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The use of smartphone applications for students to learn ESL grammar and vocabulary

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The use of smartphone applications for students to learn ESL grammar and vocabulary

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Chapter 1: Introduction

Introduction

This chapter provides an overview of the background of using Smartphone apps in English as a Second Language (ESL) learning. First, the definition of ESL and the importance of ESL teaching and learning are discussed. Then, the main issue to consider is the use of technologies in ESL learning. Next, the main reasons for the present study and the urgent need for evaluation tools and program recommendations as well as research questions and research goals are discussed. Then, the terms and concepts of the study are reviewed. Finally, this chapter ends with a general overview.

Context and background

ESL is used in the educational system to describe a set of programs and classes designed and planned for non-English language learners to improve their English (Elaish et al., 2019). The term is also used to describe non-English-speaking students as ESL students. The issue of teaching English in non-English-speaking countries like Arab countries has become very pronounced (Elaish et al., 2019). This is due to a variety of factors, including the rapid spread of technologies and literature, as English is the current lingua franca of international business, education, science, technology, diplomacy, entertainment, radio, seafaring, and aviation. Many of the new words that enter our language today are influenced by Internet culture, and new phrases frequently correspond to technical advancements i.e., smartphone apps, software, social media and networking. These technological advancements and their related language are transportable and they spread quickly through the society. People can literally use smartphone to accomplish a wide range of internet tasks while on the go (Simon & Simon, 2021).

According to Pachina (2020), the current advancement of technology result in more intelligent personal appliances (e.g. smartphones, tablets, etc.) to require English language skills. English is a global language; it is the one language spoken and understood by the majority of the population in almost every region of the world. It is the international language of business and people need to speak English if they wish to enter a global workforce. Therefore, learning English will increase the chances of job accomplishments and provide greater opportunities to further career advancements (Pachina, 2020). Numerous non-English language countries currently offer academic-level English study at their universities.

Building on the fact that smartphones are a part of life today, and examining the experiences of skilled teachers and students, smartphone apps have been developed to learn English (Kukulska-Hulme et al., 2015). This rapid growth of the Internet and the development of different smartphone applications have led to major changes in the way students transfer knowledge and methods related to student-teacher interaction (Latypova et al., 2018). Today, smartphone applications are impacting learning processes and methodologies; their effectiveness in facilitating meaningful learning environments has been proven in various studies (Latypova et al., 2018).

Smartphone apps have become increasingly popular in recent years. It is important to have a comprehensive and effective program and well-programmed engineering solutions for English language education and better education of students worldwide (Rosell-Aguilar, 2018).

A study of (Lin & Lin, 2019) asserts the shortcoming of desktop computers to provide ESL learners with the features and capabilities of smartphones and tablets. Therefore, students face numerous challenges in ESL education, such as lack of student access to different resources

and area-specific classes, lack of synchronized schedules, lack of equal facilities, and so on (Lin & Lin, 2019).

Rationale

Numerous organizations partner with English Language Training (ELT) institutes and support innovations and ELT assistance. The most well-known international language education organization is the British Council, which supports both foreign language learners and ESL teachers (Skřepská, 2018). With the advent of English language classes and focused learning programs, the development of ESL learning programs has dramatically increased the motivation of students to use smartphone applications when learning English (Liang, 2018). The quality assessment information of these applications benefit ESL teachers and students. However, recent research in this area has been limited and little information is available while new applications constantly are being updated with new methodologies. Knowing the correct educational technology methods for language learning can help teachers present newer programs and better educate students (Liang, 2018).

Research from EKİNCİ et al. (2017) has emerged to encourage the application of modern technologies in the teaching of English, supporting both classroom and non-classroom smartphone application technology, as it has brought proof of enhanced students' knowledge and skills from the use of special technologies. Today, smartphones make up a dynamic volume of this technology as the popularity of smartphones has changed the way we live, learn and communicate (EKİNCİ et al., 2017). Numerous active projects have used various qualitative and quantitative research on student needs and interests. The issue of the teachers' relationship with students and how to teach the student to progress the most out of the classroom, has been addressed (Skřepská, 2018; Torres, 2021; Yuliyanto & Fitriyati, 2019; Elaish et al., 2019; Ma,

2019; Heil et al., 2016; Fodor & Covaci, 2016; Ganapathy et al., 2016; Har et al., 2019; Ismayatim et al., 2019). Various applications for vocabulary learning, reading, grammar, etc. have been developed, some of which apply to Android and iOS versions of the smartphone. Some of the applications include FluentU, Duolingo, Johnny Grammar Word Challenge, LearnEnglish Grammar and English Grammar Learn & Test (Fodor & Covaci, 2016).

Problem Statement

The use of ESL learning is on the rise and each smartphone application has its own goals and methodology (Fodor & Covaci, 2016). The analysis of using these apps has shown that students are more interested in virtual learning, and the results of using these apps have been very effective in improving their language skills. New ways for improving and developing new, more successful educational programs for ESL students may be generated by analyzing the various features and methods of education in these applications. Smartphone language learning applications can change the way teachers are delivering methods of language learning (Fodor & Covaci, 2016).

Free apps currently used to teach languages consist of a diverse suite of web-based tools or smartphone apps, tablets, and more. These apps offer new and effective ideas for changing teachers' teaching approaches while encouraging students to use these apps (Manap et al., 2019).

The ease of use, low cost compared to traditional PC apps, and convenience are the reason for the popularity of the apps. However, recent research has shown the challenge to find effective and appropriate approaches of apps in ESL training for teachers or professionals (Tour, 2019). It is also based on a set of teaching strategies, basic skills, and academic approaches to respond to a wide range of different student needs (Tour, 2019).

The first challenge is finding a specific smartphone app to learn ESL grammar or vocabulary. Also, some of the challenges in this area include the lack of ease of development of smartphone applications, lack of face-to-face contact, lack of internet access, lack of research on ESL teaching methodologies, lack of sufficient socio-cultural knowledge of ESL students, and lack of student motivation (Abd Karim et al., 2017).

One of the gaps in this area is the lack of sufficient in-depth studies of the methodology of different strategies and applications in ESL training (Ma & Yodkamlue, 2019). Conducting such research can help develop more effective applications, update existing applications using effective and efficient methodologies, and provide new educational methods with more motivational opportunities for students.

