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Facultad de Lenguas

**Assessing the Duolingo App as a Vocabulary Learning Tool for Elementary
School Students**

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Licenciatura en la Enseñanza del Inglés

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Puebla, México

March 2024

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School Students**

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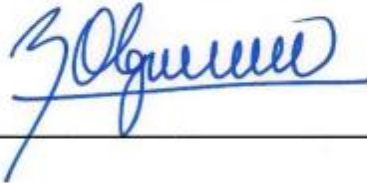
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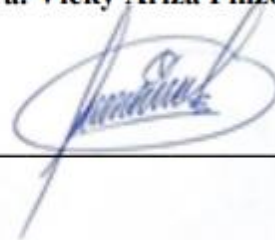
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DEDICATIONS

I dedicate this thesis to my granny, Carolina, who has been my source of strength throughout my life. Her kindness and support have been a constant source of encouragement. I am deeply grateful for all the love and sacrifices she made for me and my family. I also dedicate this thesis to my parents, Antonio and Maribel for their support throughout my education. Their belief in me and their sacrifices have been fundamental for me to achieve my goals. To my girlfriend, Nelly, whose love has inspired me and encouraged me to always do my best. I could not have done this without her. Last but not least, to the rest of my family, who have supported me in countless ways and have always been there for me. I am so grateful for all the love, laughter, and joy that we have shared. This thesis is a testament to the love and support of my family, and I dedicate it to them with all my gratitude.

Alberto Gasca González

This thesis is dedicated to my mother, Lupita, who has been my greatest admiration and motivation since I was a child. I thank her for all the sacrifices she made every day so that I could reach this moment in my life, for her unconditional love, for her education, care, and affection, for all the effort and hard work that she did for me, for her patience, for believing in me and for always supporting my dreams and decisions. I thank her from the bottom of my heart for all this and more. I also dedicate this thesis to my beautiful wife, Evelyn, who is the greatest love and joy in my life, for inspiring me to reach success, to follow my dreams, and to believe in me, this achievement is hers. Finally, I want to thank my family, teachers, friends, and all the people who helped me and guided me during this long road.

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ABSTRACT

This study, conducted at an elementary school in Puebla, aimed to assess Duolingo app as a tool for vocabulary learning with A1 level learners, to find out its efficacy as a learning app and students' overall attitudes towards it. To achieve this goal, three research questions were established, being these the following: 1) What are elementary school students' perceptions about using Duolingo as a vocabulary learning tool? 2) What advantages do elementary school students consider in using Duolingo as a vocabulary tool? 3) What drawbacks do elementary school students perceive from using Duolingo as a vocabulary tool?

A mixed method was employed to obtain both quantitative and qualitative results. This approach enabled the triangulation of the information to get a bigger picture. Three instruments were used for the data collection. A pre-test and a post-test to evaluate students' knowledge before and after using Duolingo. A survey to know students' opinions and perceptions regarding the app and a focus group to obtain qualitative data. The results indicate that using Duolingo had a positive impact on students' vocabulary development, and although there were a few characteristics they did not like, students demonstrated general acceptance and satisfaction with the app.

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Chapter I: Introduction

Technology has become indispensable in modern life. Its influence spreads to areas such as education, where it has facilitated and made tasks faster than in the past. For example, Raja and Nagasubramani (2018) provide examples of technological advancements, like the internet, which help educators facilitate students' comprehension of concepts to offer students the advantage of discovering diverse forms of assistance such as tutorials, and other supplementary materials to enhance and enrich their academic performance and learning process. Other examples are projectors and visuals to keep an engaging and interactive learning experience, as students prefer visually appealing materials that stimulate their minds rather than just reading text. However, the most used technology is the smartphone because of its portability, the applications developed for it, and the facilities that these last provide to their users. Kemp (2022) mentions that by the beginning of 2022, there were 5.34 billion mobile users worldwide, with smartphones making up about 4 out of every 5 active mobile devices. Mobile applications can be found for various purposes such as watching videos or movies on streaming, listening to music or podcasts, playing video games, or even monitoring our health.

Although most mobile applications are for entertainment, others are developed for educational purposes to learn mathematics, chemistry, programming, music, languages, etc. Among those applications, there are many focused on English language learning. One of these is Duolingo, an app that focuses on a specific aspect of the target language, where users can practice vocabulary, grammar, pronunciation, and listening skills, according to Duolingo's website (2022) it offers

personalized education because the app analyzes how millions of people learn at once to create a customized effective learning system. The teaching approach of Duolingo feels more like a game than a textbook, accordingly, this app is designed to look like a game with levels to pass, and every lesson is designed to acquire vocabulary through auditory and visual examples.

1.1 Problem

Language acquisition theories explain the way individuals learn specific behaviors and language such as behaviorism (Skinner, 1957), innateness (Chomsky, 1957), Cognitive development (Piaget & Mussen, 1983), and Sociocultural (Vygotsky, 1978). Every theory focuses on either language or learning, and they all try to explain that learning a language is a complex process that results from inner and outer factors. In addition, language acquisition departs from early stages pointing out childhood as the critical period for cognitive development maturation that leads to a gradual learning effect (Newport, 1991).

Learning vocabulary is a significant challenge for second language learners and inadequate knowledge of vocabulary may affect the process of second language learning (Asgari & Mustapha, 2011). Likewise, vocabulary is a fundamental component of language proficiency (Hunt & Beglar, 2002) that provides the basis for learners to speak, listen, read, and write. Without rich vocabulary and strategies for acquiring new vocabulary, learners often fail to reach their potential and can be discouraged from taking advantage of language learning opportunities such as the use of technology and the variety of apps for vocabulary learning.

This research aims to focus on sixth graders from elementary school who need to acquire English vocabulary. This is because English programs in public schools in Mexico require students to learn complex lexical knowledge at this stage of their language learning process to meet English program expectations to start Secondary school education. Moreover, language learning may take place in diverse ways and technology can play an important role since people are immersed in information and technology. Therefore, technology can offer great benefits for vocabulary learning thanks to its potential. Mahdi's study (2017), for example, found evidence of the effectiveness of mobile devices in improving vocabulary skills in a group of 986 participants, including both young and adult learners. Furthermore, Deris and Shukor (2019) say that several studies conducted on the implementation of mobile learning in language learning reported a positive acceptance by college students as they voluntarily downloaded educational material to their cellphones to later use information when asked to. Nonetheless, Kim (2002) claims there is hesitation and resistance on the part of teachers in a language institute at a state university in the U.S., when adapting technology, because of the lack of knowledge, lack of experience, and time constraints which create opposition in the integration process.

Young learners are immersed in technology, nevertheless, as shown by Price (2022), the technology they use is for leisure activities rather than learning purposes. Most downloaded apps focus on social networks such as Facebook and Twitter or games such as Garena Free Fire: Rampage and Candy Crush (Stolyar, 2019). Mobile language learning applications, with their convenient accessibility, portability, and engaging features, may provide a fun and entertaining way for students to learn

and practice vocabulary so that they can benefit from this technology and make the most of their time while learning a language.

According to Freeman (2023) Duolingo app has a playful atmosphere that offers an enjoyable experience because the lessons are interactive where the characters encourage learners during the exercises by celebrating their achievements and becoming their companions along the lessons. The scoring system, the learning streak, and the opportunity to compete against other users, keeps learners engaged. Duolingo makes language learning enjoyable for students and given the popularity of technology among young learners, language learning apps like Duolingo may offer an attractive and effective way for the sixth graders of this study to learn vocabulary.

1.2 Significance of the topic

The present research attempts to explore how a mobile application such as Duolingo can be used in English learning as a tool for language learning, focusing on vocabulary development. The results of this study could significantly contribute to the area of language teaching by providing new insights into the use of technology in the classroom. For example, teachers could start incorporating a mobile app like Duolingo into their classes, as a regular way of working on vocabulary so students can engage in a more innovative learning experience that promotes their motivation and interest. Learners seem excited about bringing technology into the classroom, which implies that it can be more attractive to them (Pereira, 2009, cited in Motteram & Sharma, p. 84).

Likewise, this study could provide a reference for those teachers at the Facultad de Lenguas interested in technology, to implement this or similar tools or applications in their classrooms to make their classes more meaningful and fun for their students. By incorporating Duolingo or other similar language learning apps into their classroom activities, teachers can create a more dynamic and enjoyable language learning experience for their students.

Finally, this study could offer ideas for doing more research related to technology in language education such as showing how to exploit all the technological resources available and apply them in the classroom. Exploring the full potential of available resources, such as mobile apps and other technology tools can provide valuable insights and support for language educators seeking to enhance their language teaching practices.

1.3 Objectives of the research

- ✓ To explore elementary school students' opinions about the Duolingo app in their vocabulary learning.
- ✓ To identify advantages and disadvantages of using Duolingo for vocabulary learning among elementary school students.
- ✓ To assess the effectiveness of Duolingo in improving elementary school students' vocabulary learning.

1.4 Research questions

To achieve the objectives stated above, this thesis attempts to answer the following questions:

- What are elementary school students' perceptions about using Duolingo as a vocabulary learning tool?
- What advantages do elementary school students consider in using Duolingo as a vocabulary tool?
- What drawbacks do elementary school students perceive from using Duolingo as a vocabulary tool?

1.5 Summary

This chapter introduced the importance that technology has acquired over time and how smartphones and their apps have become part of daily life, including language education. It discusses how technology, especially mobile applications, can enhance language learning, with a focus on vocabulary development. Duolingo is an example of a popular app that uses game-like features to make vocabulary learning fun and engaging. The chapter also acknowledges the challenges of implementing technology in the classroom and students' preference for entertainment apps. It suggests that incorporating language learning apps like Duolingo in classroom activities can promote student motivation and interest, and contribute to more innovative and enjoyable learning experiences. Also, the significance of the topic, and the contributions it may offer to the English language field was introduced to finally set up the objectives and the research questions. The next chapter will present the theoretical foundations for this study.

