (Karakaya & Bozkurt, 2022)). Such technological advances have given birth to the fields of Computer-Assisted Language Learning (CALL) in general and Mobile-assisted Language Learning (MALL) in particular, leading to an authentic and contextual language learning process across the globe (Kukulka-Hulme, 2009). MALL, compared to CALL, enjoys more portability and privacy and provides continuous access and global interaction (Kukulka-Hulme, & Shield, 2008). This feature has been evident in recent years, and mobile devices and applications nowadays include a bunch of users who can interact and learn within and outside of educational settings (Morgana & Shrestha, 2018). In addition, MALL features have helped individuals promote themselves socially and educationally (O'Bannon & Thomas, 2014).

There have been attempts to outshine the importance of MALL devices for educational purposes, including the "Bring Your Own Device" idea (O'Bannon & Thomas, 2014). More importantly, MALL advocates authentic and context-specific learning conditions, which is not supported by CALL devices (Chinnery, 2006). Learning through technological paths has captured learners' attention as fresh and properly formatted learning platforms (Jones & Shao, 2011).

In L2 research and pedagogy, vocabulary is considered the foundation for language learning (Brown, 2001; Schmitt, 2010; Wilkins, 1972). Therefore, vocabulary development gains extra importance in L2 education (Agca & Ozdemir, 2013). Interestingly, vocabulary learning has lent itself easily to mobile technologies through which learners can have access to millions of word items (Hulstijn & Laufer, 2001; Nation, 2001). Such mobile-directed vocabulary learning improves language learning as a whole, given helpful technological features (Basoglu & Akdemir, 2010). In this realm, previous research has adequately evidenced the influential roles of MALL-based vocabulary learning and retention in non-Anglophone settings (Lin & Lin, 2019; Loewen et al., 2019; Loewen, et al., 2020).

### Mobile-assisted language learning

Technological advances have improved the ways language skills and components are learned (Astika, 2015). Scholars advocating technological education believe it serves a transforming role in teaching and learning at the school level (Murray & Olcese, 2011). Recently, mobile devices have gained distinct popularity, leading to their determining role in general life, education, and language learning. Numerous educational strategies, such as mobile learning (m-learning) and ubiquitous learning (u-learning) have been widely used in this field (Park, 2011).

MALL refers to a flexible, ongoing, and adaptable language learning process through which language learners can easily access the corresponding content supported by mobile devices (Kukulka-Hulme, 2009; Kukulka-Hulme & Shield, 2008; Loewen et al., 2019). In MALL settings, there are ample opportunities for focused digital tasks, where learners mainly hold the responsibility for their learning (Laurillard, 2007). In a rather different conceptualization, Joseph (2009) considered m-learning a "crowdsourcing" approach that provides a hybrid of language and culture and shares across communities. In addition, m-learning suits learner needs and presents multi-purpose language education. Learners can improve their skill development by m-learning through formal and informal education (Kukulka-Hulme, 2020). M-learning potentially improves receptive and productive L2 skills, providing portable, collaborative, and interactive features (Persson & Nouri, 2018). Today, access to MALL applications tends to be effortless, and

this m-learning can be an excellent opportunity for language learners to virtually find relevant content worldwide (Karakaya & Bozkurt, 2022).

MALL is advantageous in terms of rapid information access, social networks, situational help, flexible time and space management, continuous learning across contexts, adequate alignment with personal needs and preferences, straightforward content development and sharing, and sustained language practice (Kukulska-Hulme, 2020). MALL users can limitlessly share information with others, whereby teachers and students connect easily and exchange content. (Traxler, 2005). Moreover, ubiquitous learning occurs in the MALL application without a permanent cable connection (Georgieva & Smrikarov, 2004).

As Lin and Lin (2019) noted, studies on vocabulary learning have adopted four main strands. First, several studies have used the mobile SMS/MMS approach, exposing L2 learners to target words or teacher and peer feedback. This line of research concluded that MMS/SMS models are effective in target word retention compared to traditional approaches, such as paper-based vocabulary lists or flashcards. The second area of concentration has been on improving vocabulary tutorials or personal mobile apps, such as vocabulary games or flashcard reinforcements.

The results showed that both models promote word retention and foster learner interest in mobile vocabulary learning. Researchers in the third strand have noted that vocabulary learning via devices fosters self-awareness and self-regulation in L2 students. Finally, a number of studies have reported on learners' satisfaction with MALL applications, indicating their desirable experiences in mobile learning activities and effective mastery of L2 vocabulary.