Research questions

This research is a thorough review of various ESL vocabulary and grammar applications and strategies. The purpose of this paper is to investigate applications intended for improving ESL students' vocabulary and grammar skills. An attempt is made to compare and analyze the full impact and effectiveness of these strategies and programs in ESL learning education.

This study seeks to broaden this debate by analyzing and evaluating recent studies in various reviews of several popular ESL smartphone applications. To explore deeper into this issue, several questions arise:

1. What strategies do the teachers apply to instruct through a smartphone app?

2. What vocabulary and grammar apps are effective and appropriate for teachers to use for students?

    a. What are the strengths and weaknesses of smartphone apps for ESL language learning?

b.   What are the ESL methodologies requirement in developing these apps?

c.   How can these applications be more effective?

3.   Why would students want to use these apps?

a.   What are the users' personal experiences or perceptions of the software's specific features?

b.   What do users expect in the app and what features make the app popular and different?

This study first presents an evaluation criterion for smartphone-based ESL applications. The features of these applications and the overall functionality in different categories, such as content and design, will be evaluated and analyzed. Finally, the research findings will be categorized and explained in detail.

Significance

The main importance of this research is to provide numerous grammar and vocabulary apps and examine and analyze the various methodologies of teaching English to non-English-speaking students as well as evaluating effective applications of ESL teaching for these students. This research could provide a basis for developing new applications for companies active in the field. Teachers can also apply new techniques in the classroom and online classrooms, using more effective methods and methodologies and using the new app or technologies reviewed in this paper. Students are also introduced to different applications and their different possibilities, and the results of the analyses can be effective in motivating English as a Foreign Language (EFL) students.

Definition of Terms

This section provides several specialized terms related to learning in the subject area of this research.

Smartphone refers to a portable electronic device that connects to a cellular network. Smartphones are commonly utilized by students. Take a photo, record audio, send and receive texts, images and audio recordings, read texts, communicate with others via social media, and learn a new language are all examples of how learners use smartphones. Many professors allow students to use smartphones in the classroom because of these important characteristics (Alaraj & Abughalioun, 2018). This term is defined here, because it was the most used word in this literature.

English as a Foreign Language (EFL) is the term used to describe the study of English by non-native speakers in countries where English is not the dominant language. (Nordquist, 2020).

English as a Second Language (ESL) —also called English as an Additional Language—which is the practice of learning English in a predominantly English-speaking country (Nordquist, 2020).

Mobile-Assisted Language Learning (MALL) refers to an environment or a tool that helps learn the language better (Bensalem, 2018).

Gamified-learning refers to an educational approach that uses video game design and game elements to create an effective and engaging learning environment for students (Hashim et al., 2019).

TPACK refers to a technology integration framework that tries to combine the three types of technology knowledge, content, and education (James & Lee, 2020).

Pedagogy refers to the method and practice of teaching, especially as an academic subject or theoretical concept (Liang, 2018)

Summary

The purpose of this chapter is primarily to address the key issues in using smartphone apps for ESL training, and to provide solutions for effective and efficient methodologies in delivering these technologies. This chapter presents the main questions and hypotheses of the problem and discusses the main challenges associated with this research. Besides, problem gaps and the importance of examining the gaps and key issues are identified.

In this chapter, topics related to the use of new concepts in English as a second language education and definitions of related terms were examined and related challenges were addressed. This study focuses on analyzing and evaluating smartphone applications and different strategies for students to learn English as a second language. In the next chapter, a brief overview of relevant literature will be discussed.

Chapter 2: Literature Review

Introduction

The purpose of this study is to examine case studies of ESL training applications and to discover their advantages and disadvantages, their methods and methodologies, and to evaluate the effectiveness and efficiency of the training. Classroom strategies that encourage students to actively participate in the learning process have been proven effective for decades. Students felt as if they learned more through traditional lectures, they actually learned more when taking part in classrooms that employed so-called active-learning strategies (Reuell, 2019). The learning environment has become increasingly dynamic, and as a result, today's learners tend to be significantly different from those for whom our educational system was originally built.

Classrooms are being remodeled and redefined in a variety of ways as technology advances to meet the evolving needs of modern digital learners (Sutherland, 2020). Therefore, questions will be answered in this chapter, such as the reason students tend to be more interested in the smartphone apps compared to traditional in-class activities and the reason for the apps to become so popular or effective. Concerning these questions, the purpose of this chapter is to provide a summary of the literature review related to the subject and to examine the different types of information, study populations, and the method for testing and measuring parameters. The following is a brief overview of the main topic. Then, information sources and search processes are described, and the scope of related research is identified and justified. At the end of this chapter, a summary of several review articles of various English language education applications with information relevant to the purpose of this chapter is reviewed.

Methodology for Literature Review

This literature review examines and evaluates the search strategy and databases used to find the articles. Google scholarly articles, JSTOR, and other sources within the Libsearch database of St. Cloud State University were used to find appropriate research studies. Terms used to find the related articles included "ESL Smartphone apps", "Language Smartphone apps", "Grammar learning apps", "Vocabulary learning apps", "Smartphone-assisted teaching strategy". The database search was restricted to the subject and year range of the articles in order to obtain current and accurate information.

Overview of grammar and vocabulary ESL learning Apps

New technologies have gradually become dynamic in the educational field. Classrooms have begun using technologies in the 1960s, and since the year 2000, technology in classroom has included the implementation of smartphone devices to support the teaching and learning processes (Naish, 2005; O'Connell & Smith, 2007). Currently, the issue of facilitating technology-assisted learning through smartphones or computers has been one of the main goals to support teaching and learning processes (Noriega, 2016).

Engaging students to learn vocabulary and grammar at any time and place is turning into a mainstream approach to learn with smartphones. This new way of learning is growing because smartphones have the advantage of being easy to carry and adaptable to the needs of students (Klímová & Kacetl, 2019).

Smartphone-Assisted Language Learning

Smartphone-Assisted Language Learning (MALL) is a useful method which utilizes apps as tools to assist in language acquisition. Teachers are increasingly using MALL for personal learning and classroom teaching, demonstrating a significant relationship between teachers'

understanding of smartphone apps in learning and the apps use in their teaching (Bensalem, 2018). In some of these studies, the positive effects on vocabulary learning have been shown, while in one study, the effect of desktop applications was better than smartphone (Ma & Yodkamlue, 2019).

