Research Paper

Using Duolingo to Learn French: Does it Work?

Hiwa Weisi[1] Fatemeh Baxtiari[2]

[1]Associate Professor in Applied Linguistics, Razi University. Email: hiwaweisi@gmail.com

[2]MA in Applied Linguistics, Razi University. Email:fbakhtiari995@gmail.com

Abstract

Recently, mobile device usage in daily life has rapidly increased, and it has had a crucial impact on all aspects of human life, precisely the educational aspect. Therefore, this study investigated the role of mobile applications in language learning compared to teacher's instruction in the case of French vocabulary and grammar learning. To this end, Duolingo, a free language learning application, was chosen, and 30 students participated in the study who were English students. The participants' approximate homogeneity in the English language and their exposure to French were the rationale for selecting them. They had never been exposed to the French language before and had no prior knowledge. Then, they were randomly assigned into two groups: the control group, in which students were taught French through teachers' instruction, and the experimental group, who used Duolingo as a learning tool to get instruction. Participants in both groups got treatment for 15 hours, one hour and a half for each session, and at the end, all the participants took a test to indicate the amount of their progress in each treatment group. The results indicated that the application-users group outperformed the traditionally taught group. In addition, the results demonstrated that the experimental group had better performance in vocabulary test items. However, the traditional group performed better in the grammar part of the test. In line with the research goals in the last section of the study, all the participants were interviewed to determine their viewpoints toward employing mobile applications as a learning tool and, namely, the pros and cons of Duolingo. The findings demonstrated that most learners had a positive attitude toward mobile learning. The results of this study may be helpful for learners, instructors, and computer programmers.

Keywords:
Duolingo,
Learning
Application,
Mobile Learning,
Online learning

*Corresponding author: Associate Professor in Applied Linguistics, Razi University.   **Email: hiwaweisi@gmail.com**

Introduction

Technology is an inseparable part of human life in the 21st century due to its significant impact on all aspects of human life. It is rapidly integrated into everyday life (Viberg & Gronlund, 2013). Among these newly invented technologies, the mobile device is highly favored for several reasons, such as ubiquity, portability, and accessibility, which allow human beings to experience a faster and more effortless life (Torang & Weisi, 2023). Furthermore, mobile devices are helpful for educational purposes (especially language learning) because of their cameras, video players, sound recorders, and, recently, applications. Therefore, based on what was mentioned above, the high usage of mobile phones led to the advent of a new kind of learning: mobile learning. Mobile learning is the extended form of e-learning where mobile devices are used to improve the learning process (Cabotet al., 2015g). It has several features, like being personalized, ubiquitous, and informal (Godwin, 2011; Ozdamli & Cavus, 2011), attracting learners to employ it extensively. In addition, the potential of mobile phones to be utilized anywhere and anytime for learning gives birth to many mobile learning applications. Thus, intertwining learning in the class with mobile learning has some effects on learning strategies in the class besides self-study. Therefore, examining and finding out more about its effects is vital. In addition, it has been a challenging issue for learners to be free from the constraints of time and place. When mobile devices were devised, widespread usage of mobile devices led to a rise in m-learning (Mayer, 2020), so this broad usage of mobile applications shows the necessity of this study to explore the advantages and disadvantages of M-learning among Iranian EFL learners of the French language.

Many researchers were interested in researching in this era to figure out the effect of mobile devices on the learning and teaching process to help three main groups. First, to help learners learn better. Second, to help curriculum designers design a comprehensive curriculum, and third, the computer programmer who designs a mobile application or web-based language learning platform to enhance learners' achievements (Mayer, 2020). As mentioned above, many mobile applications were devised to meet educational needs, such as Hello Talk, Memrise, Bussu, and Duolingo, the most favored ones with many users. This application is free and has courses for several languages, such as French, German, Spanish, Greek, etc. It is captivating to know the effectiveness of this mobile application in improving the quality of the learning process and, consequently, learner satisfaction and higher achievements.