### **Academic vocabulary learning via mobile applications**

Vocabulary is considered an integral component of the language learning process (Ramos & Dario, 2015; Schmitt, 2010; Wilkins, 1972). In fact, there could be deficiencies in speaking and reading fluency if vocabulary knowledge is poorly built on the part of learners (Hai-peng & Li-jing, 2007). In Nation' (2001) idea, m-learning notably fosters vocabulary learning to a great extent (Nation, 2001). In MALL-informed education, constructivism and learner-centered teaching actively engage learners and enhance their motivation (Sato, Murase, & Burden, 2015). The reason for this effectiveness is that MALL embraces built-in features that increase learning quality (Ozer & Kılıç, 2018). Previous studies in EFL contexts confirmed that MALL applications play key roles in learners' vocabulary development and retention (Burston, 2014; Lin & Lin, 2019; Loewen, et al., 2020).

Nowadays, research article genre literacy requires novice scholars to read and write for publication in accredited English-medium journals (Flowerdew, 2015; Martínez, Beck, & Panza, 2009; Valipouri & Nassaji, 2013). Indeed, scholars are well aware of the notion of 'publish or perish' and how it yields academic improvement, particularly for higher education students and university staff. To address scholars' urgent need for academic literacy, Coxhead's (2000) Academic Word List (AWL) containing 570-word families has been extensively employed in academic settings worldwide (Xodabande & Atai, 2020). In this respect, university students need to hold an adequate repertoire of academic vocabulary knowledge to compete in the scholarly world (Kuehn, 1996). As research corroborates, non-Anglophone students encounter certain challenges in participating in wider academic communities due to the lack of academic vocabulary literacy (Malmström, et al., 2018).

Academic vocabulary, also known as "semi-technical vocabulary, encompasses frequent word lists that are context-specific and represent particular disciplines" (Farrell, 1990, p.11). Academic vocabulary is a crucial sub-part of English language proficiency that is employed for instructional purposes (Coxhead & Nation, 2001). Academic vocabulary involves a genre-based use of lexical indices that frequently reoccur in specific academic texts, and each genre possesses its unique

vocabulary repertoire (Coxhead & Nation, 2001). According to Li and Pemberton (1994), academic vocabulary enjoys middle frequency across disciplinary texts and is typically challenging to master. There is a robust research line that shows students' receptive, not productive, mastery of academic vocabulary (Malmström, et al., 2018). Scholars use such words to present academic viewpoints and write research reports and articles (Liu & Han, 2015), which is supported by the notion of *essayist literacy* (Lillis, 2001).

Over the past decades, academic vocabulary researchers have created a bunch of significant academic word lists, which can be roughly categorized into two main categories: general academic word lists and field-specific academic word lists (Liu & Han, 2015).

In the first category, common academic words across disciplines are included. On the other hand, field-specific academic word lists (Martínez et al., 2009) or discipline-based lexical repertoires (Hyland & Tse, 2007) represent vocabulary items that are exclusively used by disciplinary scholars. As English for Academic Purposes (EAP) scholars and practitioners put it, word frequency can vary depending on contexts, which can be academic or non-academic (Malmström, et al., 2018). In EAP fields, there have been fruitful attempts in developing discipline-specific lists of the academic word. Coxhead's (2000) well-known Academic Word List (AWL) of 570-word families outshines in this regard. Such lists cover 8.5%-10% of common words occurring in academic texts, and EAP learners should master academic vocabulary lists to catch up with the scholarly world (Coxhead & Nation, 2001).

Literature has devoted a lot of attention to context-aware, gaming, and vocabulary-learning applications. For instance, Xodabande and Atai (2020) delved into the roles of a mobile application (AWL builder) in fostering autonomous and self-directed learning among EFL college students. They used convenience sampling and included junior and senior university students who were allotted to treatment and control groups. Treatment Students were exposed to the mobile application (i.e., AWL builder), and the control group proceeded with traditional default instruction on vocabulary. The researchers examined the long-term MALL effects on learners' vocabulary development through pretests, posttests, and delayed posttests. As findings showed, intervention students, significantly improved in terms of academic vocabulary knowledge.

In a similar study, Huang et al. (2016) compared m-learning and traditional methods in terms of effectiveness. They implemented a treatment consisting of a five-step vocabulary learning strategy (FSVL) to discover and compare the target words learners used and consolidated. Based on the findings, m-learning was found to have a positive effect on enhancing learner motivation and the learning process.

Wu (2015) used the Word Learning-CET4 application containing 3,402 English words. The words included Chinese definitions features, pronunciation, and spelling. The researchers targeted Chinese university students who were categorized into three experimental and three control groups. Their purpose was to find out whether ESL student could improve their self-directed vocabulary learning. The findings showed that treatment participants presented a prominent vocabulary knowledge improvement. Overall, such findings reveal the significance of MALL applications and respective word lists in self-directed vocabulary learning and call for the incorporation of m-learning into instructional programs.