One of the key elements of language learning is learning more vocabulary because it is not possible to express opinions and conversations without having a good vocabulary. In Ma & Yodkamlue (2019), it was stated that "without knowing the vocabulary of a language, it is not possible to learn that language," (p. 167) which illustrates the importance of vocabulary in social interactions and communication (Ma & Yodkamlue, 2019).

Grammar is also an essential step in language learning. According to Hassan et al., (2019) the time allocated in the 2013 Malaysian curriculum to learning English is rather short; estimated at two hours a week. This problem exists for many ESL students with difficulties in grammar, often repeat writing errors that they do not even notice (Hassan et al., 2019). The research in *ESL Leaners' Language Errors in a Reflective Writing Assessment* reveals most errors are related to inadequate training. This highlights the importance of syllabi and methodologies for teachers and, on the other hand, shows the importance of students' writing and grammar apps for correcting repetitive errors (Hassan et al., 2019).

Interest and Motivation

The issue of students' disinterest and motivation has been cited (Yuliyanto & Fitriyati, 2019) as a major challenge and teachers explain these challenges with varying levels of effectiveness. Understanding the concepts of English grammar requires more creativity and innovation that can interest students and, in turn, engage them in the learning process (Yuliyanto & Fitriyati, 2019). Four principles could serve as a basis for effective grammar education;

collocation, compositional, context, and contrastive (Yuliyanto & Fitriyati, 2019). These principles allow students to comprehend the teaching materials in grammar. In teaching grammar, these aspects should be seen for teaching and learning grammar not only about grammatical structure merely, they are also used to give meaningful expression both in context and meaning (Yuliyanto & Fitriyati, 2019).

Some of the best platforms that have been consistently raved around in the language learning world that increases student's interests and motivation are Quizlet and Duolingo. The impact of using Quizlet app to teach ESL grammar is an example how teachers' use of more creative and active techniques and increase student's interest and motivation (Yuliyanto & Fitriyati, 2019). Quizlet app is a desktop and smartphone application and has created a fun environment for users to build flashcard collections using a variety of gamified-learning tools or re-use those flashcard decks that other users created within the platform. A questionnaire was used to collect data for the use of Quizlet app and the participants were 4th and 6th-semester students of Tidar University. From the data, it was documented that Quizlet app can stimulate interests in students, and teachers can use it in the learning process by enhancing the learning space of the classroom (Yuliyanto & Fitriyati, 2019). On the other hand, Torres (2021) mentioned that Duolingo is one of the most popular smartphone apps which makes use of a gamified approach towards learning a new language. All the lessons in Duolingo are developed by professional teams, which means that students will have the confidence in the credibility of the app. Aside from helping to master words, it also aims to holistically develop student's skills by adding features to practice reading, writing, and speaking (Torres, 2021).

Yuliyanto & Fitriyati (2019) observed students' enthusiasm for technology, and that the Duolingo app's environment has had an important role in increasing their interest in using the

tool, since most students have characterized grammar learning as being simple using the

application. Improvement in the learning process should be achieved because the teacher is not

restricted to only using monotonous tools such as textbooks and whiteboards when instructing.

This app can change the process of creating variety and creativity in teaching. According to

Yuliyanto & Fitriyati (2019), this transformation may be achieved in the application environment

through the creation of matching test games, flash cards, and other similar tools to describe

grammatical properties in an appealing manner. Using this app at home by students and sharing

it with other classmates and peers about grammar explanations is another positive feature of this

application. In general, the use of this app has increased the percentage of students participating

in grammar learning and has stimulated interest among them. It also enhances grammar skills in

students, and teachers can use more varied, broader, and more modern ways in their classrooms

(Yuliyanto & Fitriyati, 2019).

Elaish et al., (2019) conducted a similar study, but this time with a gamified-learning

strategy, to investigate the issue of Arab students' lack of motivation to learn English as a second

language. Elaish et al., (2019) evaluated and suggested the impact of smartphone digital games

as the best way to generate student's interest. An application called VocabGame had been

launched. In this program, focusing on the vocabulary aspect, students match their vocabulary

knowledge through the first tests to find a list of familiar words. Students must guess and spell

the words in a game. In this article, 64 students were separated equally into two groups; the

control group or high-performance group, and the experimental group or low-performance

group. Experimental group students showed high-interest rates after learning through smartphone

games. The results also revealed that students with poor performance in language learning and

vocabulary had better performance after using the app (Elaish et al., 2019; Yuliyanto & Fitriyati, 2019).

Technology Skills & App Development

The technical abilities of ESL teachers in utilizing smartphone applications to improve students' language skills have also been examined in certain qualitative research. For example, in one study, in-depth interviews were conducted with ESL teachers from various schools and their results illustrate a positive understanding of the use of these technologies (Al-Jarrah et al., 2019).

Ma & Yodkamlue (2019) examines the effects of a developed smartphone app on EFL for Chinese students' vocabulary learning and students' perceptions of the program. The author selected 129 first-year non-English-speaking students from the Anshan University of China in the first semester of the 2018 school year within 12 weeks. Both groups share common characteristics such as age, gender, and duration of English learning. The effects of using a vocabulary learning app were studied in a quasi-experimental design using two questionnaires and interview methods. Students were divided into two groups of 83 control students and 56 experimental students. In this research, data collection has been done by mixed methods. In general, three main questions are raised in this study. The first question looks at the impact of using the program on the development of vocabulary learning. The second and third questions, respectively, examine the impact of using this program on the long-term memory of EFL students and how learners perceive using this app in learning vocabulary. Based on the results of questionnaires and interviews with students, it was concluded that the application was both easy to use and helpful in acquiring vocabulary (Ma & Yodkamlue, 2019).

In a comprehensive review study, Heil et al., (2016) examines fifty different business language learning smartphone applications for students. This research has raised three questions:

One, what is the main focus of education is in these more popular programs and, two, whether these programs are compatible with the level of language proficiency, students' individual needs, and learning style. Three, it asked how to use corrective feedback in these apps. Using a qualitative and interpretative exploration strategy, 50 applications were evaluated that was mentioned earlier in this paper. The selection and coding of these apps was based on a set of different criteria and principles like rankings on Google Play or using the app Annie. From the analysis, three major trends were found. First, the majority of apps tended to teach vocabulary units in isolated chunks rather than in relevant contexts. Second, many apps tended not to adapt to suit the skill sets of individual learners. Third, current apps tended to offer minimal explanatory corrective feedback to learners. These findings provide areas of focus for next-generation language learning apps (Heil et al., 2016).