Chapter II: Literature Review

2.1 English Language Teaching

Communication and language as interdependent systems can be represented in written, sonorous, and even tactile symbols whose purpose is to link individual's ideas through these codes (Delahunty & Garvey, 2010). This mind's connection process has been achieved throughout the years following different language acquisition and learning processes, as Howatt and Smith (2014) mentioned, modern foreign languages were learned and taught in Western Europe for centuries before they appeared on school curricula in the mid-18th century.

Throughout the "Classical Period," the teaching of Latin and Greek served as a model for methods of instruction, and English played a relatively minor role. However, there was a growing clientele for English literature and works on subjects such as philosophy and theology, so reading knowledge was highly valued (Northrup, 2013) and demanded for those who were willing to learn and acquire a foreign language to access that exclusive English-coded knowledge.

Moreover, English was not widely studied in European schools in the first half of the 19th century, dominated by French as the lingua franca, replacing Latin. However, English appeared in courses for adults, which offered a more varied instructional approach and, in some aspects, more sensitive. (Howatt & Smith, 2014). From this period, various methods of teaching English were developed, among which stood out the "grammar-translation method", in which students learn the grammar rules of the target language and acquire vocabulary through translation.

Thus, English Language Teaching importance relies on users' need to communicate in real-world situations as proficient speakers and listeners (Alghamdi et al, 2019) who are expected to convey and interpret a message in a foreign/second language as part of an engaging discourse process (Delahunty & Garvey, 2010) which is the result of successful language practices where users were exposed to the language as learners following specific teaching methods.

2.2 Teaching Methods

The concept of method in teaching according to Richards (2001) is defined as the notion of a systematic set of teaching practices based on a particular theory of language and language learning. A teaching method is used by a teacher or educator to impart knowledge and skills to students. It involves techniques and tools to create a conducive learning environment that can enable students to learn and acquire knowledge and skills effectively. Different teaching methods may be suitable for different subjects, learners, and learning outcomes, and they can include lectures, discussions, demonstrations, case studies, role-playing, simulations, project-based learning, and others.

Modern methods have emerged to exploit learner's language abilities according to their personal communication needs (Richards & Rodgers, 2014; Wright, 2019) along "three phases of instructional approaches and methods: the traditional methods phase, the modern approach phase, and the post-method phase" (Alghamdi et al, 2019, p. 272). The traditional method phase includes methods created one after the other to meet language teaching proficiency expectations that the first methods were not able such as the Grammar-Translation, Direct,

Audiolingual, Community Language Teaching, and Total Physical Response (Celce-Murcia, 2014).

The modern approach phase is about the methods designed to provide learned real-life situations through communicative methods such as the Task-Based Approach and Content-Based Language Learning (Larsen-Freeman & Anderson, 2013). The third phase, post-method, gathers the best of previous eras and points out the pros and cons of every single existing method to “Maximize learning opportunity, facilitate negotiated interaction, minimize perceptual mismatches, activate intuitive heuristics, foster language awareness, contextualize linguistic input, integrate language skills, promote learner autonomy, raise cultural consciousness, ensure social relevance” (Celce-Murcia, 2014, pp. 10-11).

Teaching methods provide teachers with different opportunities to teach the target language and meet learners’ needs and expectations in different meaningful ways. In Richards and Rodgers’ (2014) words, language teaching in the twentieth century was characterized by frequent change and innovation by introducing new ideologies and materials. Those changes also influenced teaching methods which have evolved in the belief that the teaching practices in the new approach are better than those included in the method that preceded it and whose purpose is to ensure language learning through more modern and effective teaching methods (Alghamdi et al, 2019). Effective teaching methods should be grounded in sound pedagogical principles and be adapted to suit the individual needs and abilities of learners.

2.3 Connectivism

Behaviorism, Cognitivism, and Constructivism are learning theories most used in creating classroom environments. However, these theories were developed when learning was not influenced by technology. Connectivism (Siemens, 2005) describes how technology allows people to make connections with others without the need to talk face-to-face and how to collect information into technological resources or devices. Over the past two decades, technology has reshaped how people live, communicate, and learn. Learning needs and theories that describe the principles and processes of learning should reflect the underlying social environment (Siemens, 2005)

Methodologies developed in the past century focused on the process of learning instead of the value of what is going to be learned; therefore, learning is no longer an internal and individual process and materials are completely electronic to make them reachable to everyone (Siemens, 2005). Connectivism describes learning as a process of connecting links and sources of information to facilitate continuous learning. Connections between fields, ideas, and concepts are a core skill. The Connectivism theory is relevant because of the introduction of electronic and/or technological tools and resources into the classrooms to make language learning more effective.

2.4 Teaching-learning vocabulary

Vocabulary is the understanding and use of words in a language, as Diamond and Gutlohn (2006) describe it, vocabulary is a never-ending process of learning and understanding words and their meanings. It goes beyond just looking up words in a

dictionary and using them in sentences. Instead, it is gained through both intentional instruction and incidental exposure to new words. Vocabulary development involves teaching specific words and strategies for learning new words.

Cunningham (2001) explains that there are types of vocabulary that researchers have identified. Receptive vocabulary refers to the words presented to us in writing or spoken, while productive vocabulary refers to the words we use when writing or speaking. Receptive vocabulary is larger than productive vocabulary because we may recognize words that we do not often use. Vocabulary can also be divided into oral and reading vocabulary, with the oral vocabulary being related to speaking and listening; and reading vocabulary related to written language.

Nation (2007) classifies vocabulary into four strands: meaning-focused input, meaning-focused output, language-focused learning, and fluency development. Meaning-focused input refers to learning through comprehensible input obtained through reading and listening. Meaning-focused output involves learning through speaking and writing. Language-focused learning involves conscious acquisition of language features like pronunciation, spelling, vocabulary, grammar, and discourse. Activities include pronunciation practice, vocabulary learning through word cards, intensive reading, translation, memorization of dialogues, and receiving feedback on writing. Finally, the fourth strand, Fluency development, encompasses all four language skills (listening, speaking, reading, and writing) when learners optimize focus on meaning in both input and output. This involves receiving and conveying messages. Conditions for developing fluency include familiarity with the language, content, and discourse features, a focus on meaning, and a substantial amount of

input or output. Typical activities include speed reading, skimming, scanning, repeated reading, retelling, ten-minute writing, and listening to easy stories.

2.5 Technology and Materials

Methodologies and approaches used in language learning education have changed in classrooms with the introduction of technology. Hence, it is essential to know what technology is and what role it plays in students' language learning. In the Merriam-Webster Dictionary (2023) technology is defined as "The practical application of knowledge for accomplishing a task, especially using technical processes, methods, or knowledge" or "the specialized aspects of a particular field of endeavor" such as those in educational technology.

When technology is used for educational purposes, it is called educational technology. Educational Technology refers to research and ethical practices to facilitate learning and improve performance through the creation, use, and management of appropriate technological processes and resources (Januszewski & Molenda, 2013). Consequently, materials have evolved with the use of new methodologies. The following paragraphs will describe examples of the previously mentioned.

Computer-Assisted Vocabulary Learning (CAVL) is a useful method for improving vocabulary because it encompasses computer-based analysis of vocabulary resulting in the creation of word lists based on word frequency in texts (Nation and Chung, 2009). For example, analyzing texts to determine their suitability for learners or how they should be adapted or sequenced in class can help to monitor the lexical

richness produced by learners for research and assessment purposes. Additionally, computer programs such as spoken support, hypertext, glosses, concordances, dictionary lookups, and electronic dictionaries can also be utilized to support reading. Word-processing tools like highlighting, tracking changes, comments, and hypertext links can provide feedback on electronically submitted written work.

Supporting this, CAVL has several beneficial characteristics that distinguish it from other forms of learning. One advantage is that CAVL offers easy and quick access to various resources, such as digital flashcards, vocabulary lists, online dictionaries, and video games. CAVL also enables the monitoring and control of users' learning conditions, providing immediate feedback on progress, and adapting to learners' performance by providing materials that are most suitable for their current level.

However, Nation (2013) argues that despite these advantages, research on CAVL has yet to produce convincing or impressive results, perhaps because the technology is relatively new and requires further development to fully exploit its benefits. Therefore, teachers need to be aware of the capabilities of different CAVL tools to successfully incorporate them into language classrooms (Nation, 2013 as cited in Alnajjar and Brick, 2017)

2.6 Electronic Learning (E-Learning)

The presence of electronic devices in educational processes of learning gives way to a new concept called electronic learning (E-Learning). Electronic learning, or E-learning, is conducted digitally via the use of the Internet. The integration of electronic devices in education has led E-Learning to take place digitally and be

accessed through a variety of electronic devices, making it convenient for students to learn from any location. Most electronic devices such as computers, laptops, tablets, or smartphones make it versatile for students to learn wherever they are.

E-learning resources come in a variety of forms, from software programs and digital courses to interactive online platforms and apps. Garrison (2011) defines electronic learning as electronically mediated asynchronous and synchronous communication for knowledge construction and verification. E-learning has opened new learning opportunities, making it more versatile and accessible for students.

2.7 Information and Communication Technologies (ICTs)

Information and Communication Technologies (ICTs) are technological tools and resources used to transmit, store, create, share, or exchange information. These technological tools and resources include computers, the Internet, radio, television, and more (UNESCO, 2009). ICTs have contributed to the way we communicate, connect or work, and have an important role in education. For instance, ICTs provide students with opportunities for language exposure, content for practicing language integrated skills, a variety of online resources and materials (Poudel, 2022).

In addition, Rank et al. (2011) state that an efficient application of ICTs may lead to create learning opportunities as learners are able to investigate, compose, create, reflect, evaluate, communicate and collaborate in a meaningful way. ICTs provide psychological benefits such as intrapersonal and interpersonal communication skills since learners develop attention to detail and language meaning-making skills as the result of cognitive processes that learners use to process the language to communicate in a competent way (Lantolf & Appel, 1994).