Though many studies were conducted to investigate learning languages such as Spanish, French, and English using Duolingo, they primarily focus on its methodological part and technical factors, and they lack any exploration of learners' attitudes toward using these applications in learning language. Besides, to the researchers' best knowledge,

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no studies have been done in the Iranian context, especially in the case of using Duolingo to teach French.

Furthermore, little research investigates employing such applications in the presence of an instructor as a guide in formal contexts, such as university, and most of the research focuses on learning outside a formal context at a learner's ease. In addition, there are few pieces of research on this case in Iran. After that, this study aimed to investigate the students' achievement in the French language by employing a mobile Application (Duolingo) in the formal context and their attitude toward it. Furthermore, filling the gaps in many other studies, this study was organized, and learners learned a language during the day. The critical issue is that this comparative study aimed to determine whether this way is proper to be replaced by teachers' instruction.

Literature Review

Mobile-Assisted Language Learning (MALL)

As mentioned previously, many studies have been motivated to use mobile applications for educational purposes soon after they proved them to be user-friendly and productive (Torang & Weisi 2023). Ally et al. (2007) discussed the use of mobile applications and mobile technology by arguing that technology makes language learning more flexible for language learners. They can learn anytime, anywhere, without any limitations. They also mentioned that this will soon become a regular part of life and lead to a self-directed education. According to their findings, most students showed good feelings toward learning the English language "English grammar" with mobile applications. On the other hand, the findings of their study showed that mobile applications are productive if they are used alongside traditional ways of learning, such as interactions with teachers and other students.

Regarding the characteristics and components of mobile learning as an educational approach, Ozdamli and Cavus (2011) conducted a study to explore the factors that contributed to language learning employing mobile applications. They found that learners, teachers, the available environment, the content of the study, and the assessment processes are essential factors to be explored for mobile applications. The learners were introduced as the core of language learning in this regard. In addition, some other features of language learning via applications were highlighted in this study. For instance, being ubiquitous is one of the main features of mobile learning. This feature enables language learners to learn whenever they are at ease. They are not limited to a specific time or place like traditional classes. Finally, mobile devices are private, interactive, collaborative, and access to instant information for better language learning.

In addition to the previously mentioned benefits of mobile applications, studies have investigated their benefits in EFL educational contexts. For example, Bodgan (2016) bolded such applications in the classroom context. As he concluded, mobile applications

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and learning via mobile devices can increase the quality of education by adding to the flexibility of both instructors and language learners in the class. Learners are more motivated in class because of using these devices and, more importantly because they meet their needs and tastes in language learning (Kukulska-Hulme & Shield, 2007). Following the same idea about the benefits of language learning through mobile applications, Godwin (2011) found that students favor these devices because they can carry them easily and use them everywhere. Hockly (2013) mentions that mobile applications and devices are unique because they can link the formal style of language learning inside the class with the informal one outside the classroom.

Exploring the effects of Short Message Service (SMS) on vocabulary learning by Iranians, Alemi et al. (2012) conducted a study in which 45 university students were investigated. The participants were divided into two groups, a control group and an experimental group, in which the learners were taught through SMS. After treatment, the learners were given a test, and their scores were analyzed through a t-test. The findings revealed no significant difference in both groups. However, the experimental group retained the words better than the control group.

In his study, Chen (2013) investigated tablets as a mobile learning tool and learners' attitudes toward such devices for learning a language. The participants were randomly chosen, and the amount of their daily usage of the tablet for academic purposes was measured and explored. The results showed that students' learning at ease did not lead to any learning, and there must be a guide if there is an aim for learning a language. The findings also showed that learners had a positive attitude toward language learning through mobile devices and appreciated its features, such as ubiquity and portability.

Gracia and Fombona (2015) explored mobile devices and their effectiveness in language learning. They concluded that these devices are motivating and very attractive, and while the learners were motivated, the effectiveness of these applications on language learning increased. In addition, mobile applications are presented as joyful and friendly; this means they are suitable packages for language learning, and teachers can spend much time with them without feeling tired or bored. Another reason for their effectiveness is that mobile applications can offer different activity levels, multimedia presentations, reading competence, and listening synchronously. So, learners improve faster because they enjoy various activities and will be aware of the progress they made after using these applications for a while. Finally, they mentioned that mobile devices enhance reading comprehension, spelling, and grammar. They also suggest that academic activities must be along with technological approaches.

