Journal of Educational Technology & Online Learning
Volume 5 | Issue 3 | 2022
http://dergipark.org.tr/jetol

Evaluation of mobile applications in foreign language learning at early age

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Suggested citation: Davudova, E. & Türel Y, K. (2022). Evaluation of mobile applications in foreign language learning at early age. *Journal of Educational Technology & Online Learning*, *5*(3), 738-753.

Highlights

- The mobile applications had a significantly positive effect on students' English achievement.
- The "Memrise" is more effective in the development of speaking, reading and writing skills.
- Students think that applications are fun in learning English and they are willing to use them.
- Parents think applications are effective, especially in the development of speaking skill.

Article Info: Research Article

Keywords: *Mobile application, M-learning, Foreign language, Foreign language learning, Primary school*

Abstract

In the technology era that we are in, teaching with traditional method is not sufficient alone in increasing efficiency. Varied content, whether technological or not, has an important place to increase the effectiveness of teaching. The methods and models used in the selection and usage of these contents are also considered important in terms of achieving the targeted success. In this study, the effects of mobile applications used in foreign language learning were examined on students' academic achievement. A total of 87 students from the Experiment-1 (E1), Experiment-2 (E2) and Control (C) groups consist of the sampling of this study. The English Achievement Test (EAT) was applied to all three groups as pretest and posttest. C group has attended to the regular face-to-face classroom teaching while students in E1 and E2 groups additionally used Duolingo and Memrise, respectively. In addition, volunteer parents and students' opinions about mobile applications were received after the implementation. In line with the results obtained by comparing the groups with respect to each other, it was concluded that the E2 group obtained higher scores from EAT than the E1 and C group. Particularly, there is a higher increase in the average score in the "Reading and Writing" section of the E2 group. According to the opinions of students and parents, both applications can be said to improve academic success positively.

1. Introduction

Technology is increasingly revealing its effect in all areas of our lives. In line with the development of technology, the use of computers and the internet, have gained a new dimension with the introduction of mobile technologies (Elverici, 2021). With the development of mobile technologies, the age limit of individuals using these technologies also decreases. Mobile phones, which were started to be used at a very early age, are the researchers' interest today. New generation makes the internet and computers a part of their lives (Aggarval & Ganvir, 2021). Since the use of mobile technologies has come to an early age, researchers have suggested that mobile technologies can be used in education in many areas such as health, trade and marketing.

These technologies that provide faster access to information, make learning quite easy. Thanks to the multimedia capabilities of mobile devices, which have become a part of our daily life, learning can now be carried out anytime and anywhere (Liu, 2020) The concept of "mobile learning" has become a popular

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Doi: http://doi.org/10.31681/jetol.1158662
Received 6 Aug 2022; Revised 24 Sep 2022; Accepted 25 Sep 2022
ISSN: 2618-6586.

and rapidly expanding research and application field in universities, with the proliferation of mobile devices and increasing technological features (Öz, 2013). Mobile learning is a form of learning that occurs as a result of evaluating mobile computing and e-learning together, enabling to reach the desired content and communicate with others without being connected anywhere (Todoranova, Nacheva, Sulov & Penchev, 2020).

Mobile learning has been used extensively in foreign language learning in recent years as well as being realized in many different learning areas. Foreign language has great importance in the 21st century, where cultural changes brought along with technological developments (Wu, 2021). Crystal (2012) explains the importance of foreign language by suggesting that learning a language accepted as a "global language" will make life easier. In our period where the number of people and culturalization increase, the age of learning foreign languages has decreased to 5-6 years (Fauzi, 2020). Using popular and interesting technologies of the period helps education to be more effective. When foreign language education at an early age is carried out in parallel with information technologies, it contributes greatly to the cognitive development of the individual. Küçük (2006) states that "The main purpose of early language education is to assist children express themselves in certain situations". Foreign language education helps eliminate shyness and communication problems when performed at a young age. Studies on this subject are being carried out in the world and new steps are being taken according to new approaches. However, as the teaching method does not reveal approaches that attract the attention of individuals at a young age, individuals are prejudiced against language learning at an early age (Arslan & Akbarov, 2010). In this context, the mobile learning approach advanced with the development of technology is thought to be an alternative in foreign language teaching as in every field.