In Nami's (2020) research, university EFL students harbored approving attitudes toward MALL applications in vocabulary instruction. Similarly, Mahdi (2018) examined MALL devices and traditional pedagogy in affecting receptive and productive L2 vocabulary. The results indicated that MALL significantly improved adult learners' vocabulary knowledge, though young learners did not show much improvement. Seibert Hanson and Brown (2020) developed and implemented an application that measured the commercial spaced-repetition-related



vocabularies, Anki. In this empirical study, participants studied and practiced vocabulary using recognition tests. Their analyses showed that students' performance on vocabulary tests and MALL-spaced-repetition tests were positively connected.

Considering students' challenges in academic vocabulary literacy (Gardner & Davies, 2014), we investigate the efficacy of a MALL application, namely AWL builder, at the university level.

Given the fact that academic vocabulary poses a major challenge for university students (Gardner & Davies, 2014), a number of studies have addressed acquiring new target words, however, few empirical studies (e.g., Martinez, Beck, & Panza, 2009; Chen & Ge, 2007; Xodabande & Atai, 2020) have investigated the efficacy of using mobile-based applications in acquiring academic vocabulary in various disciplines. To the best of our knowledge, no study to date has paid direct attention to academic vocabulary in applied linguistics. To fill this gap, the current study aims to investigate the efficacy of utilizing mobile-based applications (i.e. AWL builder) to support academic vocabulary learning among university students. The present study, by exploring the power of mobile phones on EFL learners' academic vocabulary learning, aims not only to enrich the body of literature but also hopes to peruse its major significance by equipping EFL learners with effective strategies to develop their academic vocabulary knowledge and assist them to easily access this knowledge through modern technologies such as mobile phones. In this study, we adhere to an explicit method of teaching applied linguistics academic vocabulary via the MALL application. Within the scope of this, the subsequent research questions were sought answers:

**RQ1.** Does utilizing mobile applications by learners of applied linguistics significantly promote the acquisition of academic vocabulary?

**RQ2.** What are the applied linguistics students' perceptions and expectations toward using mobile-assisted applications in learning English academic vocabulary?

**RQ3.** What are the applied linguistics students' perceptions and problems with using mobile phones and applications in learning English academic vocabulary?

## Methodology

### Design of the Study

The research design employed in this study was a non-equivalent group design, where two intact groups: control and experimental groups, were compared on the word of the statistically analyzed pre-test and post-test outcomes. To investigate the purposes of the study, after homogenizing the participants regarding their level of proficiency using PET, they were selected and assigned to control and experimental groups based on convenience sampling procedures. Thus, the quantitative and experimental research design was allotted to scrutinize the research question. Thereafter, the experimental group went through the intervention that was being taught the new academic vocabulary in the class similar to the instruction used in the control group; in addition, academic vocabulary was instructed through an English software program in mobile phones called AWL Builder multilingual mobile application. As well, the study focused on measuring students' perceptions and problems with utilizing mobile-assisted applications in acquiring and learning English academic vocabulary.

The dependent variables of this study were acquiring and learning new academic vocabulary that were measured after the experiment. The independent variable was the type mobile based application provided for the experimental group. With the aim of answering the aforementioned research questions, a pre-posttest design with an experimental group and a comparison group as well as a MALL questionnaire were employed. Therefore, the basic design of this study is a quasi-experimental pretest-posttest control group research design. According to Hatch and Farhady (1982, p. 18), in quasi-experimental design "we control as many variables as we can and

also limit the kind of interpretations we make about cause-effect relations and hedge the power of our generalizations.”

### **Participants of the Study**

To address the research questions of this study, altogether 72 learners in the field of applied linguistics participated in the study: 18 males and 54 females. The applied linguistics learners were selected from amongst 83 intermediate learners and were grouped into a similar proficiency level consistent with the consequences of the Preliminary English Test (PET) given before the beginning of treatment sessions. The test consisted of vocabulary, reading, listening, and speaking tasks. Only the learners who received at least 8 out of 10 for each part of the test were included in the study. All were recruited among the registered sophomore students studying English in the Faculty of Humanities at Islamic Azad University, Ardabil Branch. A total of 72 participants were assigned into two intact groups of 36 in each (one treatment group and one control group) based on convenience sampling procedures. The age range of the participants was from 18-27 years old and their mother tongues were Azeri and Persian.

### **Instruments and Materials**

To conduct this study and to investigate the usefulness of implementing mobile-based applications for academic vocabulary teaching/learning, several instruments were used by the researcher. They included: (1) the Preliminary English Test (PET), (2) AWL Builder multilingual mobile application, (3) academic vocabulary pre-and post-tests, and (4) the MALL questionnaire. The following section discusses, in detail, the instruments mentioned above.

### **Preliminary English Test (PET)**

PET is a second-level Cambridge ESOL exam which is designed for intermediate-level learners. To homogenize the groups and make sure learners are truly proficient in the same area (PET), the reading, listening, and writing subtests of a sample Preliminary English Test (PET) (taken from [www.cambridge.org](http://www.cambridge.org)) were administered to 83 intermediate language learners. Consequently, only those participants (N= 72) with scores that were within one standard deviation below and above the mean were selected to participate in this study. Using Cronbach's alpha, this test's reliability was found to be 0.76.