In the Iranian EFL context, Dashtestani (2015) tried to determine Iranian EFL students' attitudes toward using mobile devices to learn a foreign language. Considering the benefits of using mobile devices to learn a language, the results showed that students liked using mobile devices and applications because they believed using such devices could offer a productive method for language learning, especially in an EFL context. In

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addition to proving that mobile devices were beneficial for language learning, the students mentioned some of the benefits. One of the essential benefits of language learning through mobile phones is ubiquitous learning; this means they can use their mobiles anywhere and anytime, which is highly better than what they experience in their usual classes. Among other benefits of mobile language learning that students in this study reported are facilitating the process of learning, more possibilities of using multimedia, and the convenience of using them in comparison with other learning styles and equipment. In addition, mobile language learning is favored because of the continuity of the process and non-stop language support. Finally, they found that Iranian students have a positive attitude toward learning a language through mobile phones.

Huynh and Iida (2016) conducted a study investigating the gamification aspect of mobile applications and their course structure. They explored the effects of the winning streak on users' motivation and engagement in Duolingo's language course. To this end, Duolingo was selected as one of the most popular applications. In this study, the researchers focused only on English language teaching and not focusing on other languages or other aspects of using Duolingo, as this application is comprehensive. They observed the courses and their motivation elements. In this study, data was collected through observation. They analyzed each milestone and its context. The findings revealed that Duolingo is enjoyable for advanced learners. The results indicate that a winning streak can boost learners' motivation and attention to complete their goals. It also expressed that the winning streak is more significant for advanced learners at the high level of milestones than those at the low level of milestones.

Exploring the difference between vocabulary learning through mobile applications and flashcards, Azabdaftari and Mozaheb (2012) chose 80 Iranian freshman students divided into two groups: a control group who learned vocabulary through flashcards and the experimental group who learned through employing mobile applications. The findings showed that mobile learning is more effective than learning via flashcards. The benefits revealed during this study were ubiquity, immediate feedback, internet search, and video range of interaction.

Duolingo

In line with previous studies, many studies have investigated the role of mobile devices in learning a foreign language. One of the most favored and highlighted applications among all applications designed for language learning is Duolingo. In addition, this application is used not only for learning English but also for learning other languages. Vessolin and Gergo (2012) conducted a study to determine Duolingo's effectiveness in learning Spanish. The result revealed that participants enjoyed using this application while learning a new language. In addition, they favored Duolingo for helping them learn faster, and it was effective in helping them reach success in their learning process. On the

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other hand, language learners criticized this application due to its limitations in terms of the number of languages they could learn using this application.

Moreover, Duolingo's gaming features have been highlighted by many studies as one of the beneficial features of this application, which many language learners favored. Gracias (2013) explained that learning through gaming is effective because learners feel a sense of achievement when they learn something and are challenged when they do not. In other words, he asserted that being game-like is a motivational feature for a language learning application, and the translation method in this application helps learners learn the vocabulary much better. It can also help them learn how to have control over their translation. Moreover, Gracias (2013) asserts that based on the learners' attitudes, the app is suitable for learners at the beginner level. Those studying other languages at the beginning level of this app were more satisfied than those at higher levels. One exciting finding by Gracias (2013) was that the application's instructor must pay more attention to content, and some application features should be upgraded for higher levels.

Duolingo has been among the highly appreciated language learning applications compared to others due to its various positive features, such as being free of charge and some game-like facilitating features. Bodgan (2016) used this application and shared his experience of learning Spanish and French through conducting a study. Bodgan (2016), in his study, tries to find out if employing Duolingo has any effect on language learners' fluency level, grammar and vocabulary learning, and pronunciation. He claimed that although this application did not improve language learners` fluency, it has helped them learn vocabulary and motivate the learners. He also mentioned that Duolingo is qualified for introducing and reinforcing vocabulary or simple sentence structures; language learners cannot use it as a sole learning tool. This is because the primary goal of language learning is communication, and this app does not support it properly.