With mobile learning, foreign language can be taught in and out of the classroom regardless of time. In order for these applications to be effective, they must be well designed. Speaking, listening, writing and reading skills are four capabilities that license an individual to understand, produce and use the language effectively in interpersonal communication (Putra & Santosa, 2020). Mobile applications designed for the development of these skills are one of the most preferred foreign language learning methods by users in terms of ease use, easy to download and update, very affordable price or completely free. There are existing applications for learning foreign languages in the Play Store for Android devices and in the App Store for iOS devices. Since "Duolingo" and "Memrise" mobile applications are two of the most preferred applications for foreign language learning, we used these applications in this study.

1.1. Duolingo

"Duolingo" is a mobile application that emerges with the slogan of "Free language training program for the whole World" (Duolingo, 2020). The philosophy of this application, which has more than 300 million users, is that everyone has the right to learn the foreign language in the best way. This application was created in 2011 by Luis Von Ahn, who is professor at Carnegie Mellon University. It is known as the most downloaded foreign language learning application in the Play Store and more than 7000 exercises are completed every month. This application received three different awards in 2013 and 2014 years. The app has 23 languages support.

When the application is first logged in, the user language skills level is determined and then the courses progress according to the user's level. "Duolingo" has designed fun for people to acquire new skills as they play, rewards them to increase user motivation and gives instant feedback. The founders of the "Duolingo" application, developed to ensure true equality around the world, have developed a completely free application, claiming that language learning is expensive. At the same time, it is said that the 34-hour Duolingo study is equal to a one-year language course at the university (Duolingo, 2020). Using "Duolingo" mobile application is very easy. First, it is need to create account with Google account, e-mail address or Facebook. After login, the mother language and the language to be learned should be selected. After choosing languages, daily working limit should be selected. Prizes are earned every day when the limit is full. After these processes are completed, increasingly difficult activities begin (Figure 1). There

are questions that measure the four basic skills of the language at the levels devoted to the topics. As seen in Figure 2, the questions are integrated with the visuals.

Fig. 1. Duolingo home page.

Fig. 2. A question page in Duolingo.

The sentence given in speaking activities should be read correctly, or it has to be read correctly by translating into the language learning (Figure 3). As seen in Figure 4, any word is any word is requested to be translated into English. This is one of the application's activities that improve writing skills. In this activity, the correct use of letters is taken into account.

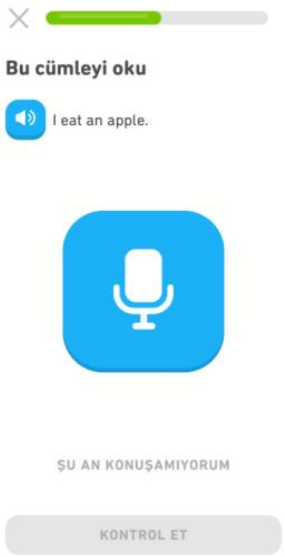

Fig. 3. A speaking question page of Duolingo.

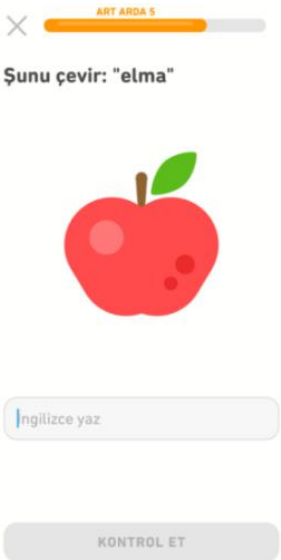

Fig. 4. A writing question page of Duolingo.

In application, when the activities are done correctly, you can move to the other question, if it is wrong the same question is repeated differently. Users are able to learn a sentence or word by writing, listening and speaking. Points are earned when the exercises are completed, and crowns are earned when the daily goal is completed.

1.2. Memrise

"Memrise" is a language learning tool available on the web (www.memrise.com), as well as the mobile version provided by Apple Store and Google Play. This application, known as a foreign language learning application, was established in 2010. With a rapidly growing number of users, the application has more than 40 million users in 189 countries. Users can set up their own course, attend someone's course, or contribute with their knowledge. The "Memrise" application sends daily reminders to users, allowing users to use the application regularly. Figure 5 demonstrates the screen after signing up or logging into the "Memrise" mobile application. Topics are divided into stages; each stage contains about 15 to 40 words and patterns. As seen in Figure 6, both the translating and reading of the words are given. At the same time, users are able to learn the words based on a multimedia learning path by listening skills, writing skills, videos and photos.