In other research on the popular *Grammar Learn & Test* app, suggestions for developing an e-learning tool for ESL students are presented. This app is designed specifically for improvement of English grammar and vocabulary. Versions of this app are available for free on both Google Play and the Apple Store and received a rating of 4.4 out of 5. A marketing study from Fodor & Covaci, (2016) demonstrated that most users review the app ratings before deciding which app to install and use. Therefore, developing a high-end marketing strategy as well as having a dedicated professional website can be effective in creating interest for students to install an app and use it. While most users prefer free applications, some are willing to pay average price for an app. Making student lives easy and constantly adding new content are two crucial qualities highlighted in creating excellent ESL language applications. So, developers should include weekly or monthly updates. The effort to learn and adapt to the demands of users

is also an essential aspect to consider while developing and upgrading an application (Fodor &

Covaci, 2016).

Building Grammatical Skills

In a quantitative study, Ganapathy et al., (2016) considers examining the grammatical

ability and knowledge of Malaysian ESL students about the capabilities of the reviewed

program, MyGrammarTest (MyGraTe). This program was developed by a research team from

the Universiti Sains Malaysia (USM). This app includes smart learning tools that can map a

person's learning style preferences to grammar learning content. The prototype, MyGraTe, was

tested on a group of postgraduate students. A questionnaire including System Usability Scale

(SUS) compliant items was also used to attain information about the perceived usability of the

app. This study sought to answer questions about the participant's rating of the usability of the

app and whether the experience difference in using this app influenced the audience's perception.

In this study, students were considered users of the MyGraTe program and their feedback on the

usability of the program was explored. Before filling in the survey, a user-level survey was

conducted to test the participants' skill using a handset. This indicates that the ease of use of the

app is one of the key factors required by students, varies from person to person with the skills of

working with a smartphone. A total of 78 undergraduate students who completed ESL courses

were selected. Then grammar tests were performed by users, questionnaires were distributed and

the rate of return of the collected letters was 100%. Participants were again asked to rate the

program's strengths and weaknesses. The survey found that users valued the app's usability,

efficiency, and pleasure. Many people said this app was enjoyable and useful. Variables were

assessed using t-tests and ANOVA. The ANOVA test was done to see if smartphone ownership

affects perceived usefulness. A t-test was also used to compare the perceived usefulness to other

grammar assessments. No statistically significant differences in total SUS ratings were detected between each group of smartphone owner respondents using t-test and ANOVA. Results suggest that users find the app more useful when they consider themselves more skilled smartphone users (Ganapathy et al., 2016).

Smartphone applications have been developed to focus on learning vocabulary using writing skills. In a new qualitative study by Har et al., (2019), the advantages and disadvantages of using smartphone apps for digital storytelling in vocabulary learning among ESL students were examined. In this study, interviews, documentation, and observation techniques were used. Participants were also six ESL 11-year-olds from a public primary school in Perak, Malaysia, with different English proficiency levels, and this level was assessed through targeted sampling (high-medium-low) and sample students were selected. The results of data collection were analyzed manually using the Nvivo software before data separation and validation after 8 weeks of users' use of the app. Results from this study showed eight benefits and five drawbacks for ESL learners. The eight benefits of learning the vocabulary utilizing the digital storytelling application as stated by the learners: (i) the multimedia elements, (ii) motivational, (iii) positive learning experience, (iv) the use of tablet as the learning tool, (v) new learning method, (vi) promote independent learning, (vii) replacing the traditional learning materials and tools, and (viii) language learning impacts. Har et al., (2019) also stated the five drawbacks of using this digital storytelling on tablet were: (i) Boredom due to the excessive learning of the application on tablet. (ii) The addiction to the use of Smartphone device and application. (iii) Addictions led to bad health. (iv) The limitation on the number of vocabularies and stories to be read. (v) The short lifespan of the devices' battery (Har et al., 2019).

Ismayatim et al., (2019) provides a paradigm of listening behaviors utilized in the app MyEVO. This study attempts to propose innovative technological ways to improve ESL students' listening skills. This quantitative study used a Google Survey link to obtain feedback from 177 postgraduate students on their experience with MyEVO. In this research, before presenting the questionnaires, participants are first taught how to use the MyEVO module. In addition to the survey, online questionnaires were also used to collect information on students' perceptions of the content of listening practices application, their perceptions of using MyEVO as a self-directed module in learning listening skills, their preference for using video media for listening practices, reasons for influencing their preference, and finally, students' preference for implementing listening practices and smartphone applications and the reasons for their preference. In general, the use of video and audio files can interest users and suggest more effective ways to train users (Ismayatim et al., 2019).

In thesis research by Skřepská (2018), the impact of numerous apps including Easy Ling, BBC app, and Mooveez on language learning was evaluated and compared for ESL students in listening, writing, reading, speaking, grammar and vocabulary skills. According to Skřepská (2018), the Mooveez app seems to be the most comprehensive of these apps with several features and useful functions. These features are helpful in the process of learning English with Smartphone applications. This app works with video display of cartoon characters. It offers features including movie information such as vocabulary count, phrase count, and more. In this application, the grammar is selected after each lesson in a movie. Then in the movie, there are a couple of comprehension exercises to practice. Using case tests, the user grammar is tested and a variety of tests such as fill-in-the-blank tests or multiple-choice tests to test different user skills in the software environment are suggested. Downloading this content into these browsers

requires an Internet connection for the first time, but then works offline for the user (Skřepská, 2018).

Liulishuo is an app for Chinese learners to improve English language skills. A study by Green & O'Sullivan (2019) was conducted on 746 Liulishuo smartphone users. Users reported a very positive learning experience over the course of two months, with almost 90% enjoying the app and wanting to use the app permanently. Besides, more than 80% of users believed that this language learning method was more effective than other English teaching methods. ANOVA, Levene's, and covariance tests were used in this study to explore the relationship between learning rate and users' judgements of their own improvement in language learning skills. None of these tests yielded significant results, suggesting that users were not generally able to gauge the improvement they had made in using English. Also, an index of English learning was created to account for the difference in the amount of time that different users have studied the language (Green & O'Sullivan, 2019).