Ahmed (2016) supported the effectiveness of Duolingo as a successful language-learning application. In his study, the learning process of a learner through using the Duolingo application investigated the beginner level both for learning English and Spanish simultaneously. The results showed that the participants were interested in using Duolingo to learn Spanish and English. The results also showed higher language learners` level improvement within two months. In addition, Ahmed believed that this app could be an enjoyable method of language learning for everyone when it comes to Spanish, especially compared to traditional ways of learning Spanish. One interesting finding of this study was that Students mentioned the effectiveness of this application as one advantage and were also interested in using this application as a part of their language courses. Munday (2016) examined students at the beginner and intermediate levels of Spanish courses at the university for about four months by encouraging them to use this application as a part of their course. The results showed that students considered Duolingo an easy-to-use, helpful, and enjoyable app to learn Spanish. They seem to like it more than regular book-based homework because it provides them with more income and

convenience. In addition, he found that Duolingo is valid enough to be added to any online or face-to-face course. Finardi et al. (2016) found that Duolingo is a useful application for learning languages, but a teacher's presence is necessary to answer the questions students may ask and fill the lack of interaction with others. The results of their study indicated that Duolingo fosters vocabulary and grammar development, but it fails to develop language development in a broader sense because of its lack of interaction and contextualized language production.

In another study, Rachels and Rockinson-Szapkiw (2017) used both treatment and non-equivalent control groups to examine Duolingo's effect on learning Spanish compared to face-to-face language learning instruction. The results showed that both groups had the same level of proficiency in the Spanish language at the end of the study. Therefore, it provided evidence that students being taught with gamification via Duolingo learn as much as students being taught in a traditional face-to-face learning environment. They also claimed that game-based apps might provide scaffolding for foreign language learning similar to traditional classroom instructions, which supports the usefulness of Duolingo and other applications.

Munday (2017) mentioned the same positive idea in his study. As he mentioned, Duolingo is useful for anyone who wants to learn a language autonomously as a first step, and it works as a part of a regular course curriculum, particularly for first-year students. Finally, James and Mayer (2018) added another study to the literature by comparing two groups of language learners. The results revealed that Duolingo users expressed higher levels of enjoyment and found the game more appealing. They wanted to learn more at the same time, and they were playing more.

Garcia et al. (2019) investigated Duolingo as a language learning tool outside of the classroom. They believed that mobile applications could be used in formal and informal learning contexts. The findings of the semi-structured review revealed that students perceived positive value while using Duolingo and were motivated. They consider Duolingo a practical, fun, and easy language-learning tool. Although many studies highlight the benefits of using Duolingo and other applications, Garcia et al. have also mentioned some negative aspects of using these applications. This means there are still some doubts about using and replacing these applications with traditional methods, and it motivates the current study to consider the usage of this application in the Iranian EFL context, too.

Recently, after the COVID-19 pandemic, Duolingo has played an essential role since its online platform allows users to learn much more quickly. Some studies meticulously investigated this mobile application during the COVID-19 pandemic. For instance, Jiang et al. (2021) explored this application's effect on listening and reading among adult learners who aimed to learn Spanish or French. The result of their study indicates that the learners achieve a significant level of reading and listening, which is comparable to the achievement of university students.

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In another study, Jaelani and Sutari (2021) focused on the gamification aspect of this mobile application and investigated its impact on learning vocabulary. The findings of their study showed that Duolingo motivates and encourages learners to learn vocabulary; in addition, it is mentioned that because of its simplicity, it is easy to understand, and learners prefer it as a way of learning vocabulary.