Fig. 5. Home page of Memrise.

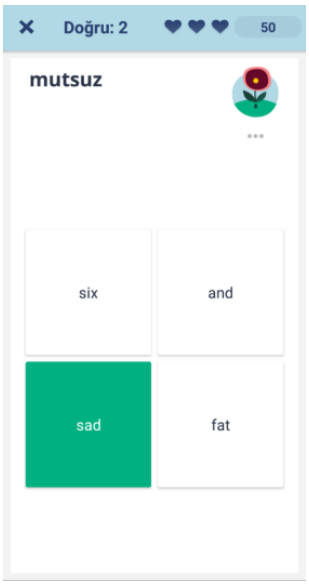

Fig. 6. A question page of Memrise.

Each word is presented to the users in writing, and then with audio and video (Figure 7). If the daily goal is not completed, the stages progressed back down and when the application is entered, the words that learned are requested to repeat.

Fig. 7. Word expression by video in Memrise.

The videos and sounds used in the application are voiced by experts who are native speakers of that language. In this way, users can learn to speak words like their mother tongue and through the videos they can observe the culture of that language. Instead of teaching the same word over and over again, the app teaches words in different ways and at certain times (Memrise, 2020).

1.3 Comparison of Memrise and Duolingo Mobile Applications

The "Duolingo" mobile app is more preferred than the "Memrise" mobile app. Because of only certain part of Memrise is free. One of the most admired features of the Memrise is the easy transition between the languages. Another feature of the application is that it teaches more words and repeats the words many times. The Duolingo, in addition to vocabulary teaching, includes grammar and sentence activities, and repeats what it teaches less than the Memrise. Duolingo encourages users to use the application by giving very different rewards at all levels. Both mobile applications contain listening activities to improve listening skills. The "Memrise" mobile application also includes video activities.

This study aims to answer the questions about the effects of mobile applications in language learning. As a research problem we took into account whether mobile applications that used in foreign language learning has an impact on the students' achievement. Depending on the research problem, we researched five sub-problems:

1. Is there a significant difference of English Achievement Test (EAT) post-test "Listening" scores between of students in the E1, E2 and C group?

2. Is there a significant difference of EAT post-test "Speaking" scores between of students in the E1, E2 and C group?

3. Is there a significant difference of EAT post-test "Reading and Writing" scores between of students in the E1, E2 and C group?

4. When the EAT pre-test scores are taken under control in the E1, E2 and C groups, is there a significant difference between the total achievement post-test score?

5. What are the opinions of students and parents about mobile applications?

2. Literature

Using of mobile devices and mobile applications in foreign language learning has been examined by various researchers with different learner groups. When these studies are examined, it is suggested that mobile applications can be an alternative in language learning and increase motivation of students. (Aşiyan, 2016; Haristani & Rifai, 2021; Juliana, 2021; Tılıç, 2016; Falah, 2020). In some studies, the subject of vocabulary learning with mobile applications has been discussed and positive results have been obtained (Atay, 2020; Ekinci, 2020; Bezircilioğlu, 2016). In various studies, it has been suggested that language teaching mobile applications are effective and entertaining when used for their purpose (Sarıtepeci and Çakır, 2017). Botero and Quester (2019) argued that mobile applications such as "Duolingo" used in foreign language learning accelerate and facilitate self-learning. In studies dealing with Memrise, it is suggested that students find the application fun, easy to use and understandable, that it is effective in the development of speaking skills, and that language learning in the classroom can be made more comfortable by using Memrise (Mardiah, Suharsih, & Hamidiyah 2022). Botero and Quester (2019) argued that mobile applications such as "Duolingo" used in foreign language learning accelerate and facilitate self-learning.

Studies using mobile devices have been added to the new paragraph to distinguish the concepts of mobile device and mobile application (Şendağ et al., 2017). Eshankulovna (2021) conducted studies to determine

the effect of mobile devices on the speaking skills of students studying English language teaching. According to the study, after the lessons, the students who had this course improved their speaking skills by talking on the mobile phone. According to some researchers examining whether language learning with mobile devices affects academic success, students state that they do more enthusiastic and willing homework while doing homework with mobile devices and their academic achievements are progressing positively (Zhou, 2021). In contrast, Bradley and Hasemi (2017) stated that most of the participants were not motivated with a smartphone and found themselves in social media applications after picking up the phone to learn the language. Some researchers stressed the constraints of teaching with mobile devices such as having an access to high quality internet signal or an ideal mobile device (i.e. fast processor, large screen, high memory capacity etc.) for effective mobile learning (Kadızade, 2015).