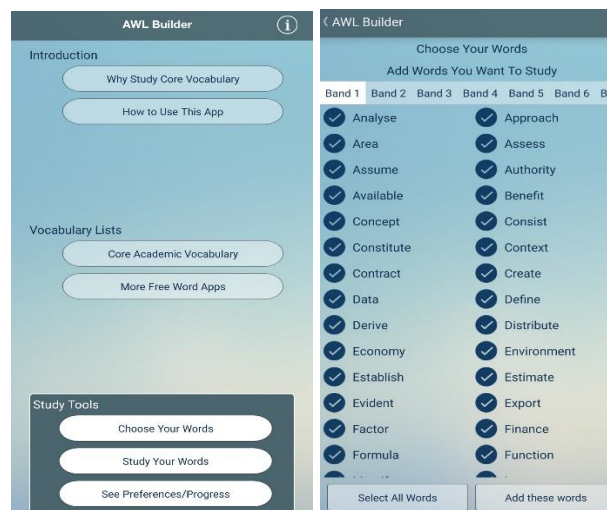
### **The Mobile-based English Teaching Application**

To conduct the study, a mobile-based application namely, AWL Builder was used. The new academic target words were instructed through using this application. The mobile English learning application, AWL Builder, is compatible with various operating systems of cell phones, and recently even on BlackBerry devices, and offers free online registration, and customers can sign in using their smartphones. The app is a free science-based learning tool that was created to satisfy the needs of businesses, customers, and students. The AWL builder app presents 570 academic vocabularies in the word list by utilizing intelligent flashcard technology (Coxhead, 2000). The application retains thorough records of learners' improvements made in acquiring particular academic target words, which provides opportunities for emailing the outcomes of the student's progress to the instructors. Likewise, learning the definitions of the vocabulary, knowing words' different parts of speech, and the pronunciation of each academic target word is accessible in this application.

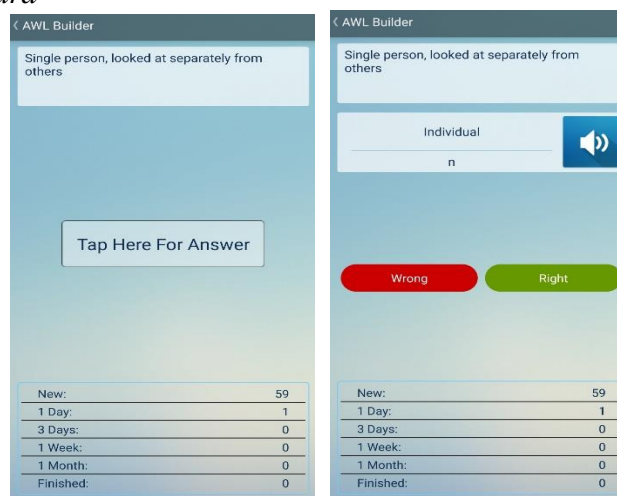
The subsequent screenshots demonstrate the main menu of the application and available alternatives for determining study plans. As shown in Figure 1, the starting page of the app involves three major sections: introduction, vocabulary list, and study tools. The introduction

section is subdivided into two parts; the first part reveals the reasons for learning core vocabulary, and the second section explains the four steps of using the app. The learners, first, were supposed to choose the level they want to start at. Then, they will automatically be taken to the flashcard section to begin learning. Finally, they can see how much they have learned by looking in the preferences section. After selecting the vocabulary lists area, the application leads users to the following screen in which the learners can select whether to study terms by frequency or alphabetically. Learners can choose particular words from the several bans after selecting any of these options. This characteristic permits them to ignore the words they previously are familiar with them in different bands. They can skip the vocabulary words in different bands thanks to this capability. The study tools section, which is the final one, offers further details about the application's vocabulary learning possibilities. As seen in Figure 2, the AWL Builder program shows the definition and grammatical details of a word while also allowing learners to hear how it is pronounced.

**Figure 1**  
Main Features and Configuration Options of the AWL Builder Application



**Figure 2**  
AWL Builder Flashcard



### **Vocabulary Pre and Posttest**

Pre and post-test questions were drawn from the course syllabus, which the instructor had taught to both groups throughout the course. The exam was constructed using the course text from the Summit books series (Saslow & Ascher, 2006). Each pre and post-tests consisted of twenty multiple-choice questions in which learners were required to choose the exact response out of three given alternatives for 30 minutes. The reliability amount of these tests was calculated by Cronbach's alpha and an acceptable amount of reliability (pre-test  $R=0.69$ , and post-test  $R=0.73$ ) was achieved.