On the other hand, ICTs are beneficial for teachers since “ICT tools have been found to be helpful for teachers in the activities such as preparing and presenting their lessons, searching and collecting teaching-learning resources, motivating their students, and updating themselves” (Poudel, 2022, p.112). Teachers and learners interacting through ICTs create interpersonal input that promotes communication through meaning negotiation (Chapelle, 2003). Therefore, it is important for teachers to apply ICTs tools properly according to language goals (Van Dijk, 2013) since this determines efficiency and efficacy, as well as opportunities and challenges along the way.

2.8 Computer-Assisted Language Learning (CALL)

According to Levy (1997), CALL (currently known as TILL, Technology Integrated Language Learning) is the search and study of computer applications in language teaching and learning that provides teachers with a framework to link teaching, learning, and technology, and to prepare students for technological challenges. Levy (1997) also claims that our language teaching philosophies, methods, or approaches need to be expanded to include new technologies, and the interrelationships between language teaching and computers must be carefully considered.

CALL provides a way to improve the four skills for language acquisition: speaking, listening, writing, and reading, and teachers need to understand how CALL can provide effective instruction to language learners (Chapelle, 1990). One of the many advantages of CALL in language classrooms has to do with vocabulary because it provides software materials such as audio, graphics, video, and playback. Also, CALL vocabulary competitions motivate students and their collaborative work. Other

advantages of CALL are its multimodal practice with feedback, it generates Individualization in a large class, and promotes pairs or small groups to work on projects. It also includes a variety of resources available to promote learning styles as it uses exploratory learning with large amounts of language data to give real-life skill-building through computer use (Warschauer & Healey, 1998).

Some disadvantages of CALL, indicated by Gips, et al. (2004) is that computers and their attached language learning programs increase educational costs and harm the equity of education as schools with a lower budget will have unfair educational conditions for students. Also, teachers will suffer because not all of them may have the training to know how to use a computer and how to teach students to use it for language learning.

2.9 Mobile applications

A mobile application or app is a program or software designed to run on a mobile device such as a phone, tablet, or watch. They can be used directly on mobile devices. Applications are useful tools that can be downloaded for different purposes on smartphones, laptops, or tablets. Mobile applications, according to Islam and Mazumder (2010) are a form of software that can be run on mobile devices and perform various functions for users. They are a rapidly growing segment of the global information and communication technology industry.

Mobile apps are user-friendly, affordable, and can be downloaded and used on most mobile phones. They have a wide range of uses, including making calls, sending messages, browsing the internet, chatting, social networking, playing audio and

video, and gaming. Apps can be free or premium which mean that one has to pay for them, or freemium, which is a business model that offers basic products or services for free but charges a fee for additional features that extend the functionality of the free version (Gokgoz et al., 2021)

Education is not excluded, for example, Bidin and Ziden (2013) mention that mobile learning, is considered a powerful method of providing instruction and acquiring knowledge due to its ability to be accessed at any time and any location with various applications. In the field of education, for instance, the use of apps enhances vocabulary acquisition, increases confidence, and encourages class participation due to students' inclination toward incorporating multimedia into their learning experience (Rezaei, Mai & Pesaraghader, 2013).

2.10 Mobile-Assisted Language Learning (MALL)

MALL, a sub-discipline of CALL, works with mobile devices such as tablets and smartphones for language learning. These devices may be mini laptops that allow the learner to choose and install applications. The Apps could be used with an internet connection or without it. Klopfer et al. (2002) state the following five properties of mobile devices: portability, devices can be taken anywhere due to their small size and weight; social interactivity, exchanging data and collaboration with others is possible; context sensitivity, data on the mobile devices can be gathered and responded to the current location and time; connectivity, devices can be connected to other devices by creating a shared network; and individuality, platform activities can be customized for learners.

Some disadvantages of MALL are the small screens, some mobile phones do not allow learning because of data storage, multimedia limitations, and some smartphones are expensive and not available for all students. However, mobile technology provides materials for L2 and supports language learning by using tools, such as mobile apps like Duolingo. Electronic materials increase students' autonomy and independence associated with technology in education and the growth of self-access language learning (Benson & Voller, 1997).

2.11 Duolingo

According to Teske (2017), Duolingo is a language learning platform designed to make learning fun and engaging by gamification and interactive exercises. Duolingo is a freemium App on smartphones, tablets, and computers, which makes it available to anyone who wants to learn or practice a language. Duolingo tracks users' progress as they work through the lessons, and offers rewards and incentives to keep users motivated, these rewards can include virtual coins, gems, experience points, and virtual badges for completing lessons and reaching milestones.

The platform offers exercises and activities to help users practice their language skills, including multiple-choice questions, fill-in-the-blank exercises, matching exercises, and speaking and listening exercises. For example, a type of exercise on Duolingo is translation, where users are presented with a phrase or sentence in their target language and are asked to translate it into their native language. These exercises may also include a word bank or other hints to help users find the correct translation. Another type of exercise is listening, where users are presented with an audio clip in the target language and are asked to answer questions about the

content of the clip or transcribe the spoken text. Duolingo also offers speaking and writing exercises, where users are asked to produce original responses in the target language. Overall, the exercises on Duolingo are designed to help users practice and improve their vocabulary, grammar, reading, writing, listening, and speaking skills in the target language.

Students can acquire and improve vocabulary through the variety of methods mentioned above including interactive lessons, quizzes, and games. It presents new words and phrases in context and uses repetition and spaced repetition to help learners retain new information. The App also allows learners to practice by using new vocabulary in sentences and provides immediate feedback on their use. Additionally, the use of gamification techniques such as points, badges, and leaderboards, creates a motivating learning experience.

2.12 Assessment

Richards and Schmidt (2013) define assessment as a systematic method of gathering information and drawing conclusions about students' abilities or about the effectiveness of teaching using various sources of evidence. The evidence can include tests, interviews, questionnaires, and observations. For instance, an assessment may be conducted to determine the comprehension abilities of immigrant students, to establish whether students can follow a school curriculum, or if they require additional language training. Additionally, students may undergo tests at the start and at the end of a course to evaluate the teaching quality. While "testing" is typically associated with standardized tests on a large scale, the term

"assessment" encompasses a more comprehensive range of approaches to testing and evaluation.

Language assessment measures a user's proficiency in a particular language, whether it is their first or second language. While tests are a form of language assessment, there are many other methods to assess language: summative and formative. Garrison and Ehringhaus (2007) mention that summative assessment evaluates students' knowledge at a particular moment in time and it is utilized as part of the grading system. It can include end-of-unit or chapter tests, as well as end-of-term or semester exams. The primary purpose of summative assessment is to measure students' learning in relation to content standards, although it can only provide limited insight into the overall learning process. Summative assessment occurs after instruction and is spaced out every few weeks or months. It is suitable for evaluating the effectiveness of programs, school improvement goals, curriculum alignment, or student placement in specific programs. Summative assessment may provide information to support instructional adjustments or interventions during the learning process.

Formative assessment is an ongoing process in which teachers use various strategies to gather information about students' understanding while they are still learning (Garrison & Ehringhaus, 2007). Formative assessment enables teachers to make timely adjustments to instruction and learning to ensure students achieve learning goals. Some strategies for formative assessment may include criteria and goal setting, observations, questioning strategies, self and peer assessment, and student record keeping. Teachers engage students by involving them in assessing

their own learning and providing them with feedback that helps them understand what they are doing well and what they need to improve. Formative assessment is not about grades but about providing opportunities for practice, and teachers use this information to inform instruction and engage students in the learning process (Taras, 2008).

2.13 Vocabulary assessment

White (2021) mentions different methods to assess vocabulary since each method has its limitations, for example, one way to evaluate vocabulary is by asking for the definition of the word, where students are tested on their ability to provide definitions or match words to their definitions. Another method is to have students choose the correct word from a list of options or fill in the blank with the appropriate vocabulary term. Assessing students' ability to use vocabulary in context is an indicator of their mastery of the word while testing their knowledge of antonyms can push them toward higher-order thinking.

Brainstorming words in categories, creating a skit using vocabulary words, and assigning students to come up with unique titles featuring vocabulary words are other methods of assessing vocabulary. Common mechanisms used in schools for vocabulary assessments include observational data, vocabulary games, teacher-created tests, word journals, and standardized tests. Assessing vocabulary can be challenging since it involves more than just memorizing a list of words; it requires evaluating a person's overall vocabulary knowledge and usage (Read & Chapelle, 2001).

2.14 Vocabulary assessment in Duolingo

The Duolingo app (Freeman et al, 2023) is structured in sections, consisting of a series of levels. In each lesson, Duolingo follows a structured approach. Firstly, it chooses frequently used words in the language to teach and assess, exposing learners to words they are likely to encounter in real-life situations. Secondly, Duolingo uses repetition to reinforce vocabulary learning, presenting difficult words more frequently. Thirdly, the platform provides vocabulary in context, within a sentence or dialogue, to enhance the understanding of the word's meaning and usage. Finally, Duolingo tests vocabulary using various methods, such as multiple-choice questions, fill-in-the-blank exercises, and translation exercises. Furthermore, at the end of each lesson, if the user answers incorrectly, Duolingo repeats the exercises until the user gets the correct answer, ensuring that the user comprehends the vocabulary.

2.15 Summary

This chapter provided an overview of the literature supporting the study, beginning with an exploration of English Language Teaching linked with Connectivism as a way to emphasize technology's role in vocabulary learning in the classroom. Also, teaching vocabulary strategies served to assess Duolingo's effectiveness in monitoring students' progress. E-learning, and computer-assisted language learning (CALL) were also revised to provide a broader context of technology in education by focusing on mobile applications. The Duolingo app was detailed to show its role as a vocabulary learning tool in the classroom besides the assessment of Duolingo's

impact on young learners' vocabulary learning. The following chapter will describe the methodology followed during this study.

CHAPTER III: Methodology

This chapter addresses the methodology implemented in the study; it provides detailed explanations for each element in the section. The elements included below are research design, participants and context, instrument, data collection procedure, data analysis procedure, and a summary.