In the related literature, there are many studies in which "Duolingo" and "Memrise" mobile applications are handled separately (Arifin 2020; Wagner 2020; Kessler 2021; Luzcak, 2017; Walker, 2015), but there are fewer studies that discuss speaking, listening and writing skills by using both applications together. Despite the fact that English lessons were made compulsory from the second class, with the decision taken in Turkey in 2012, no studies directly related to the subject of study were encountered. At the same time, it is thought that the two most preferred applications from different types of tools will be selected and the results of two mobile applications containing different teaching approaches will give an idea to parents, teachers and educational institutions. These results are also considered important in terms of contributing to the future mobile application development processes in this regard, by enabling the applications to be examined in different dimensions such as design, vocabulary teaching style, and the skills they most concentrate on in development. In addition, it is considered to be important as it will provide preliminary information for researchers who will conduct similar studies in the future. In this context, the data of the current research will reveal the effect of the educational mobile applications used in the study on the academic success of the students and their attitude towards the course.

3. Methodology

3.1.Participants

The participants of the research consisted of 87 students studying in the second grades of a private school in the Middle Eastern part of Turkey. Three separate classes was determined neutrally as E1 using “Duolingo” mobile application (N=27), E2 using “Memrise” mobile application (N=25) and C groups having regular face-to-face class sessions (N=35). (Table 1)

Table 1.

Responses to reviewers

Study Group Code	Number of Student	Mobile Application Used	Applied Instruments
E1	27	“Duolingo”	EAT and Semi-Structured Interview Form
E2	25	“Memrise”	EAT and Semi-Structured Interview Form
C	35	-	-

3.2. Research Design

In this study we preferred mixed method that is used to validate or compare a data with other forms (Creswell & Clark 2014). In many cases, both qualitative and quantitative data were obtained from the same people for easier comparison. The main goal of this design is to look problem from distinct sight (Creswell & Clark, 2014), because of the data ensures various outlooks based on the combination of data. The research was performed over a period of eight weeks.

3.3. Instruments

In this study, "English Achievement Test (EAT)" was used to collect quantitative data. "Semi-Structured Interview Form" prepared by the researchers to use to collect qualitative data.

3.3.1 English Achievement Test

EAT was used to check the participants prior knowledge of English before the process and to reveal the change in students' learning at the end of the process. EAT was by Cambridge University in 2018. This test consists of three parts. The parts of test consist of questions including listening, writing and reading and speaking skills. All three of the qualifications reviewed are in line with the Common European Framework of Reference for Languages (CEFRL) published by the Council of Europe and demonstrate real-life communication skills. While scoring the achievement test consisting of a total of 25 questions, correct answers are evaluated with "4" points, and wrong answers with "0" points. The reliability coefficient of KR-21 was calculated as 0.81. EAT was applied as a pre-test and post-test to the E1, E2 and C groups (Table 1).

3.3.2 Semi-Structured Interview Form

An Interview form was developed by the researchers. The form occurred of personal information and opinions about the mobile applications. Expert opinions were taken as a validity study for the interview form. The interview form questions were determined together with the experts in order to get information about the interface and ease of the mobile applications used in the study by considering the daily mobile device usage time and mobile application usage habits of the students. The data obtained were systematically coded and the inter-rater reliability coefficient was calculated in accordance with the formula proposed by Miles and Huberman (1994).

3.4. Data Analyses

To determine the differences between the achievement scores of the E1, E2 and C groups was used One-Way ANOVA that one of the data analysis techniques. When the pre-test achievement scores of the E1, E2 and C groups were taken under control, the change of the post-test achievement scores were analyzed with the ANCOVA test. The data obtained from the interview were systematically coded and the reliability coefficient between the voters was calculated in accordance with the formula proposed by Miles and Huberman (1994). For analyzing the following steps were taken:

- Encoding of data: The students of E1 group were coded as S-A1, S-A2, S-A3 and parents of this group were coded as P-A1, P-A2, P-A3; The students of E2 group were coded as S-B1, S-B2, S-B3 and parents of this group were coded as P-B1, P-B2, P-B3;
- Identifying themes: Two researchers independently identified themes for students' answers. Separate themes were compared.
- Arrangement of codes and themes: The themes gained are lined up and numerical data of themes are tabulated.
- Identification and interpretation of the findings: The results obtained were evaluated by the researcher and data analysis was concluded.