### **MALL questionnaires**

To explore students' perceptions and problems toward MALL usage in learning academic vocabulary, two questionnaires adapted from the Mobile Learning Perception Scale (MLPS) designated by Uzunboylu and Özdamlı (2011) were employed. The first questionnaire inspected learners' perceptions toward utilizing MALL to support learning academic target words and the second one concerned with the problems with the use of mobile phones as tools in vocabulary learning. The students were supposed to answer a total number of 20 questions of the mobile-assisted questionnaire (with 10 questions in each section). A 5-point Likert scale, with the categories being Strongly Disagree (SD) = 1, Disagree (D) = 2, Neutral (N) = 3, Agree (A) = 4, and Strongly Agree (SA) = 5 was allocated to the questionnaire items.

### **Data Collection Procedure**

To address the purposes of this study, after confirming the participants' homogeneousness level through the Preliminary English Test, they were divided into two groups according to convenience sampling procedures: a control and an experimental group. Seventy-two participants were selected for experimenting out of the total number of 83 students. Only those students who acquired scores one standard deviation below and above the mean were nominated as contributors to this research. To start with determining the participants' initial vocabulary knowledge, the students in two groups were administered a vocabulary pretest consisting of 20-word item questions. The words were selected from students' course books and were provided by the use of the aforementioned software.

During the treatment sessions, the learners in the control group acquired the new words' meaning and pronunciation in an ordinary way, i.e. the teacher presented the definition and the pronunciation of new-fangled target words him/herself, and then students repeated what their teacher said. Despite the control group, those who were in the experimental group were trained in the meaning of new academic vocabulary via the AWL Builder multilingual application. Toward the end of the experiment, the two groups' students were required to take a posttest comprising 20 academic vocabulary questions to investigate whether utilizing a mobile-based application was beneficial in improving learners' vocabulary acquisition. In the last part of the treatment, two mobile-assisted app questionnaires were distributed among the student in the treatment group. They were required to set forth their outlooks toward the use of mobile in learning academic vocabulary as well as the problems of applying mobile apps in language learning by answering each question. Finally, SPSS software was used to carry out the majority of the statistical analysis.

### **Data Analyses**

The main determination of the current research paper was to compare the effectiveness of utilizing a mobile-based application on academic vocabulary acquisition in the field of applied linguistics. To address the aforementioned research questions, paired-sample T-tests, and



independent-sample T-tests were employed to scrutinize the obtained scores of academic vocabulary pre-and post-tests were analyzed as follows. Additionally, to weigh the students' insights and problems with mobile technology applications, the obtained data from questionnaires were statistically analyzed in terms of mean and standard deviation.

Initially, regarding the first research question, the results of academic vocabulary tests were demonstrated in the following tables. Table 1 shows the comparison of scores of experimental and control groups in both pre and post-tests.

**Table 1**

*Two Groups' Descriptive Statistics of the Academic Vocabulary Pre and Post-Tests*

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Vocabulary Pre-test-experiment	12.82	36	1.446	.252
	Vocabulary Post-test-experiment	18.03	36	1.759	.306
Pair 2	Vocabulary Pre-test-control	13.03	36	1.630	.261
	Vocabulary Post-test-control	16.92	36	1.952	.313

As verified in Table 1, the mean scores comparison of both the control group and treatment group in the pre-test demonstrated that there is not any noteworthy difference between the mean scores of these participants (M control= 13.03, M experimental=12.82). Therefore, it would be logical to state that the learners of both groups exhibit approximately an identical level of homogeneity. As well, Table 1 provides the descriptive statistics for the vocabulary tests of the control and experimental groups. Regarding the mean scores of the control group, there is not any momentous difference between the performances of the participants in pre and post-tests (M=13.3, M=16.92). Additionally, the mean score observed in the experimental post-test, as it is shown in Table 1, is profoundly greater than that of the pre-test (M=12.82, M=18.03). Accordingly, it would be reasonable to state that those who were in the experimental group outperformed in the post-test and in comparison with the participants of the control group.

**Table 2**

*Paired Samples t-test for the Experimental and Control Groups' Performance on the Academic Vocabulary Pre and Post-tests*

		Paired Differences		95% Confidence Interval of the Difference		T	df	Sig. (2-tailed)
		Mean	Std. Deviation	Lower	Upper			
Pair 1	Vocabulary Pre-test-experiment - Vocabulary Post-test-experiment	-5.212	1.933	-5.897	-4.527	-15.493	32	.000

Pair	Vocabulary								
2	Pre-test-control								
	- Vocabulary	3.897	2.583	.414	-4.735	-3.060	-9.422	38	.000
	Post-test-control								

To check whether the observed differences are statistically meaningful, two paired samples t-tests were conducted to compare the means scores of both control and experimental groups in the pre and post-test of academic vocabulary to approve the efficiency of using mobile-assisted language learning on vocabulary acquisition. The consequences of the paired-sample t-test (Table 2) of the control group scores indicate a statistically noteworthy dissimilarity between the mean scores of pre-and post-test;  $t(38) = 9.44$ , ( $p < .05$ ). In the same vein, the results show a statistically momentous difference between the experimental group pre-and post-test mean score;  $t(32) = 15.49$ , ( $p < .05$ ). Consequently, the obtained outcomes indicate that learning and retention of new academic words are improved in both group through the traditional method and via mobile applications. Nevertheless, the significance of the variances in the treatment group was an indicator of the fact that using the mobile-based application by applied linguistics learners have a momentous effect on promoting their academic vocabulary learning. To compare the groups' post-test scores, the acquired data were evaluated via utilizing an independent sample t-test.