According to what was mentioned above, there is a lack of studies investigating the effect of Duolingo on grammar and vocabulary, particularly in Iran. In addition, no study guides learners through systematic mobile learning in the presence of an instructor. Also, most of the studies focus on mobile learning itself, and there are rare studies that compare mobile learning with traditional language learning through teachers' instruction to measure the possibility of replacing the teacher's instruction with a mobile application, based on the gaps and shortcomings mentioned before, the following research questions are formulated:

- Are there any significant differences between learning a second language through traditional instruction and learning through using a mobile Application, Duolingo, employing the same material in the presence of the instructor?
- What are the learners' attitudes toward learning a language with Mobile Application Duolingo?

Method

The current study aimed to compare learning vocabulary and grammar in French through a mobile application (Duolingo) and teachers' instruction among Iranian EFL learners. Furthermore, this research investigated the learners' attitudes toward using the Duolingo application as a learning tool. Due to the aims of the study and the research questions mentioned before, this study used a mixed method, which is a procedure for collecting and analyzing both quantitative and qualitative data at some stage of the research process within a single study, understanding a research problem more completely (Ary, 2019). This study used one of the most popular mixed methods designs in educational research: sequential explanatory mixed methods design, consisting of two distinct phases (Ary et al., 2018). In the first phase, the quantitative, numerical data is collected using a test. In the second phase, the data was collected through individual semi-structured interviews to elicit the learner's points of view.

Participants

Due to the basic knowledge needed to use this application and the choice of the French language as the language to be learnt through this application, the users of this app in the study must know the English language and use it to learn French. Therefore, 30 students (female=25, male=5) participated in this study and were chosen through random sampling.

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The participants of this study are a group of English language and literature students at Razi University. These students were selected because they were in the second year of their BA, so their English proficiency level was suitable for the aim of this research. The Participants know Persian well, too, and were beginners in learning the French language, so those with a prior knowledge of French were excluded. The participants' ages ranged from 19-26 (mean =21.7). For the first phase of research (quantitative section), the sample was equally divided into two groups: the experimental group (n=15) and the control group (n=15). For the treatment phase, the experimental group was taught through the instructions of the Duolingo application. At the same time, the control group was taught using the teaching method used in public schools in Iran (Teacher-based instruction).

Instrument

This study used an achievement test in the post-test (see Appendix A). This test consists of 30 questions in five sections (Vocabulary, idioms, Articles, subject-verb agreement, and translation). Each question has one mark; therefore, the student will get one mark for each correct answer, and zero is considered for every wrong answer.

The second instrument used in this research is a set of open-ended questions for the semi-structured interview (see Appendix B). It included three questions that sought students' views on the benefits, disadvantages, and advantages of the Duolingo Application. The third instrument used in this study was a mobile application, Duolingo. As explained previously, Duolingo is a free online language-learning application. This application is used for mobile learning, which allows "learners to obtain learning materials anywhere and anytime using mobile communication, mobile devices, and the Internet" (Feng Lan & Siang Sie, 2010, p 723). This ubiquitous feature helps the learner to have control over their time and learning. As Pourreau and Wright (2013) explained, Duolingo represented various transparent activities from the smaller units such as exercises to larger units, like complete lessons that teach languages. The application is translation-based and contains several game-like activities that are easy to use.

Achievement Test

When the training section was completed, the researcher assessed students' French knowledge levels in both groups according to the content being taught. In this regard, a specific achievement test was developed by the researcher. The validity of this test was checked by one of the professors teaching French at Razi University. Then, it was delivered to language learners, and they were given enough time to answer the 30 items (40 minutes). The test consisted of 24 multiple-choice questions to examine their achievement in learning vocabulary and grammar. The first ten items evaluated the vocabulary progress of the students, and the next 14 items tested their knowledge of

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grammar. There were also six translation questions from French to English and vice versa, as the translation was the base of the Duolingo application.

Interview

Some questions were formulated to answer the second research question, and a pilot test was run; then, five students were randomly selected for an interview, and they were assured that their answers would be used only for research purposes. These students were given three open-ended questions. The first question explored whether mobile applications are valuable tools for beginners who want to learn a new language. The second question asked about Duolingo's advantages and disadvantages, and the last question probes learners' attitudes toward the mobile-learning method and the rationale behind the method they prefer to learn a new language. The researcher recorded answers to these questions. Finally, the researcher transcribed the answers to the questions and the main themes of their attitudes reported as a result of this study.