3.1 Research design

This research follows a mixed tradition which addresses the measurement, examination, and connections between determined variables by the quantitative approach as well as the distinct perspectives, analysis, and interpretations that the qualitative lens provides to the study (Creswell, 2007). In addition, Brannen (2017) states that the application of both perspectives requests and points out the importance of establishing suitable research methods and instruments to overlap, analyze, interpret, and explain analytic (qualitative) and enumerative (quantitative) data in an accurate way.

In McCracken's words (1988, p.17), "qualitative work does not survey the terrain, it mines it" in a concise and descriptive way by implementing analytic techniques that allow to formulate and reformulate hypotheses based on data to proceed towards testing and verification stages which may lead to answers (Brannen, 2017). On the other hand, quantitative work relies on testing and verifying processes as a scientific paradigm in which, as Creswell explained (2014), a variable is a quality or feature of an individual or organization that can be observed or measured, and which differs between the individuals or organizations being examined and two or more categories

may emerge to eventually be measured or evaluated and analyzed using statistical procedures.

Therefore, and for the purpose of this study, three instruments were selected: a pretest–posttest, a Likert scale questionnaire, and a focus group to triangulate information concerning the measurement of participants' progress with English vocabulary and attitudes toward using the Duolingo app. These instruments will be fully described in the corresponding section.

3.2 Participants and Context

The participants attend classes at a private elementary school located in San Mateo Mendizábal, a semi-urban town in the state of Puebla. The school is a preschool and an elementary school, the elementary school has six grades, and only one group per grade. Each group has an average of twenty students, except the sixth grade with only nine students. All groups have the basic subjects in their curricular programs, and they also have special subjects like Music, Dance, and English as part of the curriculum.

The participants are nine students in sixth grade in a semi-urban private elementary school. This is a small group of six girls and three boys, whose ages are between 11 and 12 years. To ensure participants' privacy, they are referred to by the following pseudonyms: Alexa, Cindy, Emanuel, Gerardo, Irvin, Joana, Naomi, Patricia, and Valentina. They have three hours of English per week, in the morning, on Monday, Tuesday, and Wednesday. The teacher of the English subject is one of the

researchers of this study and has been with this group since the academic year started in September 2022.

The school has Internet access in all classrooms, but this service is mainly used by teachers, however, some students can bring their smartphones to school in specific cases. The students of this research did not have mobile data services on their phones, so they were allowed to use the school's Wi-Fi service to work with the Duolingo activities only during their English class. Permission was requested from the parents of the sixth-grade group so that their children could bring their devices, to work with the Duolingo application during their English classes.

3.3 Instruments

To assess the effectiveness of Duolingo, three instruments were created. The first instrument serves as both a pre-test and a post-test to evaluate the participants' prior knowledge of the English language and their progress after using Duolingo. It was designed as an English language level assessment tool adapted from Duolingo's exercises and applied in a longitudinal way at the beginning, as a diagnostic test, and at the end as enumerative data collection which shows and highlights students' particular instances concerning vocabulary level progress.

Thus, post-test and pre-test (**see appendix A**) items were based on the different types of exercises Duolingo has, as well as the categories of the vocabulary covered in the app. The items in the test attempt to assess if students can identify family relationships, translate sentences, respond to multiple choice exercises, match words, fill in the gap sentences, and write the names of objects from pictures. The

resulting test has forty-five test items distributed in seven sections: A, B, C, D, E, F, and G. In Section A, seven items, participants must fill in the blanks with the correct family relationship. Sections B and C, seven items each, require translating sentences from English to Spanish and from Spanish to English. In Section D, four items, participants need to complete sentences with the correct word from a group of words, while in Section E, seven items, they match pairs of words with their translations. Section F, seven items, prompts participants to complete sentences using provided words in a box for all statements in this section, and in Section G, six items, they must name given images in English.

The advantage of the pre-test and post-test is that its data leads to the interpretation and analysis of the efficacy of the strategy applied (Shek & Zhu, 2018) since “the power of the test represents the probability of detecting differences between the groups being compared when such differences exist” (Dimitrov & Rumrill, 2003, p.160). The tests allowed us to gather quantitative data at two different points leading to the comparison of participants’ performance before and after the (Campbell & Stanley, 2015) strategy.

The second instrument, a Likert scale questionnaire (**see appendix B**) was formulated and applied to assess Duolingo app impact on students’ learning process by asking them to rate their experience using Duolingo as an English learning tool which may be helpful during and even after the teaching process. The questionnaire contains ten statements that pertain to the users' comfort and ease when utilizing the app, as well as their perceptions of progress in English vocabulary after using the application.

This questionnaire aimed to gather opinions about the effectiveness of Duolingo as a language learning tool as well as perceptions toward the mentioned app. The Likert scale ranges from "Muy de acuerdo" (strongly agree) to "Muy en desacuerdo" (strongly disagree). Participants are asked to indicate their level of agreement or disagreement with statements about Duolingo, such as whether the exercises are entertaining, whether it is useful for learning vocabulary, whether it is motivating, and whether they plan to continue using it after the course.

The questionnaire gathered quantitative data measuring participants' attitudes, behaviors, and conceptions (Dörnyei & Taguchi, 2009) toward predefined statements whose scores are the basis for constructing validity and interpretation of empirical results (Messick, 1989). The Likert scale statements offered validity criteria as "questionnaires can be designed to minimize, but not eliminate, dishonest, and careless reporting" (Aiken, 1997, p. 58). Besides, questionnaires meet analytic and enumerative data construction for the administration and processing of factual, behavioral, and attitudinal responses in big or small groups (Dörnyei & Taguchi, 2009).

The third instrument, a focus group (**see appendix C**) was used to explore participants' perceptions. The focus group was employed to achieve an accurate analytical qualitative data collection that let students express their conceptions towards Duolingo as a learning supportive tool by interviewing the nine students about their user-experience opinions before, during and after the application of the strategy.

A focus group was selected to provide a broad understanding of unknown circumstances or situations that lack documented knowledge (Tümen-Akyıldız & Ahmed, 2021) and it is carried out when researchers aim to explain and share a topic's particular instances (Prasad & Garcia, 2017). Moreover, a focus group must be well planned, and participants' groups must be carefully chosen (Tümen-Akyıldız & Ahmed, 2021) as they are expected to share emotions, opinions, points of view, sensitive topics, and general participant's backgrounds (Wisker, 2001) which is valuable data for analysis.

3.4 Data collection

The first step for the data collection was to find the participants. Initially, the major struggle was finding enough participants for the study. One of the researchers was teaching a small group of students but there were not enough participants to put the project into motion. To address this issue, it was decided to search for participants outside schools by asking parents if they were interested in having their children learn English. Although the parents were interested, their children were not willing to attend English classes during the upcoming holiday season, Christmas. Following the winter vacation, the other researcher saw the opportunity to find participants in the elementary school he was working at. Permission was requested from the principal of the elementary school to conduct this investigation and to apply the instruments to collect the required data. In the same way, parents granted permission to conduct the focus group in the classroom, as well as recording the audio. The participants chosen for the study were sixth graders from a private Elementary School.

Firstly, it was necessary to apply a pre-test to assess the participants' prior knowledge and to provide a benchmark for measuring the effectiveness of the use of Duolingo by comparing the results obtained from a pre-test with the post-test after the application of the strategy. Once the pre-test had been applied, the next step was to apply the strategy. The strategy consisted of giving students English classes based on Duolingo's vocabulary for one hour, three times a week for a period of five weeks. The classes were structured around the vocabulary offered by Duolingo and lasted between 40 and 45 minutes. Toward the end of each class, in the remaining 20-15 minutes, the students were allowed to use their smartphones to complete Duolingo exercises under the guidance of the teacher. This arrangement was possible due to the Wi-Fi connectivity at the school, and parents' permission to allow their children to carry their smartphones for this activity.

The teaching strategy to use the Duolingo app in the classroom had the following sequence: Initially, the topics from the previous class were reviewed to clarify questions or doubts students might have. Then, the topic of the class, aligned with Duolingo's content, was introduced. Visual material was used to present the new vocabulary, while providing pronunciation and example sentences. After this, there was a discussion about the importance of the topic's vocabulary in daily life. Following this, a game such as bingo, puzzles, mimic, concentration game, hangman, or Pictionary, was selected to practice vocabulary. It was after this that students were allowed to use their phones for Duolingo practice. They were instructed to practice with specific Duolingo exercises related to the class and during

this practice the teacher would monitor them to provide support, answer questions, clarify doubts and ensure that students were using Duolingo accordingly.

The teaching strategy followed the same pattern over five weeks, and at the end of this period, a post-test was applied to evaluate the effectiveness of the strategy, in this case, the use of the Duolingo app as a tool for vocabulary learning. By comparing the results of the pre-test and post-test it was possible to assess changes or improvements in the student's vocabulary knowledge resulting from the use of the app. After applying the post-test, there was an interest in gathering information about students' attitudes and perceptions toward the Duolingo app. Therefore, a Likert scale questionnaire was applied. The decision to do a questionnaire was to get an objective measurement of students' attitudes and perceptions toward using Duolingo as a tool for vocabulary learning by contrasting this with the tests' results.

However, it was necessary to triangulate the information to consolidate the results. Therefore, the researchers decided to use a focus group technique to gather more personal data from the participants. The focus group was conducted by one of the researchers. Before the focus group could take place, permission was requested and granted by the school principal and parents. The researchers formulated a set of nine questions that aimed to elicit positive or negative opinions about the app, its features, its effectiveness, and its challenges. The questions were reviewed and refined to ensure clarity and validity. The participants were informed about the purpose and procedure of the focus group and agreed to take part voluntarily. The focus group was held in the classroom and lasted about 20 minutes by using a cell

phone to record the audio of the session. The researcher explained the rules and expectations of the focus group so participants could share their opinions.

3.5 Data Analysis

The analysis of the results of the pre-test and post-test consisted of collecting the scores from all participants. The scores of both tests were tallied. The mean score for each test was calculated, and the difference between the mean score of the pre-test and the post-test was obtained. Then, the scores of each participant were compared by examining evidence of a change in scores by individuals. For each student who took both the pre-test and the post-test, the difference score was computed by subtracting the pre-test score from the post-test score. All of this was done using Microsoft Excel.