**Table 3**

*Descriptive Statistics of the Results of the Experimental and Control Groups' Academic Vocabulary Post-Tests*

	Grouping	N	Mean	Std. Deviation	Std. Error Mean
Vocabulary Post-test	Experimental	36	18.03	1.759	.306
	Control	36	16.92	1.952	.313

**Table 4**

*Independent Samples t-test for both Groups' Performance on the Academic Vocabulary Post-tests*

		Levene's Test for Equality of Variances		t-test for Equality of Means			95% Confidence Interval of the Difference			
	Equal variances assumed	F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
		Vocabulary Post-test	Equal variances assumed	.388	.535	2.509	70	.000	1.107	.441

Equal variances not assumed	2.531	69.703	.000	1.107	.438	.235	1.980
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The domino effect of the independent-samples t-test (Table 4) confirms a statistically significant difference in the post-test mean scores of the two groups;  $t(70) = 2.50, p = .000 < (.05)$ . In light of the findings, the study hypothesis should be accepted rather than the null hypothesis. Although, the means for both groups have improved significantly; however, according to the description of  $d$  magnitude suggested by Plonsky and Oswald (2014), the small size impact in favor of the treatment group shows a discernible dissimilarity between the mean scores significance levels of the two groups.

To explore learners' perceptions and problems in utilizing mobile applications in learning and acquiring English academic words, the quantitative data obtained from the aforementioned questionnaires were investigated for the purpose of determining the mean and standard deviation of each question. To begin with, the validity and reliability levels of the questionnaires were checked by implementing Cronbach's Alpha. As shown in Table 5, both questionnaires measuring learners' perception and problem were confirmed to be valid and reliable, since the reliability levels of these questionnaires were within the acceptable range of reliability ( $R_1 = 0.714$ , and  $R_2 = 0.729$ ).

**Table 5**

*Validity and Reliability of Students' Perceptions and Problems toward the Use of MALL*

		Cronbach's Alpha	Spearman & Brown
Perception	Validity	0.678	
	Reliability	0.714	0.206
Problems	Validity	0.690	
	Reliability	0.729	0.213

After confirming the reliability and validity level of each questionnaire, the mean and standard deviation of the questions were determined. Table 6. Illustrates the outcomes of the questionnaire study on learners' perception of utilizing MALL in acquiring academic English words.

**Table 6**

*Applied Linguistics Learners' Perception toward the Use of MALL (adapted from Nuraeni et al., 2020, p. 4)*

Item No.	Items	Mean	Std.	Level
1	Mobile phones permit me to reach authentic English language learning material on every occasion I need.	5.38	0.49	High
2	The main feature of mobile devices is transportability.	5.41	0.71	High
3	Time-efficient is the advantage of applying mobile phones for learning English.	5.49	0.62	High
4	It would be possible to learn various English language skills via utilizing mobile phones.	5.03	0.77	High

5	Cost-effective is the cause that English language learners prefer to make use of the mobile phone.	5.23	0.78	High
6	Mobile phones make available occasions for learners to study English without paying attention to place and time constraints.	5.30	0.76	High
7	There are numerous applications and software in mobile phones that are operational for learning the English language.	5.43	0.62	High
8	Learners can connect to the internet at wherever and whenever they need	5.16	0.55	High
9	Using a Mobile phone will simplify Language Learning related activities.	5.43	0.73	High
10	Using mobile phone enable learners to interactively participate in English language learning activities.	5.24	0.52	High
<b>Total</b>		5.31	0.71	High

As demonstrated in Table 6, the average mean score of learners' perceptions of utilizing MALL was extraordinary ( $m=5.31$ ). The results indicate that learners have highly optimistic insights concerning the implementation of mobile-assisted applications in acquiring English academic words. The highest level was given to item No. 3, "Time-efficient is the advantage of applying mobile phones for learning English." ( $m=5.49$ ). The mean score of this item exemplifies that the students prefer to use mobile-assisted applications in learning target words to prevent the wastage of their studying time. Nevertheless, the lowermost rank is item No. 4, "It would be possible to learn various English language skills via utilizing mobile phones." With a mean score of 5.03. The low mean score of this item demonstrates that students don't believe in the efficiency of using mobile applications in improving their overall language skills. Broadly speaking, the outcomes of this Table reveal the positive perceptions and attitudes of most of the students toward implementing mobile applications in learning academic target vocabularies since they believe that, in the digital era, the usage of the mobile phone will support them to progress their language learning ability and will qualify them to be an independent learner. Furthermore, the learners' problems with the use of mobile-assisted applications in acquiring and learning English academic words were estimated. Table 7 clarifies the results of this questionnaire.