Procedure

The first two classes for the experimental and control groups were set in the English Language and Literature Department at Razi University. Then, the students participated in classes to learn the French language. In the first session, the researchers introduced the research goals to students by attending the class and talking to them. Also, the researchers assured the students that all stages of the research would be confidential and that those reluctant to participate could withdraw. Three main steps in collecting data will be explained in detail in the following sections.

During the treatment phase, the learners were introduced to how to use the Duolingo application for learning French. This phase lasted five weeks with one-and-a-half-hour sessions twice a week. Duolingo was introduced to learners, who were informed about how they could create accounts and join the virtual class. They also knew how to do the tasks and work independently to learn French. Also, the lessons were assigned to them at the beginning of the session. Furthermore, the instructor monitored their performance (Figure 3.1) via online classrooms, which are available on the Duolingo website only for the instructor (one of the researchers) on a laptop in the classroom. To obtain a reliable result, the researcher monitored them in the class. Furthermore, virtual class on the Duolingo website monitored their activities during each session and checked to study assigned lessons thoroughly. In addition, if there were any technical problems, such as an internet connection or problems with the application itself, the instructor helped them cope with such troubles. The learners practiced the assigned lessons and learnt new vocabulary and sentences with new verbs and idioms. Duolingo would help them with the immediate feedback feature if they did something wrong. It is also important to note that Duolingo provides feedback in two ways. First, it tells the user if

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his/her answer is correct, and next, the program sometimes offers a brief explanation (Munday, 2017). On the other hand, the control group learnt the same content at the same time, just as planned for the experimental group, but through the teacher's instructions. Like the experimental group, they took part in classes twice a week for one hour-and-a-half sessions. The instructor taught them French and wrote the sentences and words with English equivalents on the board. Then, the learners repeated new words several times, and they wrote them down in their notebooks. In each session, the previously taught content is reviewed. The teaching content was adapted from the Duolingo classroom, which is available on its website for instructors and gives the content of each level separately. In this group, French language teaching was based on the teachers' instruction. In each session, the teacher was responsible for ultimately teaching the students the specified syllabus.

Results

The result showed that students in the experimental group (mean=26.31, SD=3.27) outperformed those in the control group (mean=23.28, SD=2.86). In addition, the normality of distribution for both sets of scores was tested by the Kolmogorov-Smirnov test, and the results showed that scores in the experimental group ($p>0.05$) and control group ($p>0.05$) were normally distributed.

Table 1

Normality distribution

	N	Minimum	Maximum	Mean	SD	Alpha	KS sig.
Experimental Group	15	20	29	26.31	3.27	0.72	0.12
Control Group	15	17	28	23.28	2.86	0.74	0.06

A t-test was run to answer the first question. The findings showed a significant difference between the scores students achieved in the experimental and control groups ($p<0.05$). Their mean scores show the better result of students who engaged in the mobile language learning application of Duolingo over students who were taught by the traditional method of learning (teacher-based learning), as the mean score of students taught by Duolingo is 26.31, while the mean score for students taught by the teacher is 23.28 and the 2-tailed t value is 3.27. The result shows a significant difference in the scores of both groups (Table 2).

Table 2

Independent Sample t-test between the Experimental Group and Control Group

	N	Mean	SD	T Value	Sig. (2-tailed)
Experimental Group	15	26.31	2.18	3.27	0.00
Control Group	15	23.28	2.86		

The result of test items

The test items were analyzed separately to reveal more authentic and reliable results. The findings are demonstrated below in Tables 3 and 4. The t-test comparing vocabulary test items demonstrated that the learners in the experimental group, who learned vocabulary using mobile applications, outperformed the control group (sig<0.00). Therefore, it can be concluded that this application is excellent for vocabulary learning compared to traditional learning (teacher's instructions).