To examine the questionnaire (in a Likert scale format) applied at the end, a pie chart per statement was produced using Microsoft Excel. The pie chart option was chosen, and the percentage of responses for each option was inserted. The pie graph was then personalized by including suitable data labels, titles, and legends. The pie graph was interpreted by analyzing each section of the pie chart, percentage and the responses' distribution. This method offered an effective way to observe the general trend of responses on the questionnaire.

Finally, to analyze the focus group, the focus group discussion was transcribed for analysis of the data and identification of key themes and topics. After that, key themes and topics that emerged during the focus group were identified by reviewing the transcript. Subsequently, the responses of participants were categorized into

different themes to identify common opinions, concerns, or perspectives that emerged during the focus group. Patterns and trends in the responses were then identified and reviewed, looking for certain opinions or perspectives shared by multiple participants or any contradictions or inconsistencies in the answers. The analysis of the focus group data was used to draw conclusions and insights regarding what the participants thought about the application used in class, their concerns, and suggestions for improvement. The following is the table (Table 1) that shows the final categories that emerged and that will help answer the RQ's of the study.

What are elementary school students' perceptions about using Duolingo as a vocabulary learning tool?	What advantages do elementary school students consider in using Duolingo as a vocabulary tool?	What drawbacks do elementary school students perceive from using Duolingo as a vocabulary tool?
Gamification	Learning in Context	Freemium Model
Visual Appeal	Vocabulary Learning Aid	App Features (notifications)
Engagement	Scaffolding Method	
	Motivation to Participate	

Table 1: Focus Group Categories

3.6 Summary

This chapter outlines how the study was conducted. In this study, a quantitative and qualitative research design was used to examine the progress of participants'

English vocabulary and their attitudes toward using Duolingo. A pretest-posttest design was employed, with a Likert scale used to supplement this approach for triangulating information. The participants were described as well as the instruments employed. The data collection procedure was explained, and the data analysis was also described to illustrate the procedure for analysis and interpretation of the results. The results will be fully described in the next chapter.

Chapter IV: Results

This chapter provides the findings from the data analysis of the pre-test, post-test, questionnaire, and focus group. The quantitative results are represented on graphics and indicators, as for the qualitative results, they are categorized, explained, and illustrated in tables and categories. Participants' names were changed to keep their anonymity. Finally, the rest of the chapter is organized in two main sections: quantitative data results and qualitative data results and summary.

4.1 Quantitative data results

As indicated before, quantitative data was gathered from a pre-test and a post-test to assess Duolingo App effectiveness in learning vocabulary at an A1 level of English. The pre-test was applied to measure students' vocabulary level at the beginning of this research while the post-test was applied afterwards to identify progress. To follow research's original timeline and visualization, pre-test scores and analysis are presented first.

4.1.1 Pre-test results

The pre-test consisted of forty-five items based on the content of Duolingo. Initially, the test was subdivided into sections from "a" to "g"; however, in order to facilitate the interpretation of the results, these sections were grouped into three categories according to the type of item: "Naming the pictures" with thirteen items, "Translation/Inversed Translation" with twenty-one items, and "Fill in the blanks" with eleven items. The pre-test attempted to address the previous knowledge of students at A1 English level. Pre-test final scores are visualized in the following table (Table 1).

TABLE 1 Pre-test Scores

	Naming the pictures (13 items)	Translation/inverse translation (21 items)	Fill in the blanks. (11 items)	Total (45)
Alexa	12	7	11	30
Cindy	11	6	2	19
Emanuel	5	2	3	10
Gerardo	9	6	2	17
Irvin	13	17	11	41
Joana	8	6	5	19
Naomi	8	4	8	20
Patricia	9	10	7	26
Valentina	7	5	6	18

As it can be observed, the first column indicates the student's name, the second, third, and fourth columns indicate students' scores according to the maximum expected obtained points per section, and the fifth column indicates final pre-test scores where 45 corresponds to the highest score. Thus, the highest overall score obtained was 41 points, the lowest overall score was 10 and the average among the nine participants was 22.2.

In the “naming the pictures” section participants had to write vocabulary in English based on visual prompts, a score of 13 was obtained as the maximum by Irvin and 5 as the minimum by Emmanuel. Then, in the third column, the “inverse translation” exercises with twenty-one items, just one participant, Irvin, scored 17 over the rest who scored from 2 to 10. Finally, in the fourth column, the “Fill in the blanks” section,

two participants, Alexa and Irvin, reached a score of 11 over 11 as the highest, and 2 as the lowest score obtained by Cindy and Gerardo.

It seems from the statistics that the “Fill in the blanks” section was the one in which participants struggled the most because of the lower scores unlike other sections where they performed better overall pre-test results, with just two participants scoring 30 and 41, respectively. It can be inferred that “Fill in the blanks” exercises made participants to look for a suitable word which appeared to be a limitation, perhaps because of participant’s previous vocabulary knowledge and spelling since this represents one of the most difficult areas of English learning for Spanish speakers (Llombart-Huesca & Zyzik, 2019) since there are different ways to represent English sounds that differ from Spanish phoneme-grapheme system.

4.1.2 Post-test results

The Post-test instrument follows the same design as the Pre-test, forty-five questions adapted from the Duolingo app and divided in the same number of sections. The post-test scores are organized in five columns specifying the same sections content and expected maximum scores, 42 being the highest obtained between the overall ones, and 20 as the lowest. The post-test was applied to obtain students' performance after interacting, practicing, and reviewing English specific content during class as it traces their progress (Table 2).

TABLE 2 Post-test Scores

	Naming the pictures (13 items)	Translation/inverse translation (21 items)	Fill in the blanks (11 items)	Total (45)
Alexa	10	13	11	34
Cindy	10	14	9	33
Emanuel	5	7	8	20
Gerardo	10	10	5	25
Irvin	13	18	11	42
Joana	10	11	6	27
Naomi	11	11	6	25
Patricia	5	6	9	20
Valentina	7	10	9	26

In the “Naming the pictures” section, a score of 13 was obtained as the maximum and 5 as the minimum that correspond to the same obtained numbers in the pre-test. This section shows that participants' improvement was minimal with 1 to 3 extra points above in comparison to the pre-test as it is the case of Gerardo, whose score increased from 9 to 10, Naomi from 8 to 11 and Joana from 8 to 10. Other participants obtained the same score as Irvin's from 13 to 13, Valentina from 7 to 7 and Emmanuel from 5 to 5 whereas other participants presented a decline of two or three points as it is the case of Alexa from 12 to 10, Patricia from 9 to 5 and Cindy from 11 to 10.

Then, in the “Inverse translation” exercises eight out of nine participants showed a significant improvement with a maximum score of 18, a minimum of 5 over 21. It is

important to highlight that only one from the nine participants showed a significant decline of four points while the other eight ones obtained from three to four extra points.

Finally, in the “Fill in the blanks” section, the participants with the lowest score in the pre-test score reached a score of 5, 9 and 8 over 11 respectively pointing out their performance improvement along the most challenging section. In addition, Alexa and Irvin, were the only two who reached a score of 11 over 11 as the highest and Joana, Naomi and Gerardo obtained 6, 6 and 5 as the lowest respectively.

Overall, the comparison of the scores presents an improvement among participants in the most challenging section, as it is the “Fill in the blanks” section where both Gerardo and Cindy obtained 2 points in the pre-test, but they obtained 5 and 9 points in the post-test, respectively. In addition, there were participants who maintained their scores such as Irvin and Alexa who reached the maximum since the pre-test. Finally, Naomi was the only participant who decreased her score from 8 to 6 points, but she met expectations in the other sections.

The “Inverse-translation” section presented a significant improvement even though no participants reached the maximum score, 21. For example, Irving obtained 18 whose pre-test score was 17. Cindy, Naomi, and Valentina obtained 6, 4 and 5 during the pre-test but reached 16, 11 and 10 in the post-test, respectively. Finally, Patricia's score went down from 10 to 6 over 21.

The “Naming the Pictures” section, considered the easiest, presented a decrease since some participants reached fewer points compared to those obtained during the pre-test. For example, in the case of Patricia, Alexa, and Cindy with 9, 12, and 11 points during the pre-test in contrast with 5, 10, and 10 obtained in the post-test.

Whereas other participants kept the same score during both tests such as Irving, 13, Valentina, 7, and Emmanuel, 5. Only three participants showed a slight improvement during this section like Gerardo, Joana and Naomi who obtained 9, 8 and 8 points initially, and after the post-test they scored 10, 10 and 11, respectively.

Overall, participants who met the highest expectation in the total final score of the pre-test are the ones who slightly increased their score in the post-test by 1 to 4 more points. For example, Irving and Alexa who scored 41 and 30 over 45 in the pre-test, scored 42 and 34 in the post-test. Besides that, participants with the lowest performance improved by doubling points just like in the case of Emmanuel who got 10 over 45 during the pre-test, but 20 in the post-test especially showing improvement in “translation” and “fill in the blanks” sections. Finally, Patricia was the only participant who instead of having an improvement, scored lower points in the “naming the Picture” and “Translation” sections but kept the same score in “Fill in the blanks” and went down from 26 over 45 in the pre-test to 20 over 45 in the post-test. The overall comparison shows two participants, Alexa and Irving, as the ones who met post-test higher expectations by obtaining 34 and 42 points over 45 respectively whereas the rest reached from 20 to 33 points which is an indicator of the effectiveness of Duolingo App during the English class.

Interestingly, participants did not meet the post-test expectations in those exercises that seemed to be the easiest and scored lower than in the Pre-test. An explanation can be that challenging exercises engaged participants more as they noticed higher difficulty and complexity which had probably made them focus more on improving

weaker areas. Also, participants were expected to practice and perform in classroom activities using target vocabulary based on Duolingo app and not just in isolation which could have also impacted their performance on the challenging exercises of the post-test.