Summary

This chapter includes a review of a series of trends on applications developed for learning vocabulary and grammar and other English language skills. Significant numbers of the questions raised in these articles were similar, though the answers were similar in some cases, yet different in others. Apps such as Quizlet, Duolingo, and Mooveez have been able to address the challenge of motivating and encouraging students. VocabGame software can also be an example of creating fun while learning a language for students. With video presentation software and modern grammar tutorials, teachers can use newer apps to make students more active in the classroom and more interested in learning (Skřepská, 2018).

This chapter offers suggestions to software developers on providing more effective software for student learning. The students' expectations from a good app and how they understood their personal experience with the apps were reviewed. The strengths and weaknesses points of some of these apps were studied. The application's methods and methodologies will be discussed in the next chapter. However, some questions remain unanswered, such as which methodologies are most effective for educating students, and despite some effective and popular apps outlined, the question remains as to which of these apps are better for teachers and why. In the next chapter, the methodology that will portray certain techniques and methods in the context of the study.

Chapter 3: Methodology

Introduction

The purpose of this study was to investigate the systematic application of English-based grammar and vocabulary learning applications for non-English speakers. The effort is to fully explain the key questions of researching the most popular and effective applications. Most of the research questions were answered in the previous chapter, however, this chapter focuses on answering the research question of which methodologies and methods of vocabulary and grammar learning are most useful and effective for ESL students.

The purpose of this chapter is to summarize the methodology for the study, including how the research articles were selected, and how all the data was organized. After completing next chapters, this chapter will then examine the different methodologies of popular applications and the effective learning methods used by them to help answer the research questions in the next chapter. Following is a review of the different methodologies and a summary of what has been said and the results obtained and the questions answered. Finally, the context for the next chapter will be provided to the readers.

Institutional Review Board Exemption

As a St. Cloud State University protocol, Institutional Review Board (IRB) approval is required for research projects if the study involves the collection of data or information from human subjects. The IRB is responsible for the review and approval of research conducted by students, faculty, and staff is to assure the protection of human subjects, the investigator, and the university. However, this secondary research study does not involve collecting any primary data from human subjects. The information sources in this paper only makes use of data that have

already been collected from secondary data analysis and did not collect data from any human

participants. Therefore, this secondary research paper does not require IRB approval.

Methodology

In this study, scholarly journals and articles were used for research and were downloaded

from the Google Scholar web site and from the websites of relevant journals. Some books about

the study which have been evaluated came from Google Books. Information gathered from the

Google Play app store and the original website of the applications like Quizlet etc. Multiple

resources are located in the Appendix A.

A range of eight years from 2015-2021 of research was estimated for this study, as most

of the studies in this paper were published from 2015-2021. Few articles were collected from

older studies. The articles chosen for review in Chapter Two – Literature Review were included

in this study because they were useful to analyze and evaluate the ESL learning apps for

grammar and vocabulary.

No age range of participants was upon focused in this study. Any students learning ESL

will were included. The main importance of this research was to review numerous grammar and

vocabulary apps and examine and analyze the various methodologies of teaching English to non-

English-speaking students as well as evaluating effective applications of ESL teaching for these

students.

This secondary research paper examined previously published articles on smartphone

apps for ESL learners. Since every study uses different terminology and methods, instead of

using all quantitative measures, this study was analyzed using qualitative factors that identify the

use of smartphone applications to learn ESL grammar and vocabulary. This study presented

various applications for ESL training in the skills of grammar and vocabulary. In addition to their

various characteristics, the methodology used and other qualitative information was studied to evaluate their effectiveness and impact on student learning.

Studies for this research paper were prepared using a MacBook. After reading the articles, the main foci were identified and gathered into a Microsoft Word document. This process was very effective to see the complete picture of the research and evaluate the collection of data. The information was classified using a table in the Microsoft Word document that includes the name of the author, year it was published, title of article, summary of findings, number of participants if applicable, and any other factors that might be considered as relevant to interpret the data.

Timeline

The planned completion date for this research paper is May 2022. In May 2021, Chapters One, Two and Three were completed, and in August 2021, the author received the feedback for the revision of Chapters One, Two, and Three. The culminating project committee was approved at the end of June 2021. The committee is made up of three graduate faculty members, including Dr. Jennifer C. Hill, who acted as the Committee Chair, Mr. Dave Blanchard, and Dr. Plamen Miltenoff. July through August 2021 consisted of research for the first three chapters, with all studies selected for analysis by August 20th, 2021. August 21st - October 30th 2021 consisted of data analysis and paper writing. Copies of the paper was sent to members of the committee in November 2021, and the committee held the proposal meeting in December 2021. Once the proposal edits were completed and approved, the rest of the chapters were written. In March 2022, the defense writing of last 3 chapters: Findings, Recommendations and Conclusions were completed and was submitted to the committee members, and the committee help the final defense meeting in March 25th, 2022.

Summary

This chapter describes the collection of the data, year range of the articles that were collected, age range of participants on this study, the analysis of the study, the instruments used to organize the study, and lastly, the timeline of the research paper. This secondary research paper examines previously published articles found in the Google Scholar website and from other relevant journals and websites, with an estimated range of eight years (2015-2021) of research about smartphone application for ESL learning. No age range of participants focused upon in this study. The study was analyzed using qualitative data. All data was collected and organized using a table within a Microsoft Word document.

In the next chapter, the research findings will be reviewed and the background will be provided for answering all research questions. It will also attempt to draw new conclusions from this research and compare different applications then some suggestions for future research can be made.

Chapter 4: Findings

Introduction

In the previous chapter, different methodologies of various apps have been explored. The purpose of this study is to examine the different applications, their methodologies, and analyze the impact of these methods on learning ESL students in grammar and vocabulary learning. Most research questions have been answered in previous chapters. Chapter 3, outlined comparing methodologies is a good guide to identifying some of the most popular and common apps. Following is a discussion of what has been gained from reviewing articles and apps in this chapter. It also attempts to fully answer the main research questions and sub-questions while analyzing the previous material.

Findings

Overall, smartphone apps provide a great opportunity to utilize technology to learn ESL. The advent of technology and its use has made developers of electronic device applications more likely to think about building applications in the field of education. Today, smartphones are the most usable device that students carry and use (Yuliyanto & Fitriyati, 2019). In response, the developed apps are trying to provide a fun learning environment for ESL students while presenting newer ways of teaching.