3.5 Findings and Discussions

3.5.1 Quantitative data findings

*R. Q.1.*Is there a significant difference of EAT post-test listening scores between of students in the E1, Et-2 and C group?

One-Way ANOVA analysis was used to compare pre-test and post-test student scores for the English "Listening" skill in the E1, E2 and C groups. Looking at the analysis results, there is no significant

difference between the "Listening" pre-test scores of the E1, E2 and C groups ($F_{1\text{-}92}$ *0.57; p>.05*). This situation shows that there is no difference between the groups at the beginning of the listening skill.
Other results revealed the "Listening" scores of the E1, E2 and C groups after the study process differed significantly ($F_{1\text{-}92}$*4.87; p<.05*). To identify the sources of differences, Scheffe test that is one of complementary post-hoc analysis was implemented. The "Listening" post-test scores of the E1 group ($\bar{X}$=31.11; SD=6.21) were found higher than the "Listening" post-test scores of the C group ($\bar{X}$=26.57; SD =7.02) and statistically significant difference was found between the two groups (p<.05). The "Listening" post-test scores of the E2 group ($\bar{X}$=31.68; SD=7.93) were found to be slightly higher than the post-test scores of the E1 group ($\bar{X}$=31.11; SD=6.21), but there was no statistically significant difference between the two groups (p> .05). The "Listening" post-test scores of the E2 group ($\bar{X}$=31.68; SD=7.93) were found higher than the "Listening" post-test scores of the C group ($\bar{X}$=26.57; SD=7.02) and there was a statistically significant difference between the two groups (p <.05). Figure 8 presents a graph showing the prtest and post-test scores in the "Listening" section of the E1, E2 and C groups.

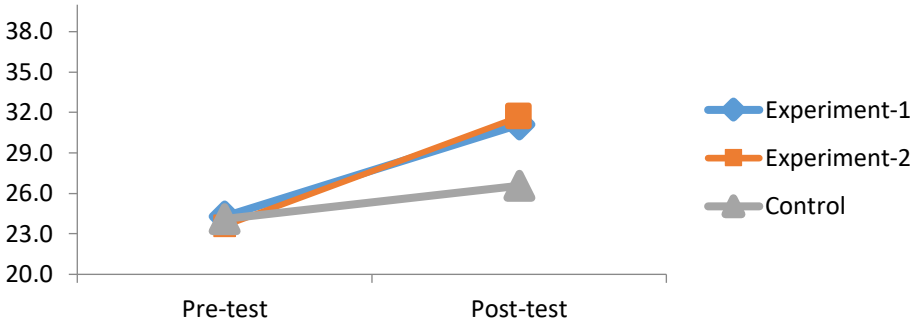

Fig. 8. Diagram of Groups' Listening Score

*R. Q.2.*Is there a significant difference of EAT post-test "Speaking" scores between of students in the E1, E2 and C group?
One-Way ANOVA analysis was used to compare pre-test and post-test student scores for the English "Speaking" skill in the E1, E2 and C groups. According to the findings, there is no significant difference between the "Speaking" pre-test scores of the E1, E2 and C groups ($F_{1\text{-}92}$*1.214; p>.05*). This situation shows that there is no difference between the groups' pre-tests.
According to another result, the difference between the "Speaking" post-test mean scores of the students was not statistically significant ($F_{1\text{-}92}$*0.011; p> .05*). When the total means scores of the E1, E2 and C groups are analyzed, the group with the highest increase in post-test score is the E1 group. This order is followed by the C group. It is seen that the pre-test and post-test scores of the E2 group are equal and there is no increase (Figure 9).