Table 3

Independent Sample t-test for Comparing Two Groups concerning Vocabulary Learning

	N	Mean	SD	T Value	Sig. (2-tailed)
Experimental Group	15	25.75	1.80	4.69	0.00
Control Group	15	22.28	2.23		

Similarly, the same test was run to compare grammar test items. The results demonstrated no significant difference between learners in both control and experimental groups in the case of grammar learning.

Table 4

Independent Sample t-test for Comparing Two Groups concerning Grammar Learning

	N	Mean	SD	T Value	Sig. (2-tailed)
Experimental Group	15	25.93	1.87	175	0.09
Control Group	15	24.71	1.93		

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The second research question sought students' views on using this educational Application (Duolingo). This section will elaborate on the advantages and disadvantages of this application over teacher-based education using the students' views. In this regard, the experimental group was interviewed. Almost all learners believed that the Duolingo application made them feel good while learning French because it is attractive and gets them more involved in the learning process. As Erfan puts it:

> "I always wanted to learn the French language, but I had not enough time to go to classes. I hoped to find a way to do it. And when I started working with this program, I was very motivated to learn French and enjoy it more."

Three students mentioned some benefits of this application, such as the accessibility on a mobile device, its gamification aspect, and the variety of tasks, which increased their motivation to learn French. As Asra mentioned:

> "The reason that I was motivated to learn more with this application was various and exciting tasks and game-like activities which were not boring for learners and got us into using this application. Also, working with this software was very easy, and I had no problems with it."

Another student named Alireza said that the most apparent advantage of this application is that it allows you to review and practice the content of previous sessions. He mentioned that Duolingo allows learners to review vocabulary several times a day.

In contrast to the advantages mentioned above, one student named Saba stated that language learning through this application would deprive students of oral communication and discussion in the classroom. She stated that:

> "This way of learning is constructive for learning vocabulary; however, it leaves the students working on their practices, so the class is almost passive, and there is no communication between students and between student-teacher. And this calls into question the most important aim of language learning, which is communication."

Also, the learners mentioned that the presence of an instructor who monitors their progress is helpful to help them focus on learning. However, it is not enough because, during learning, they face some vague questions, and the instructor should teach them and discuss them in the classroom to make understanding and learning better.

Another student named Sara believed that using this application alone would not be helpful in language learning. As she said:

> "Despite the good feedback this application provided, there were always several questions that constantly boggled my mind during the class. I think having a teacher alongside this application can be the best solution".

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Discussion

The results of this study indicated that students who were taught by the Duolingo application performed better than those who were taught by the teacher's instruction in the case of vocabulary learning. In other words, the results of the independent sample t-test showed that those learners who learned French by mobile phone outperformed those who received teachers' instruction. Accordingly, this finding is consistent with Rosell-Aguilar (2018) and Sung, Chang, and Yang (2015), who argued that mobile applications are helpful for language learning. Rosell-Aguilar (2018) claims that mobile apps attract and can best support learners in language learning. She further argued that the most popular reason for learning in this way was 'for personal interest,' which had been identified as a popular response but less effective for language learning with apps by previous research. Furthermore, Sung, Chang, and Yang (2015) stated that the main reason mobile devices created more marked learning effects in multiple and unrestricted settings might be that integrating mobile devices with language-learning contexts permits students to conduct learning tasks beyond the formal learning environment and with fewer restrictions.

Regarding the qualitative phase of this research, the results showed that most of the participants in this study liked the product, and most of them succeeded in improving their knowledge of French. These results were quite similar to those who believed that mobile learning is enjoyable) Ahmed, 2016; Garcia & Fombona, 2015; Huynh, Zuo, & Iid, 2016) attractive and usable (Ally et al., 2007; Bin Chen, 2013; García Botero, Questier, & Zhu, 2019), and learners have a positive attitude toward learning a language by mobile phone (Ally et al.,2007). The ubiquitous feature of Duolingo was the most positive point for learners, and almost all participants were satisfied with using their mobile phone for language learning anywhere and anytime, which was in line with many other pieces of research (e.g., Dashtestani, 2015; Kim, & Kwon, 2012; Ozdamli & Cavus, 2011; Burston,2011; Kukulska-Hulme, 2007; Ally et al., 2007).