Table 1

ESL Learning Grammar and Vocabulary Applications

Application	Features	Total Reviews	Total Install	Interactive Elements	Rating (Google Play)	Fee
Duolingo	Vocabulary, Grammar, speaking and listening learning, word matching – translation – multiple-choice question – use images, quizzes, etc.	8,809	100,000,000+	Users Interact	4.7	Free
BBC Learning English	Video and image, vocabulary Learning, grammar Learning, quizzes.	7,262	1,000,000+	Users Interact	4.5	Free
LearnEnglish Grammar (British Council)	Tests and quizzes, Multiple-choice questions, quizzes, tests and practices, interactive activities, using images, etc.	8,766	1,000,000+	User Interact	4.3	In-App Purchases
English Grammar Tests	Multiple-choice questions	35	5,000+	User Only	4.7	Free
English Vocabulary Test	Tests on Vocabulary and Grammar, Synonyms, Antonyms, Idioms, and Phrases, having feedback, etc.	334	50,000+	User Only	4.5	Free
Learn English Phrasal Verbs and Phrases	Full English definition, using example sentences, sound pronunciation, synonyms, etc.	4,456	100,000+	User Interact	4.9	$0.99 - $3.99 per item

Note. Features and information about ESL Learning applications

Table 2

Duolingo Learning Grammar and Vocabulary Application Overview

Curriculum	Pedagogy	App Design	Well-designed features
- Objective - Good Learning content - Accuracy - Uses text, animation, audio, and images in the lessons and quizzes	- Picture of everyday life - Tests and quizzes - word-sentence dictation - Gameplay and fun - Health bar, rewards - Leaderboard - Feedback for user - Good to use by teachers	- Online/offline - Multimedia	- Grammar mistakes - Not provided for all language non-English countries - Not sensitive to mispronunciation

Note. Features and information of the Duolingo Learning Grammar and Vocabulary Application

As mentioned in previous chapters, new and effective strategies and methods have been developed by applications that have created advantages for language skills training. Especially in ESL grammar and vocabulary training, apps like Duolingo and GRammarEnglish Learning have been able to attract and interest more users among competing applications. According to Table 1, the most downloaded of all popular apps was Duolingo software, equivalent to just over 100,000,000 downloads (Liang, 2018). This may be because the app has been developed to teach more languages through which users can learn other languages such as French, German, and Arabic.

BBC Learning English software has also attracted a large audience by providing an extensive database of language learning videos and files (Liang, 2018). Teachers can use these apps to implement different strategies for more effective education. For example, a teacher may

use English videos and class conversations to teach a specific grammar rule, time rule, or conduct a multiple-choice exercise. Text writing can also be useful as homework or as a class answering solution.

Apps that have an interactive interface and provide a game-like environment for students, such as Quizlet or MyEvo, can provide teachers with interesting methods and strategies that make the traditional classroom learning strategies more attractive to students, such as using video, audio files, in-app interactive sections, four-choice grammar training methods or sentence sorting, spelling correction, or varied word learning games. Choosing a word from a set of synonyms, etc. can help teach classrooms for better efficiency and more effective education (Yuliyanto & Fitriyati, 2019).

To answer the second main research question, which is "What vocabulary and grammar apps are effective and appropriate for teachers to use for students?" Table 1 provides an overview of the various features and methodologies of popular apps. Duolingo and Learn English Phrasal Verbs and Phrases have higher ratings (4.7 and 4.9), given the total number of reviews. Duolingo and BBC Learning English are also free to use, some of which have in-app payments, which could potentially influence the user's decision to use the app. In this study, useful applications have been reviewed that may help the teacher instruct more effectively. However, it should be borne in mind that the choice of the teacher can vary between different apps and methods and strategies. In general, apps that have been effective in teaching ESL can provide teachers with good solutions and methods. In some applications, feedback is provided to the user after the learning activity (Table 1). Delivering this information will help students realize their mistakes. This can be helpful as some students are not interested in completing assignments or correcting errors. Activity planning, using machine learning algorithms by the

program, allows users to spend more time on challenging exercises that will make the game increasingly attractive and learning more effective (Ganapathy et al., 2016; Yuliyanto & Fitriyati, 2019; Ma & Yodkamlue, 2019). Apps like these have significant educational value for students, and they may benefit from modern teaching and learning methods no matter where they are and at a low cost. Students will be able to experience more effective learning as most of these methods rely on enhancing their long-term memory. Using these apps also delivers an engaging user experience and motivates students to learn language skills (Skřepská, 2018; Elaish et al., 2019).

As indicated in Table 1, an app offers several benefits and drawbacks, which are detailed in Appendix B. Skřepská, (2018) and Sung et al., (2016) estimated that being a free app, using animated images and interactive interface, using fun methods and strategies and gameplay, using new techniques, using feedback systems, using tests and taking quizzes all help the user decide to work with the software and learn more effectively.

Findings of past researchers (Yuliyanto & Fitriyati, 2019; Sung et al., 2016), showed how interviewing and questioning students and users can clarify the choice of useful and effective methodologies for app developers. The requirements of these methods are made understandable from the users' point of view.

Research from Ganapathy et al., (2016) indicates that users seem to have higher expectations for these apps. They care about the aesthetics and graphic design of the app. One of the important factors that most students refer to in the questionnaire is the ease of use of the software and its user interface. They also care about features such as content, adaptive technology, and additional explanatory feeds, which they consider to be essential for an application to be effective (Ganapathy et al., 2016).

Whatever a student or teacher expects from an app is equivalent to what makes the app popular and distinct. A closer look at the Duolingo app in Table 2 shows that most of the expected features such as explanatory feedback, fun exercises, word matching, good teaching content, and bonus methods, are popular in this app. This is evidenced by a 4.7 rating on Google PlayStation with of over 100,000,000 downloads. Additionally, the use of digital storytelling in vocabulary learning is useful and motivating. There is evidence that it can be as effective and useful as out-of-class teaching tool (Har et al., 2019). However, all of these apps have their pros and cons, suggesting that developers should pay more attention to user reviews and look for new methods and methodologies as well as more attractive user interface designs. In another study, students identified internet access and downloading videos and media as one of the challenges of using the app. However, the results of the questionnaires indicated that the use of media and video files made them very interesting to learn (Ismayatim, 2019).