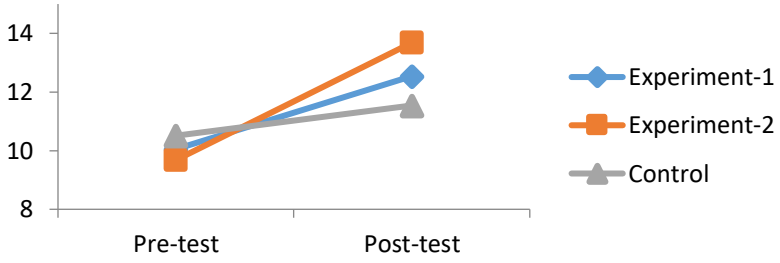

Fig.9. Diagram of Groups' Speaking Score

*R. Q.3.*Is there a significant difference of academic achievement post-test "Reading and Writing" scores between of students in the E1, E2, and C groups?
One-Way ANOVA analysis was used to compare pre-test and post-test student scores for the English "Reading and Writing" skill in the E1, E2 and C groups. According to the findings, there is no significant

difference between the "Reading and Writing" pre-test scores of the E1, E2 and C groups ($F_{1\text{-}92}1.4797; p>.05$). This situation shows that there is no difference between the groups at the beginning of the study. Also, the difference between the students' mean scores of "Reading and Writing" post-test scores was found statistically significant ($F_{1\text{-}92}$ $4.809; p <.05$). To identify the sources of differences, was used Scheffe analysis that is one of complementary post-hoc test. As shown in Figure 10, post-test scores of the E1 group ($\bar{X}$=25.92; SD=10.25) were found higher than the post-test scores of the C group ($\bar{X}$=22.51; SD=7.64), and there was a statistically significant difference between the two groups (p <.05). The success post-test scores of the E2 group ($\bar{X}$=29.44; SD=7.73) were found to be slightly higher than the post-test scores of the E1 group ($\bar{X}$=31.11; SD=6.21), but there was no statistically significant difference between the two groups. (p> .05). The success post-test scores of the E2 group ($\bar{X}$=29.44; SD=7.73) were higher than the post-test scores of the C group ($\bar{X}$=22.51; SD=7.64) and there was a statistically significant difference between the two groups (p <.05).

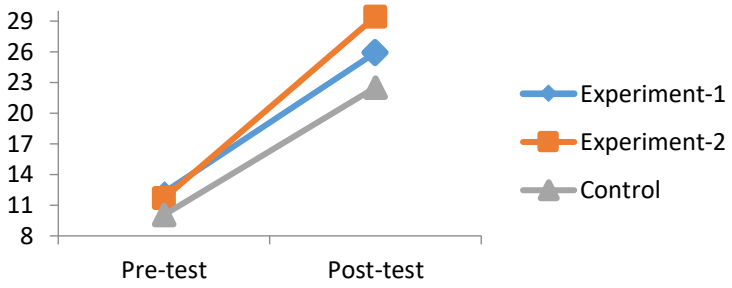

Fig. 10. Diagram of Groups' Reading and Writing Score

R. Q.4. When the EAT pre-test scores are taken under control in the E1, E2 and C groups, is there a significant difference between the total achievement post-test score?

According to this question, when the success pre-test scores of the groups were taken under control, ANCOVA test was applied to determine the change between the success post-test scores. The mean value obtained by the achievement test of the E1 group was found as 68.81, and it was calculated as 69.65 with the covariate correction. The standard deviation value for the same data was found to be 17.67. The average value obtained by the achievement test of the E2 group was found as 75.28, and it was calculated as 74.98 with the covariate correction. It is seen that the standard deviation value is 18.30. The mean value obtained by the C group from the achievement test was found to be 60.45 and was calculated as 59.94 with the covariate correction. The standard deviation for this data appears to be 14.05. While the pre-test values didn't have a significant effect on the groups, ($F_{1\text{-}92}18.92; p=.102$), there was a statistically significant difference between the post-test mean scores of the E1, E2 and C groups ($F_{1\text{-}92}$ $7.79; p=.001$). Looking at Figure 11 to determine which group is in favor of this difference, it is seen that the mean of the E1 group is 69.65, the mean of the E2 group is 74.98 and the mean of the C group is 59.94. These means show that the difference is in favor of the E2 group.