**Table 7**

*Applied Linguistics Students' Problems toward the Use of MALL (adapted from Nuraeni et al., 2020, p. 5)*

Item No.	Items	Mean	Std.	Level
1	The learners may have problems with their internet connection.	4.19	0.79	High
2	Learners may make use of mobile phones for non-academic aims.	4.30	0.74	High
3	The features of mobile phones does not support learning the English language.	3.92	0.83	High
4	The small screen size of mobile phones is a major problem.	3.78	1.01	High
5	Mobile phones have limited battery capacity.	3.64	1.19	High
6	Mobile data are expensive	3.43	1.27	High



7	Not as much of students are familiar with using mobile phones as a source of English language learning	3.29	1.46	High
8	The problem of slow internet speed	3.09	1.25	High
9	High cost of mobile phone	2.83	1.16	High
10	English language learning mobile-based application is still lack.	2.90	1.39	High
<b>Total</b>		3.56	1.12	High

According to the outcomes of Table 7, applied linguistics students proposed their agreement on the significance of most challenges toward the implementation of using mobile-assisted applications. The students' problems in utilizing their cell phones as an instrument for learning target academic vocabulary was at a high level ( $m=3.56$ ) with a standard deviation of 1.12. The overall responses prove that applied linguistics learners are faced with many problems in using mobile-assisted applications in educational environments. Therefore, in spite of the so many advantages of using mobile-assisted applications, this instrument cannot be determined as the foremost learning media.

### Discussion

Our primary aim in this study was to discover the efficiency of a mobile-based app (AWL) in helping applied linguistics learners learn academic vocabulary. We found that students' pre-treatment vocabulary knowledge did not differ meaningfully. However, after the AWL treatment, improvements in vocabulary knowledge were detected in both groups. The AWL group showed prominent performance in vocabulary tests. Our findings accord with those of previous studies on m-learning and vocabulary knowledge, which reported noticeable effects of MALL on general vocabulary learning (Burston, 2015; Cerezo, Calderón, & Romero, 2018; Chen & Chung, 2008; Darmi & Albion, 2014; Loewen et al., 2019; Loewen et al., 2020; Xodabande & Atai, 2020). Such positive roles of MALL in vocabulary development could be attributed to the processing time involved in m-learning, which is short and straightforward (Xodabande & Atai, 2020). MALL can effectively address students' needs and encourage flexibility and collaboration in L2 education (Karakaya & Bozkurt, 2022). Moreover, students can personalize their learning utilizing of MALL-related applications (Agca & Özdemir, 2013).

As a secondary objective in this study, we examined learners' perceptions and expectations in terms of MALL applications and their use in academic vocabulary instruction. According to our findings, the participating learners cultivated favorable attitudes toward mobile applications in learning target academic vocabulary. They noted that MALL instruction could help them improve independence and autonomy in learning a language, given the flourishing of digitalized education. In the same vein, previous studies similarly reported students' positive viewpoints on m-learning (Hsu, 2014; Kohnke, 2020; Yu & Yu, 2021).

As Nami (2020) observes, learners mostly prefer MALL in L2 vocabulary learning due to its applicability outside educational milieus, which keeps knowledge production active and ongoing (Ma, 2017). It can be postulated that MALL approaches help personalize learning experiences and offer autonomous education, fostering a shared and collaborative learning environment among students and instructors (Pérez-Paredes, Guillamón & Jiménez, 2018; Viberg & Grönlund, 2013). However, we think that MALL approaches should be further studied for more detailed effectiveness. Unlike the studies on MALL's positive roles in L2 education (e.g., Lin, 2014; Viberg & Grönlund, 2012), some researchers reported the inadequacy of MALL for instructional purposes (Dashtestani, 2016).



In this study, we tried to determine students' challenges in using MALL applications for vocabulary knowledge improvement. It was found that most applied linguistics students ran into certain problems in using the application, mainly cell phones being the center of challenges in terms of their instrumental uses for vocabulary learning. To draw more general conclusions, the findings supported the notion that using mobile applications aids vocabulary development. In particular, it can be inferred from the findings of this study that an efficient way to enhance English vocabulary learning according to Mayer (1997)'s principle in the designated focus group based on Mayer (1997)'s principle is to demonstrate the contents via multimedia accompanied form to display the connotation of words and support students recall. This may be attributed to the abundance of enough input provided by the application in comparison to the traditional method. That is, the amount of input added by this software was effective enough to make a difference from that of the control group. Similar findings were reported by Chen (2013), who argued against MALL's ever-present effectiveness in developing L2 knowledge.