4.1.3 Questionnaire results

A questionnaire with ten closed-ended questions based on Likert Scale was designed and applied after the strategy of using Duolingo in class was completed. This questionnaire was applied to gather participants' perceptions about Duolingo app as an English language learning tool. The data was processed and represented in the following figures.

4.1.3.1 Duolingo as an Entertaining English Learning tool

Figure 1 shows the results of participants regarding the interactive aspect of Duolingo's exercises and if they found this tool as entertaining for learning English.

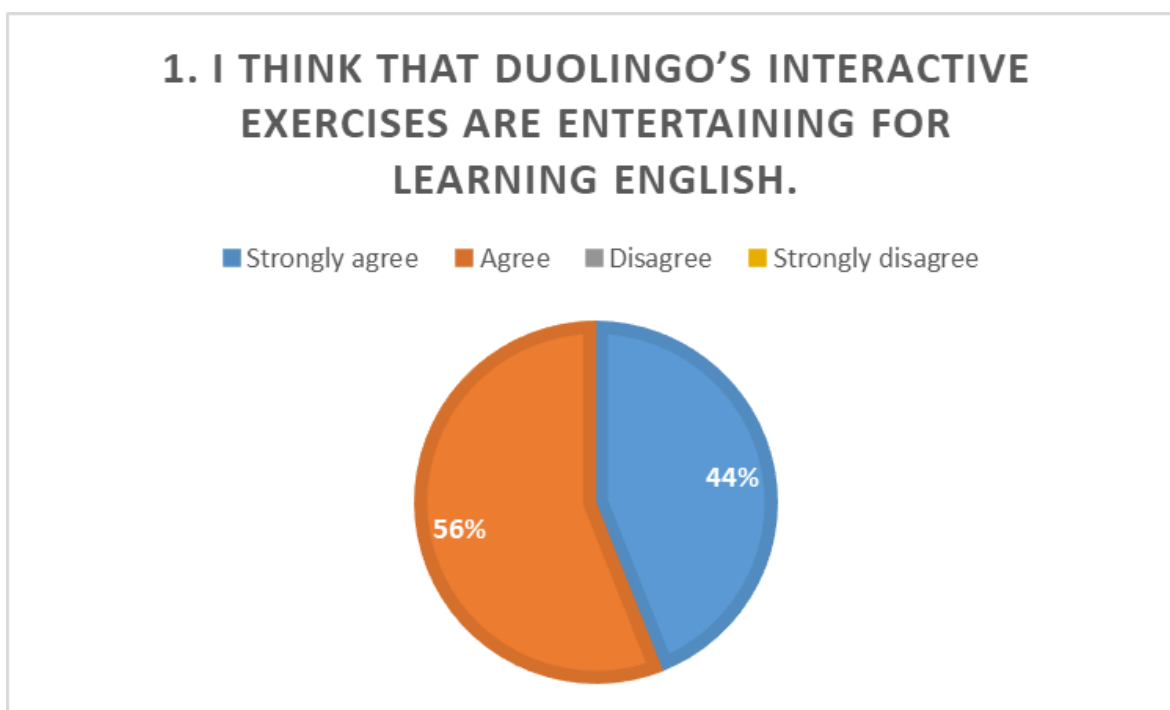


Figure 1. *I think that Duolingo's interactive exercises are entertaining for learning English.*

It can be observed that above 56% agree that the Duolingo app is an entertaining and engaging tool when practicing translation, listening, writing, sentence arrangements, and conversation exercises. While 44% strongly agreed with this statement, the Duolingo app was an entertaining supportive tool. From the results, it can be inferred that Duolingo tasks are attractive to users since their gaming-like interface catches users' eye and does not let them switch off easily as traditional drilling exercises do.

4.1.3.2 Duolingo as a Useful English Learning Vocabulary Tool.

Figure 2 addressed participants' perceptions towards the Duolingo app as an English language learning tool regarding vocabulary learning.

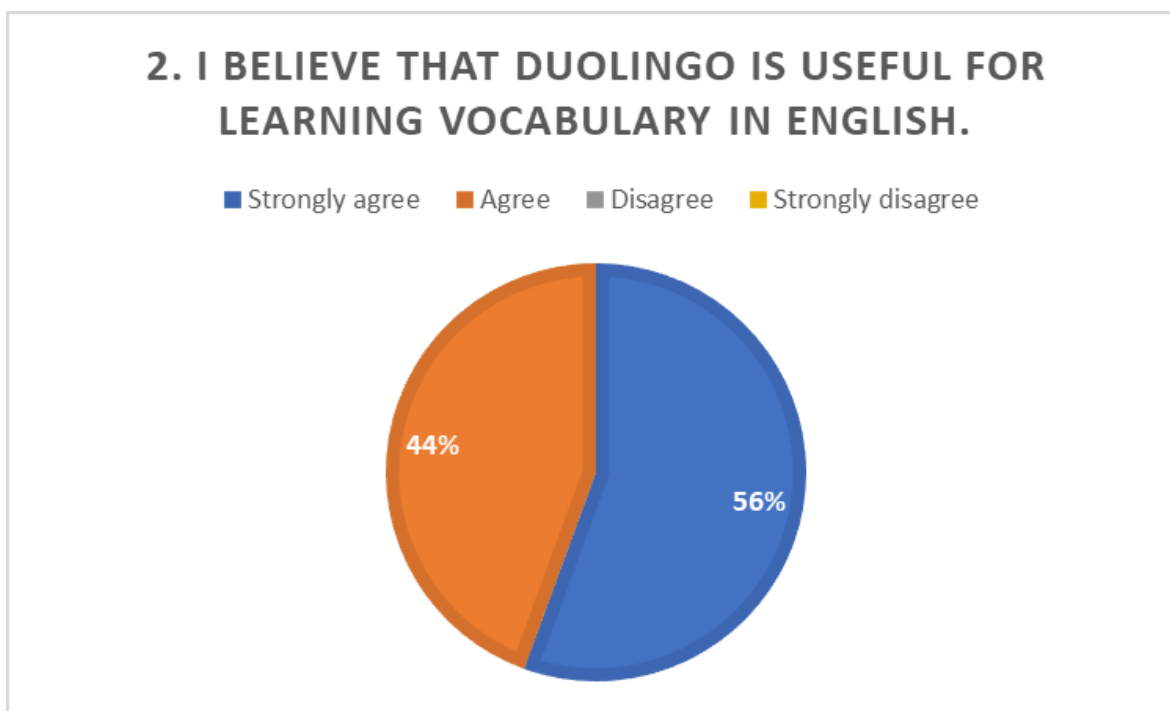


Figure 2. *I believe that Duolingo is useful for learning vocabulary in English.*

According to the data, 56% of participants strongly agree and 44% agree that Duolingo App is useful for English vocabulary learning. It shows that Duolingo App provides strong vocabulary learning opportunities. One explanation could be that the exercises are designed to introduce, assess and reinforce lexical knowledge as it shows the list of all the words that users have learned so far which motivates participants to continue making progress.

4.1.3.3 Duolingo App as an English language improvement tool.

Figure 3 gathered participants' opinion about their progress and improvement as a result of using the Duolingo App.

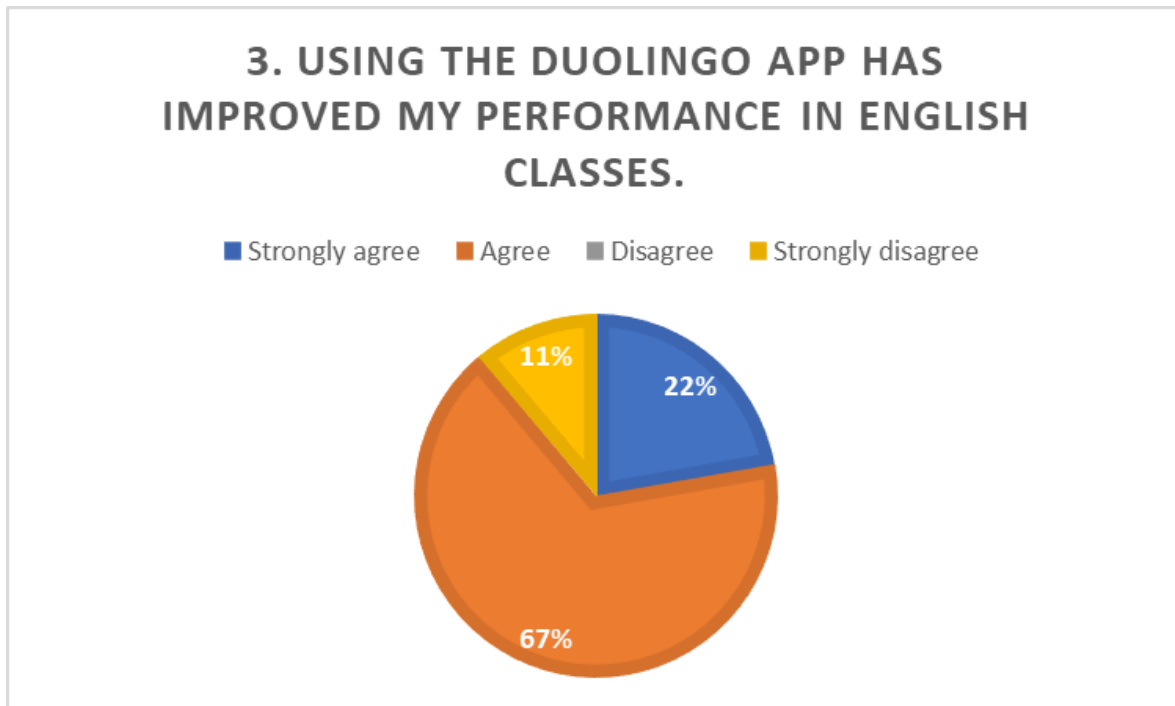


Figure 3. *Using the Duolingo app has improved my performance in English classes.*

The graphic shows that 67% of participants agreed and 22% strongly agreed that their English performance has improved thanks to the Duolingo app support whereas 11% strongly disagree. Thus, Duolingo's impact on English performance varies from user to user because performance is measured according to their capabilities while constructing knowledge in an individual way by providing higher chances to enhance language use since user's experiences differ from one another.