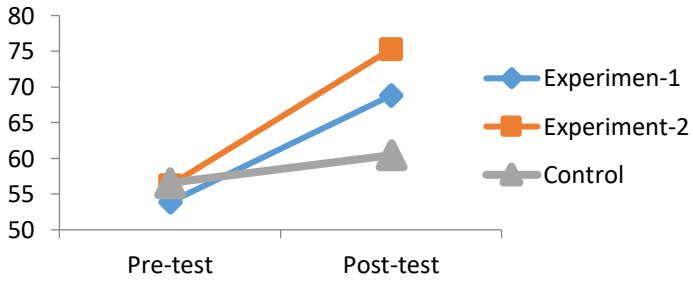

Fig. 11. Diagram of Total Score of Groups

3.5.2 Qualitative data findings

R. Q.5. What are the opinions of students and parents about mobile applications?

The qualitative data gained are grouped under two issues: positive and negative opinions (Table 2).

Table 2.

Rates of opinions about mobile applications.

	Positive		**Negative**	
	Duolingo	Memrise	Duolingo	Memrise
Parents	%97	%86.6	%3	%13.4
Students	%98	%94	%2	%6

As seen in the Table 2, although the general thoughts are positive in both applications, there are also those who think negatively. While most of those who think negatively about "Memrise" complain that the application is paid, those who think negatively about "Duolingo" complain that the application does too much repetition and starts from a very simple level.

According to results, positive opinions of students and parents for the mobile applications can be summarized as follows:

1. The appeal of application
2. Supporting content with sound and video
3. Progress of application levels like a game
4. Winning awards
5. The application develops four (Listening, speaking, reading and writing) skills
6. Helping vocabulary learning

Some examples of positive options were:

"I want to use application every day. But sometimes my mother doesn't allow me when I don't finish my homework." S-A2

"I do it all right, so I will complete all the levels immediately" S-A6

"Sometimes I get the questions wrong, but it doesn't matter because I can learn the truth. If only we always practice this in lessons, we will understand the lesson better. I play every day when I go home. " S-A10

"The application is beautiful, very fun. We play with my brother every day." S-B1

"I know what "What's up" means. I learned in Memrise." S-B4

"I say that I will not give the phone if she will not use Duolingo when she requests phone. I open and give Duolingo. She willingly uses the application." P-A3

"… It was also good to give an award. We use the app every day, even to get a reward." P-A5

"Very good application, we use it regularly with children every day, kids love it too." P-B2

"… Sometimes he repeats the words there out loud. I believe he learns. " P-A5

"I liked it when I examined the application. It starts from the foundation and progresses in levels. I can use this application for myself as well." P-A3

"It has a feature called learn from the native. It really great teaches the correct pronunciation of the word." P-B4

The negative opinions of students and parents for the mobile applications can be summarized as follows:

1. Difficulty of the levels
2. The application is boring

Some examples of negative options were:

"… I expect my father to come off work to use the app. I do it all right with my father." S-A7

"… I can't do it alone, so I do it with my brother. My mom always told me to do it with my brother. " S-B5

"Some questions in practice are very easy, but I don't understand some at all." S-B9

“I think the levels in application are difficult. My daughter usually asks me.” P-A4

"Sometimes he gets bored while using the app." P-A7

3.5.2 Discussion

In the current research, the authors examined the effectiveness of mobile applications to the English success of primary school second grade students. We assumed that the experimental groups would show higher levels of success. With this foresight, we planned a mixed-frame research framework. Eighty-seven second grade students participated in this study. One-Way ANOVA and ANCOVA tests were conducted to analyze the data. In addition, structured interviews were conducted for cross verification of quantitative data.

The mobile applications had a meaninfully positive effect on students' English achievement. It was observed that especially the success of E2 group students was higher than other groups. It is thought that the "Memrise" mobile application used by the participants of the Experiment-2 group is more effective in increasing English success. In particular, the design of the "Memrise" application and the style of transferring the information to the learner is different from the "Duolingo" application. The “Memrise” mobile application is thought to encourage learning by first teaching a word by explaining it in written, audio and video, then asking the learner in the same way with written, audio and video questions.