Summary

In this chapter, the main research questions during the discussion were fully answered while analyzing the previous material in Table 1, that explains the new and effective strategies and methods developed by applications that have created advantages and disadvantages for language skills training shown in Appendix B. Table 2 shows the features and information of the Duolingo Learning Grammar and Vocabulary Application, such as explanatory feedback, fun exercises, word matching, good teaching content, and bonus methods. Table 1 and Table 2 are included at the beginning of this chapter, before the summary that discusses the findings. In the next chapter, necessary background is provided to support conclusions and suggestions for future research and findings are discussed.

Chapter 5: Recommendations

Introduction

In the previous chapter, the research findings were discussed. The main and secondary questions raised in this study were answered in the form of discussions. This chapter discusses research findings in several important areas. Finally, a summary of all the reviewed material is provided, as well as recommendations and suggestions for future strategies and research.

Discussion of Findings

The main research questions including sub-questions this secondary research paper sought to answer were:

- What strategies do the teachers apply to instruct through a smartphone app?

- What vocabulary and grammar apps are effective and appropriate for teachers to use for students?

  - What are the strengths and weaknesses of smartphone apps for ESL language learning?

  - What are the ESL methodologies requirement in developing these apps?

  - How can these applications be more effective?

- Why would students want to use these apps?

  - What are the users' personal experiences or perceptions of the software's specific features?

  - What do users expect in the app and what features make the app popular and different?

In line with the research findings, the paper portrays two tables to answer main research questions. Table 1 provides an overview of the various features and methodologies of most

popular language learning apps, and explains the new and effective strategies developed by those

apps along with its advantages and disadvantages. Table 2 defines the features and information

of the Duolingo Learning Grammar and Vocabulary Application and suggests that developers

should pay more attention to user reviews and look for new methodologies as well as more

appealing user interface designs.

Distinctive features such as explanatory feedback, dedicated interfaces, the use of

animation, real-time access to information, and text sensitivity are features of smartphones.

These features reinforce the impact of some specific training. However, these features need to be

enhanced or modified to enhance learning effectiveness (Gangaiamaran & Pasupathi, 2017; Kim

& Kwon, 2012). Tutorials and strategies for effective learning with key technologies are

integrating smartphone devices with educational strategies. Developers created these apps with

unique smartphone features that are constantly being upgraded and addressing specific

educational challenges (Gangaiamaran & Pasupathi, 2017).

The goal is to maximize specific impacts on language learning. Some of the most useful

strategies are to provide explanatory feedback, create interactive user interfaces, use games, and

incorporate vocabulary training into learning methods. Commonly used visual texts or audio files

to get improved results.

Tour (2019) suggested that using artificial intelligence technologies can also improve the

software interface and reduce the number of grammatical errors. Mechanisms for monitoring

grammar and vocabulary learning through speech recognition to provide feedback and text

recognition can be designed to enhance interaction between the learner, the computer, and the

effect of self-directed learning (Tour, 2019). A recent study from Tour (2019) established less

regard for higher-level skills assessment methods. However, the focus of research is more on

content knowledge. Reinforcing professional teacher development programs through

smartphones also requires teacher preparation and training. As much as students should be

encouraged to use these apps, teachers should be encouraged to modify their curricula and

gradually change them. More content-language, adaptive technology, and explanatory feedback

may all aid in the development of language learning applications and the effect of such apps.

Ease of use is also a factor that should be taken into consideration. To discuss this further,

looking at some of the challenges overlooked in recent research can be helpful.

Uses of smartphones demonstrate varying levels of skills and abilities when utilizing their

smartphones for learning, especially when using web applications. So, given the inability to

separate students' lives from the Internet and smartphones, teaching them to work with apps is

crucial. This can be a step in motivating the student to learn more skills. Another issue from

student feedback can be the freedom and flexibility of user activities, which is also an important

factor in an app (Tour, 2019).

Recommendations for application

What has been reviewed in this study indicates that with a bit of creativity, developers

can add interesting features of ESL grammar and vocabulary to the software that are often

estimated from survey results, questionnaires, and interviews with different users and students.

The software deficiencies reviewed should be remedied. Given the strengths and disadvantages

(Appendix B) of different apps, while eliminating the disadvantages, the unique and effective

features of other apps need to be exploited to develop a comprehensive, effective, and engaging

software. In general, many useful features are suggested below:

- Add interactive graphics and animated interfaces

- Add interactive user interfaces and user explanatory feedback

- Add app explanatory feedback

- Create fun and entertaining space for solving quizzes and tests using images and animations

- Fix grammar errors

- Enhance vocabulary contents

- Create more artificial intelligence to develop app capabilities

- Ease of use of software

- Creating interactive user segments with the server to send periodic reviews

- Updating and upgrading monthly and adding features and lesson content

- Strong and fun lesson content

- Use video, audio, animation, image, and text to sync with each other for better education

- Using teachers' opinions to develop methodologies and apply new strategies

- Use different strategies and learn all the language skills in one app

- Use all of the methods in the blank, image capture, sentence sorting, story building, story reading and more

Recommendations for further research

Numerous examples have been analyzed as a part of this research, highlighting some of the weaknesses in this area and suggesting ways to improve ESL learning. To make recommendations for future work, three user groups should be considered in connection to provide grammar and vocabulary training apps to ESL students: students, teachers and software developers.

First and foremost, students need the skills to work with smartphones and the Internet, which is the basis for using these apps. Teachers should also introduce these applications and advise students on the use of technology as they develop their skills. They can also implement

the methods and strategies of these apps in the classroom and not keep the learning process in a uniform state.

Teachers can use different parts of the software and even check out quizzes and side-by-side tutorials on the content of the software as a student assignment. Using the videos and audio files provided will also help teach new vocabulary and special grammar and will make the class attractive for the student. The critical point is that teachers can be creative and integrate their exercises and lesson content with similar apps to make the learning process more effective and motivational for their students (Al-Jarrah et al., 2019).

Third, and most importantly, software developers have different suggestions in this area. A review of these popular apps demonstrates that designing comprehensive and satisfying language learning apps is not difficult. As the first suggestion to ESL learning app developers, it can be said that using all the English language skills and training content is much more useful than building single-skill app (Fodor & Covaci, 2016).