4.1.3.4 Duolingo's Exercises are Engaging and Interactive.

Figure 4 gathered participants' perceptions towards Duolingo exercises designed as an engaging way to practice the language.

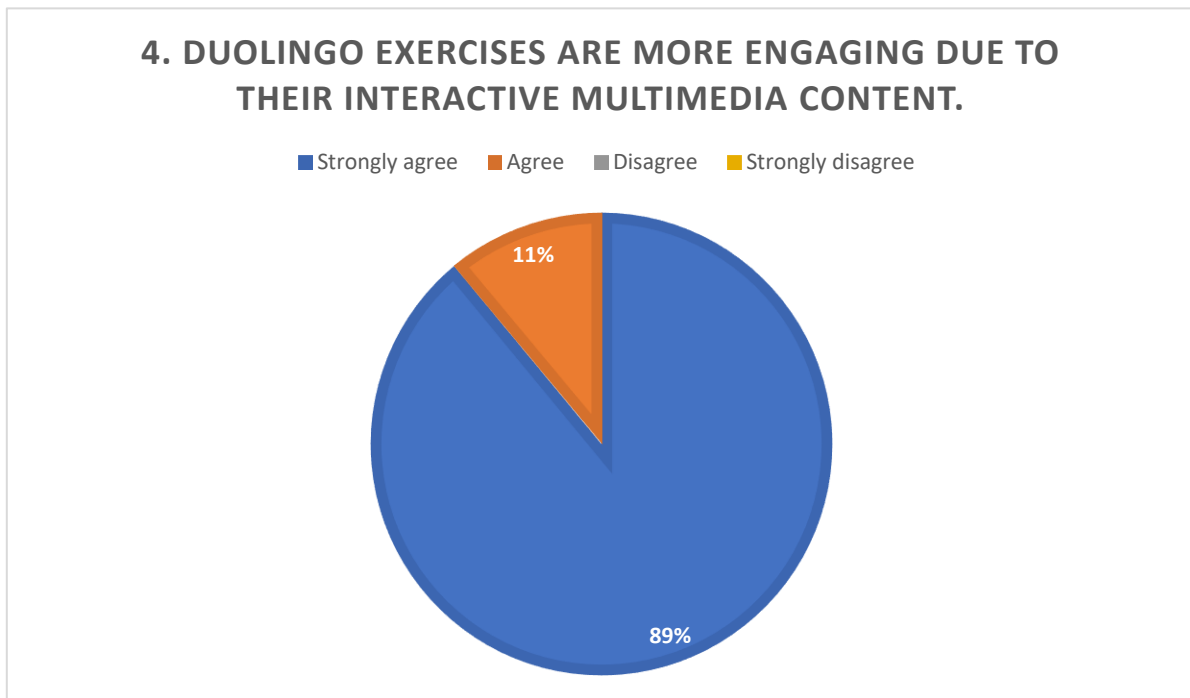


Figure 4. *Duolingo exercises are more engaging due to their interactive multimedia content.*

Data shows that 89% strongly agree and 11% agree on Duolingo as a more fun and engaging way to practice the language through multimedia content and interactive exercises. Duolingo seems to provide exercises that allow users to practice the language in an enjoyable, immersing, and gaming-style way. The fact that Duolingo exercises lead to user engagement means that they will be practicing the language more, get higher scores, and even level up the exercises' difficulty which is challenging and exciting at the same time. These results suggest a preference for

Duolingo's multimedia elements and interactivity over traditional paper exercises in terms of fun and engagement. This is reflected in the general students' improvement that can be seen in their pre-test and post-tests scores. The correlation between this preference and observed improvements in students' pre-test and post-test scores suggests a positive impact of Duolingo's engaging interface.

4.1.3.5 Duolingo app makes learning process easier.

Figure 5 illustrates the agreement among participants about Duolingo and its interface and game-like features to make the learning process easier.

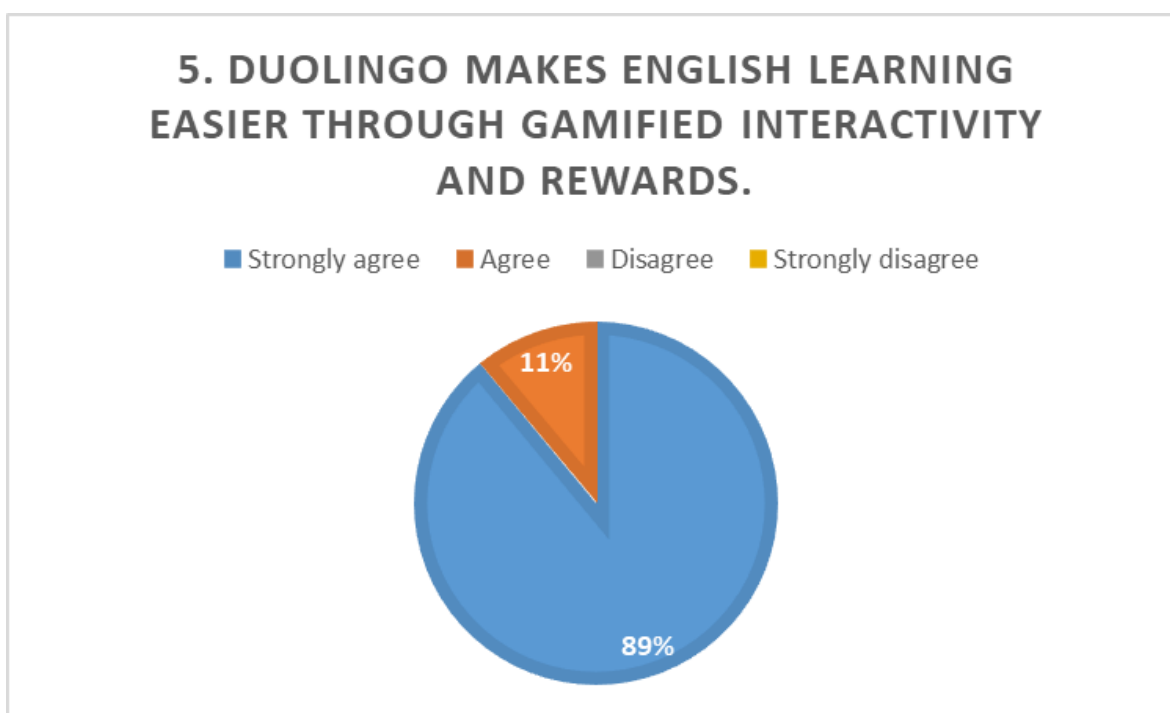


Figure 5. *Duolingo makes English learning easier through gamified interactivity and rewards.*

As presented above, 89% strongly agree and 11 % agree that Duolingo makes English learning easier as it is designed to be a game that rewards users every single

time they move forward. The English learning process is easy and perceived as a video game. This allows users to practice for pleasure and not as a regular learning task that most of the time is difficult to enjoy because it has to be done to process and reinforce information for class.

4.1.3.6 Duolingo App is a motivation tool.

Figure 6 addresses participants' agreement towards Duolingo as a motivation tool.

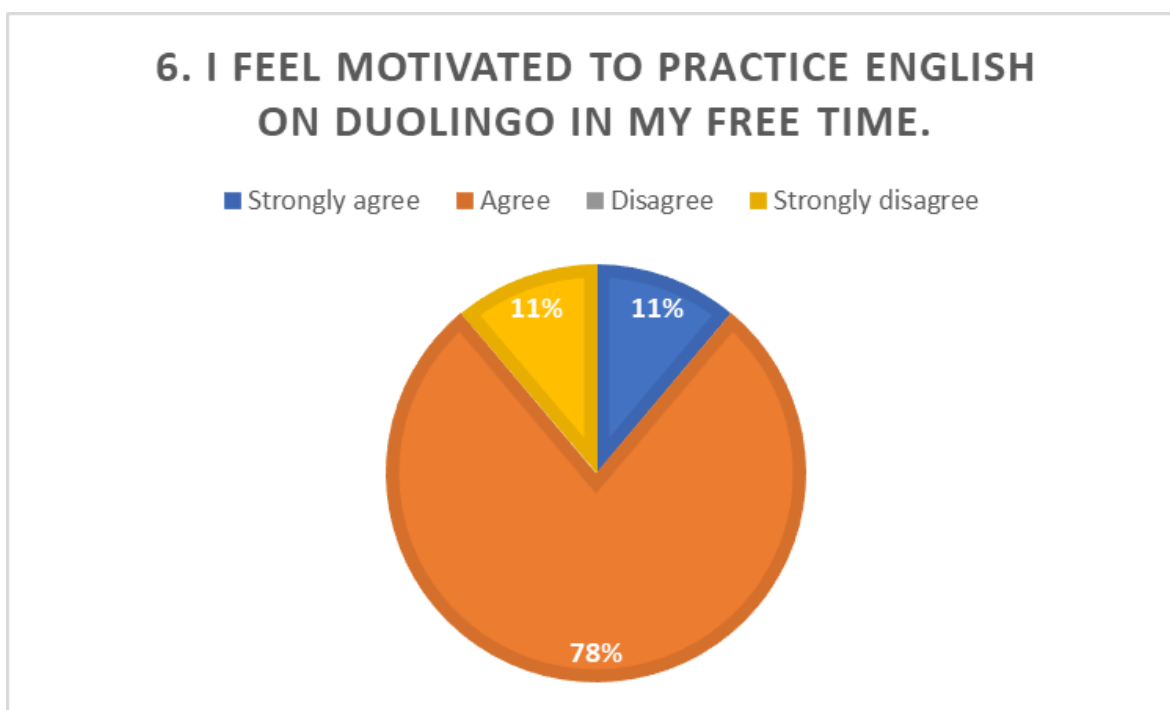


Figure 6. *I feel motivated to practice English on Duolingo in my free time.*

As illustrated above, 78% agreed and 11% strongly agreed that Duolingo makes users feel motivated when practicing the language during their free time as it is game-like designed to have users immerse in the language through different levels and tasks just like popular video games do. However, 11% strongly disagreed as a result of the way Duolingo is programmed to push users to continue making progress

through excessive notifications and promoting users to acquire the premium features of the app.