Despite sound findings and justifications for MALL's effectiveness in L2 vocabulary learning in the literature, some research provided evidence for its disadvantages. For example, improper self-directed digital literacy in MALL uses could be a source of ineffectiveness as some student users may not be well trained in using the (Conole & Pérez-Paredes, 2017). Even worse, instructors cannot devote sufficient time to selecting appropriate applications and resolving respective issues (Chou, Block, & Jesnes, 2012). In such cases, mobiles are simply considered personal devices for socializing rather than learning (Stockwell, 2010). Thus, it is not astounding that learners voice negative perceptions of MALL-based vocabulary development, encounter certain problems in m-learning, and show reluctance in using applications (Lu, 2008). Lin and Lin (2019) believe that the effects of mobile-informed L2 vocabulary development should be established based on synthetic research methods to obtain reliable findings.

### Conclusion

Teaching and learning L2 academic vocabulary present great challenges in EFL contexts. This challenge is two-sided. On the one hand, students feel frustrated with learning numerous L2 academic words for effective comprehension and communication. On the other hand, teachers typically find it burdensome to create and maintain student motivation to learn L2 academic vocabulary. Given these problems, students search for effective ways of developing their vocabulary knowledge. Nowadays, new academic words can be easily mastered by the use of cell phone devices, which have remarkable potential in enhancing the speediness and effectiveness of learning. Earlier methods or desktop computers provided less occasions for learners and required pro-activeness in learning lexical features. Therefore, most newly mastered words quickly disappear due to the lack of repeated exposure available for learners (Zhang, Zou, & Xie, 2021).

This study examined whether mobile learning technologies would induce superior word retention compared with traditional vocabulary instruction. We used AWL builder to discover changes in applied linguistics students' academic vocabulary development. The findings showed that MALL-informed academic L2 vocabulary learning yielded significant results in terms of student performance. We concluded that mobile phones offer great potential for out-of-class learning, and learners may improve their language skills (Xodabande, 2018). In addition, our study detected students' favorable viewpoints on AWL Builder mobile application.

The first and greatest obvious limitation of the current study was the research setting. The current study was restricted to intermediate learners in Islamic Azad University, Ardabil Branch. Therefore, the results need to be verified by conducting similar studies across different settings. The second limitation was that the treatments were given to 72 students. However, to enhance generalizability, a greater number of learners could take part in this study.



The other limitation of the study is that it sought to distinguish the influence of traditional and mobile-based applications on vocabulary learning; hence, the results may not be generalizable to other language skills and components such as writing, speaking, and grammar.

Our findings offer insights into the field of L2 teaching and learning. First, mobile technologies might be useful pedagogical tools to facilitate L2 vocabulary learning. More specifically, those mobile technologies produce context-sensitive, socially interactive, authentic, and individualized learning environments in L2 educational contexts (Klopfer et al., 2002; Kukulska-Hulme, 2006). Second, academic word-learning mobile applications are a useful tool for L2 academic word retention, and instructors may use such technologies to teach proportionately. Moreover, mobile L2 academic word acquisition can take place outside educational settings, demonstrating that teachers may think of mobile technologies as practical complementary tools to stimulate L2 academic retention of the words and incorporate them into the systematic language syllabuses. However, the majority of MALL experts point out that m-learning frequently gives students access to a more authentic, situated, personalized, and spontaneous informal learning environment (Jeng et al., 2010; Johnson, Levine, & Smith, 2008; Kukulska-Hulme & Shield, 2008; Zheng, Ogata, & Yano, 2005). Therefore, L2 learners' effective use of mobile technologies in informal settings should be reconsidered. Future research on MALL could focus on creating sophisticated, artificially intelligent, and multifunctional mobile programs. In addition, researchers should think of implicit and explicit vocabulary learning approaches that can encourage learning motivation, time, and space.

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### **Biodata**

**Zeinab Abdollahpour** is assistant professor of applied linguistics at Islamic Azad University Najafabad Branch, Iran. Her research interests are English for Medical Purposes (EMP), academic vocabulary, academic writing, corpus linguistics, and computer-assisted language learning.

Email: [zeinab.abdollahpour@iau.ac.ir](mailto:zeinab.abdollahpour@iau.ac.ir)

**Nafiseh Asadzadeh Maleki** is an Assistant Professor in the Department of Linguistics at Islamic Azad University. Her main research interests are centered on second language learning, educational technology, methodologies and practices in the teaching of foreign languages, innovative pedagogical and teaching approaches in bilingual education, and educational psychology. She is the author of several articles related to language teaching and learning.

Email: [nafiseh.asadzadeh@iau.ac.ir](mailto:nafiseh.asadzadeh@iau.ac.ir)



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