Students' and parents’ interviews encourage the quantitative results. Students reported that they learned vocabulary with mobile applications with their experience. In addition, parents stated that their children especially improved their listening skills through application. As seen in the test analysis, "Listening" scores of the E1 and E2 groups were higher than the C group. When the literature is analyzed, it is observed that the success has increased in the studies performed using both the “Duolingo” mobile application (Wagner, 2020; Hiddayati and Diana, 2019; Tılıç, 2016) and the “Memrise” mobile application (Affandi and Syafi, 2018; Walker, 2015; Luczak, 2017). In this study, it was determined that both models were used more effectively in E1 and E2 groups compared to the C group and were similar to the studies in the literature.
When the average scores of the groups related to EAT sections were analyzed, it was seen that the section with the highest increase in scores was the "Reading and Writing" section. The group with the highest score increase in this section is Experiment-2, then Experiment-1 group follows the order. It is thought that the practice of transmitting the words verbally and in writing is effective in the development of this skill. It can be said that by showing the written form of the words first, the levels that the user wants to write afterwards improve the "reading and writing" skill.
According to the studies about the "Memrise" application, the "Memrise" mobile application especially developed the vocabulary learning (Luczak, 2017), reading and writing (Walker, 2015) skills, and having a listening feature is quite important in improving the speaking skill (Affandi & Syafi, 2018). It is claimed that the “Memrise” mobile application is multi-featured, includes videos that teach the language from the native, and there are listening sections encouraging learners to use the mobile application and effectively improving their listening skills (Walker, 2015).

In the studies related to the "Duolingo" mobile application, it is observed that the group using the "Duolingo" mobile application is more successful than the group that does not use any application. This result is in line with the studies in the literature (Ajisko, 2020; Hidayati & Diyana, 2019).

4. Conclusion and Suggestions

In the current study, the effect of mobile applications used in foreign language learning at an early age on students' English success was examined. In the Experiment-1 group, English lessons were conducted in a face-to-face classroom environment during class hours and the “Duolingo” mobile application was used by the participants daily under the supervision of their parents. In the Experiment-2 group, English lessons were conducted in the classroom during class hours and the “Memrise” mobile application was used daily by the participants under the supervision of their parents. In the control group, English lessons were conducted in a face-to-face classroom environment during normal class hours and no mobile applications were used by the participants.

As a result of the analysis, it was determined that there was a significant difference between the achievement post-test averages of the Experiment-1, Experiment-2 and Control groups. It was observed that the Experiment-2 group experienced a higher increase in the mean achievement score compared to the other two groups. It is thought that the “Memrise” mobile application used by the participants of the Experiment-2 group is more effective in increasing the English language success. It is observed that the average score in the "Reading and Writing" section of the Experiment-2 group increased more compared to the other sections of the test. Although the application contains more questions to improve skills such as speaking and pronouncing words correctly, the research result shows that the "Memrise" mobile application is also effective in improving "Reading and Writing" skills.

It was determined that the section with the least increase in the average scores from the sections was the "Speaking" section. In this section, it was concluded that while there was no increase in the pretest mean score and the posttest mean score in the Experiment-2 group, there was little increase in the Experiment-1 and Control groups.

In the "Listening" section of the test, it was seen that the group with the highest increase in the average score was the Experiment-2 group, followed by the Experiment-1 and Control groups. When the Academic Achievement Test sections are examined separately, the fact that the group with the highest score increase in the two sections, "Listening", "Reading and Writing", is Experiment-2, leads to the conclusion that the "Memrise" mobile application is more effective in increasing these two skills.

According to the results obtained in the study, there is a significant difference between the pretest and posttest scores of the Experiment-1 group students, even though there is a higher increase in the academic achievement of the Experiment-2 group.

Research samples are limited to primary school students. The same study can be conducted with high school and university students who use mobile phones intensively. During the study, it was observed that the students could not fully understand the mobile applications and could not use them properly. Students can be informed about the functioning of the mobile application. Only two mobile applications were used in the research. A new study can be done using more mobile applications. The Experiment-1 and Experiment-2 groups in this study were given a mobile application to use under the supervision of their parents. During the application process, some problems were encountered regarding the use of the application. It is considered important to identify existing problems and to conduct research on solutions. The contents used within the scope of the research are related to foreign language teaching, which is one of the difficult areas to learn. Therefore, in a study like this, different content that is not easy to learn can be used. Within the scope of the research, the academic achievement variable was examined. In addition to the academic achievement variable, variables such as attitude, permanence, and self-efficacy can also be examined. The content used within the scope of the research is for mobile application. Similar content

can be developed for different technological tools. More studies can be conducted on the use of mobile applications in education and these studies can be examined in different dimensions.

Notes

This study has been derived from the second author's Master dissertation completed at Firat University Graduate Institute of Educational Sciences and supported by Scientific Research Center of Firat University.

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