Additionally, the results showed that the monitoring process was very influential because it makes the learner feel more responsible for their learning process. In line with this finding, Bin Chen (2013) believed that learners need to be guided appropriately technologically and methodologically.

The learners asserted that the instructor's guides were helpful and diminished the vague points of working with the application. Wang and Chen (2013) also believed that it is necessary to train learners for online learning, therefore in this study, the presence of the instructor had a positive effect on the learning process. The learners must be aware of the usage of mobile learning. Mobile integration into language learning must thoughtfully take place.

The results also highlighted the impact and importance of context on language learning (García Botero, Questier & Zhu,2019). In this study, learners learn a new

language in the formal context (university), which guided them to learn more systematically by mobile phone. This study asserted the effectiveness of using an informal mobile application for learning any language. In line with this finding, Dashtestani (2015) and Sun (2014) claimed that formal learning context directed learners into better language learning.

So based on what was obtained, Duolingo was an effective tool for beginners to learn vocabulary (Ahmed, 2016; Muhammed, 2014; Alemi, Anani Sarab, & Lari, 2012; Lu, 2008) and grammar. However, it is not helpful for communicative purposes. The learners believed that mobile applications are practical as learning aids besides teacher's instruction (Sung, Chang & Yang, 2015). In this regard, Kiernan and Aizawa (2004) and Bodgan (2016) declare that applications alone cannot meet the communication objectives related to language learning, so having a teacher can help with this.

It is also noticeable that the game-like environment of Duolingo encourages learners to get more involved in language learning and, in turn, increases student academic achievement and student success. As Zakaria, Zaini, Hamdan, and Norman (2018) argued, the gamification features of the Duolingo application can improve learning to ensure that all students find and use the teaching content in an attractive learning environment.

Finally, it is worthwhile to mention that the immediate feedback feature of the Duolingo application helps learners learn better by letting them know their mistakes (Azabdaftari & Mozaheb, 2012).

In line with Azabdaftari and Mozaheb (2012), the t-test results indicated that the learners who learned vocabulary and grammar by mobile phone outperformed in comparison with the traditional learning group while there are some limitations such as a lack of socialization and interaction that make mobile learning useless for learning to speak and making the communication. Therefore, learners mainly prefer to use it as assistance alongside the teacher's instructions.

The presence of the instructor at the first session was beneficial in getting students familiar with the application and helping them join an online class, along with the learning process, it solves the technical problems they may face.

Conclusion

In light of the findings and discussion, it is concluded that students taught by the Duolingo application performed better than students who received teacher-based instructions. From the quantitative analysis result, it was demonstrated that the participants who received experimental treatments made significant progress on their post-tests, while the participants in the control group did not make any significant progress. The interview results show that the learners hold a positive attitude towards the Duolingo application in learning French. As the qualitative analysis showed, all interviewees considered that the

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new learning approach was helpful and practical for most of them to improve their French. They felt motivated, delighted, and interested in using mobile apps to learn English by themselves. They all considered that MALL could promote college students in self-regulated learning cycles, which conforms with the previous literature (Kitsantas & Dabbagh, 2010; Hadwin & Winne, 2001; Dabbagh & Kitsantas, 2004). However, the results show that it is better to use this application as a teaching supplement rather than a stand-alone language-learning tool. Since in Iran, there is a lack of information about the effectiveness of mobile learning and technology integration into language learning, especially in formal contexts such as schools and universities, this study will be beneficial for instructors to gain positive points about language learning through a mobile application and the way they can use it ideally. In addition, they can devise new applications based on learners' needs and use in the classroom. After all, it is noticeable to emphasize the advantages of this study for computer programmers or producers to fill the gaps mentioned by participants and fulfill the learners' needs.

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