Multilingual language learners are usually looking for software that can enhance all language skills and are also interconnected. For example, to improve speaking, a learner needs to improve their listening skills. Therefore, using different strategies in teaching all skills can help increase the impact of learning. Another suggestion is to create a teacher-level user panel that can provide student-level assessments to the teacher. It will be time-saving for teachers to review the assignments requested in the app. Creating a teacher user panel creates many ideas for enhancing learning quality.

According to the findings of previous research studies, creating explanatory feedback for text exercises and spoken recordings is an essential learning component (Liang, 2018). Due to its simplicity of use, appealing graphical and animated environments, and flexibility of the student

interface, adding freedom and flexibility to an app's user interface is effective at increasing its popularity (Yuliyanto & Fitriyati, 2019). Removing program errors, constantly updating, paying attention to users' reviews and applying their opinions leads to upgrading and adding new features which can be effective in making students interested in using the program (Klímová & Kacetl, 2019).

Another point to consider is app promotion. While it may seem unusual, the quantity of apps installed, the number of reviews, ratings, and initial explanations offered by the creator, all have an effect on students' interest in installing and utilizing the program. App development companies must provide a compelling and enticing description of their app (Lin & Lin, 2019). It is important for app developers to concentrate on acquiring hands-on skills that can be learnt and assessed at different ages in order to successfully manage their development. A systematic review of English language leveling methodologies and strategies are helpful considerations when developing new technology-based applications. Studies to determine the challenges teachers and students both face in using technology, especially for developing and poor countries, will further inform the development of applications for education and learning programs.

Conclusion

In this chapter, the research findings were discussed, such as, the distinctive features of smartphones that reinforce the impact of specific training but need to be enhanced or modified to improve learning effectiveness. The goal, however, is to optimize the unique effects on language acquisition through the use of tactics such as explanatory feedback, interactive user interfaces, games, visual texts, and audio files, among others. All major and sub-questions were answered during the research and suggestions were made based on the research findings. ESL grammar

and vocabulary learning applications have been able to capture the lives of many students who access the internet using their smartphones. With the advent of technology and the development of smartphone capabilities, more changes and upgrades from language learning apps are expected in the coming years (Yuliyanto & Fitriyati, 2019). Suggestions are presented in this paper for all three groups of stakeholders: teachers, students, and developers. Recommendations for future research topics are provided as a way to develop new strategies and methodologies to create interest in students and to make learning more effective.

Additionally, teachers should make these applications available to students and support them in their digital use as their abilities grow. Teachers can also use the strategies of these applications in the classroom to break up the monotony of the learning process. Most importantly, software developers have diverse opinions and talents on the subject. Hence, a systematic review of English language leveling methodologies and strategies are helpful considerations when developing new technology-based applications. Further research into development of applications for education and learning programs is recommended.

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Appendix A: Additional Resources

Additional Resources:

1.   FluentU, Rosetta Stone, MindSnacks, Memrise, Open Language, Mosalingua, Busuu,

Duolingo: https://www.fluentu.com/blog/english/best-apps-learning-english-esl-students/

2.   British Council, https://www.britishcouncil.org/english

3.   New York Times, Practice English Grammar, Learn English Grammar, Grammar Up,

https://www.nytimes.com/video/technology/personaltech/100000003476171/app-smart-improve-

your-english.html?src=vidm

4.   Edutopia, https://www.edutopia.org/blog/apps-support-diverse-learners-classroom-

chester-goad

Appendix B: Advantages and Disadvantages of The Applications ESL Grammar and

Vocabulary Learning

Figure 1

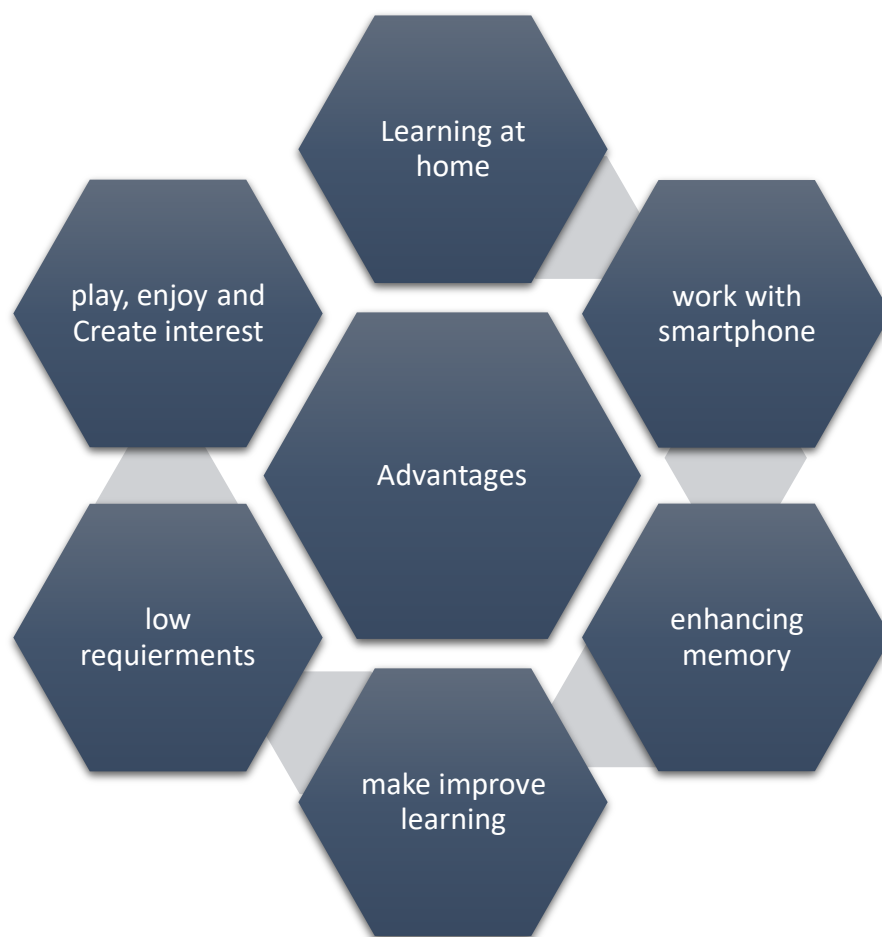*Advantages of The Applications ESL Grammar and Vocabulary Learning*

Figure 2

Disadvantages of The Applications ESL Grammar and Vocabulary Learning