4.1.3.7 Duolingo app is a user-friendly and attractive tool

Figure 7 addresses participants' agreement towards Duolingo as an easy-to-use tool and its intuitive interface access.

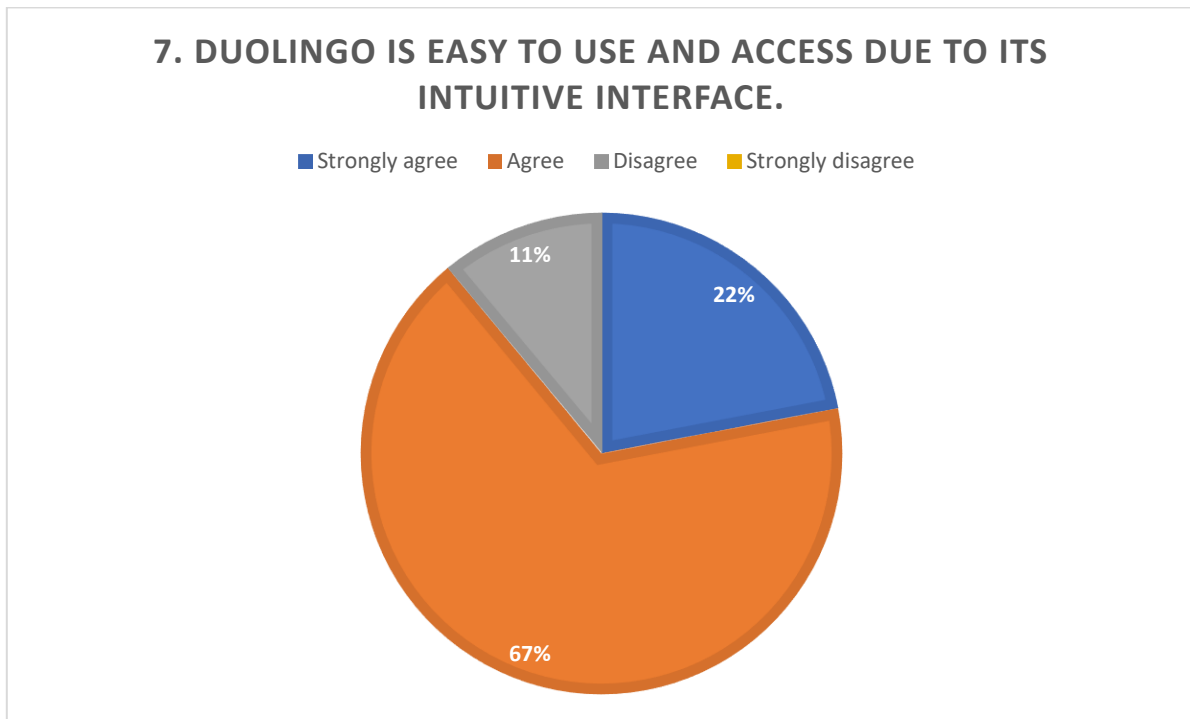


Figure 7. *Duolingo is easy to use and access due to its intuitive interface.*

According to the data results, 67% agreed and 22% strongly agreed Duolingo's interface makes it a user-friendly tool that allows them to get used to it easily and to navigate through it as a learning vehicle. On the other hand, 11% disagreed with this statement pointing out that user-interface experience efficiently varies from user to user, and it may be affected by different aspects such as internet connection, device capacity and more.

4.1.3.8 Duolingo app is a helpful English language learning tool with a variety of exercises.

Figure 8 addresses participants' agreement towards Duolingo as a helpful resource for English Language with a variety of exercises.

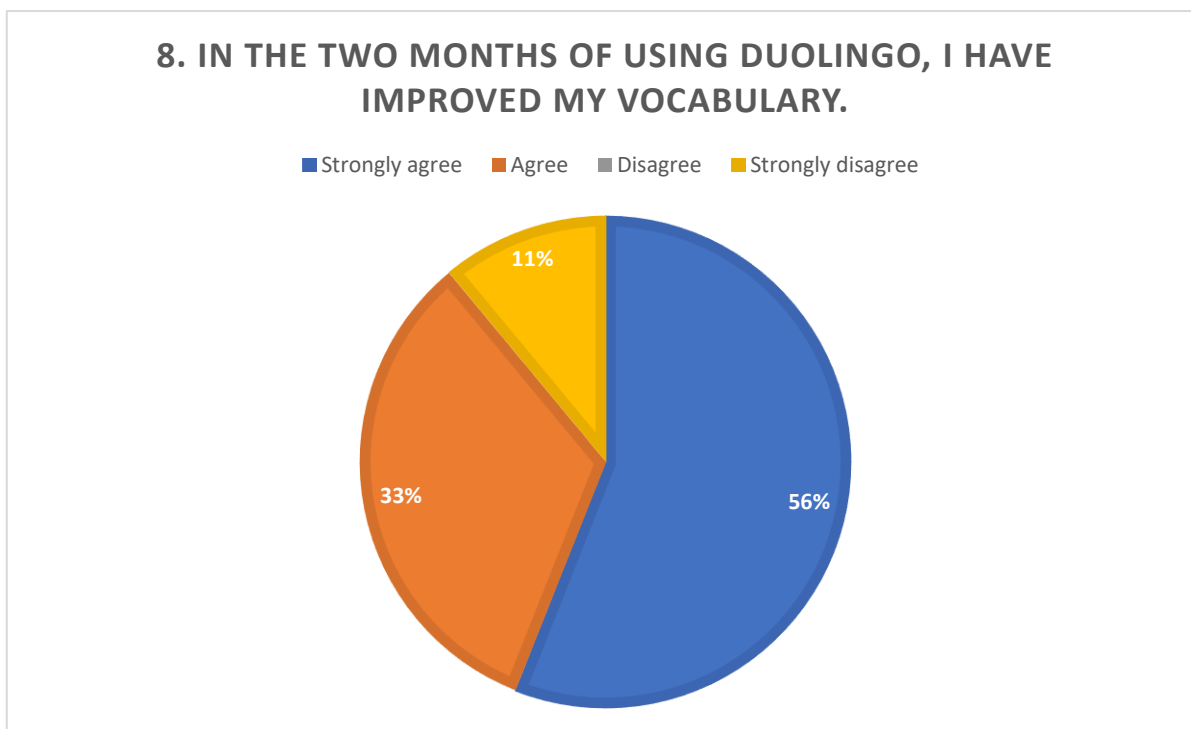


Figure 8. *In the two months of using Duolingo, I have improved my vocabulary.*

Data points of that 56% strongly agreed and 33% agreed that Duolingo app is helpful to practice the language in context through a variety of vocabulary and grammar drilling exercises as the app is designed to introduce, practice, reinforce and even assess lessons taught along all levels set by the platform. However, 11% disagreed because users' performance is not always straightforward, and scores may be different in relation to lessons and level's difficulty and users' strengths and weaknesses.

4.1.3.9 Participants Willing to use Duolingo App

Figure 9 measures participants' willingness to use Duolingo App to learn English.

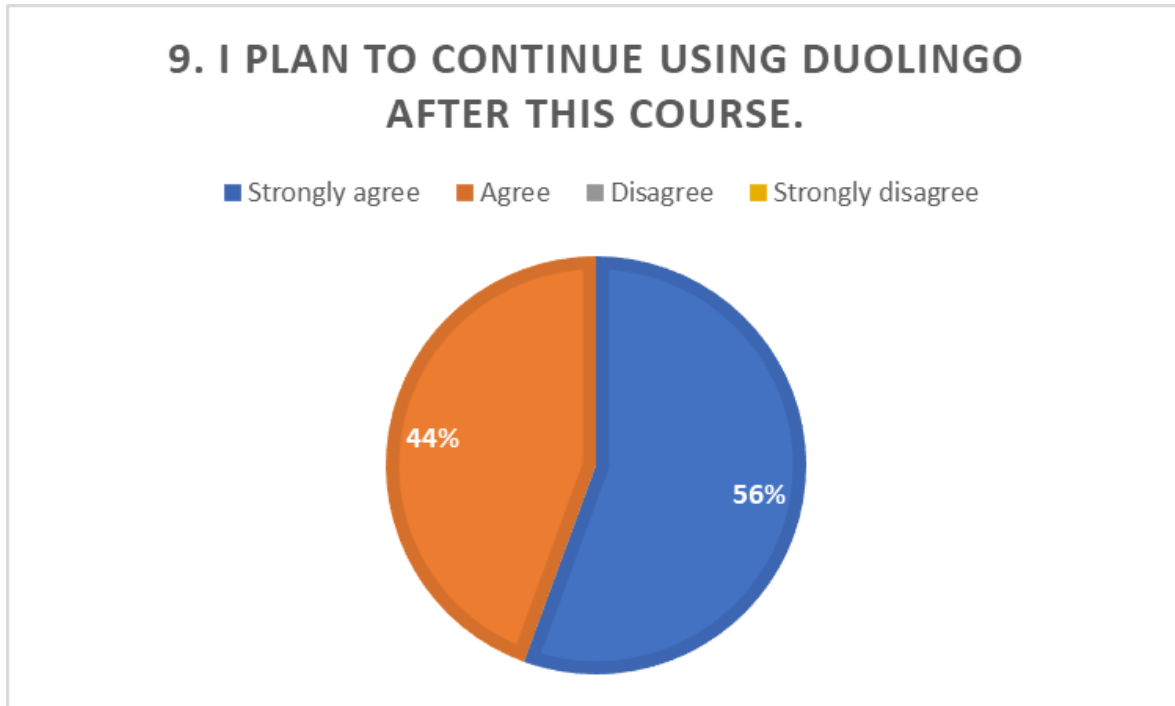


Figure 9. *I plan to continue using Duolingo after this course.*

The graphic above points out that 56% strongly agreed and 44% agreed to continue using the Duolingo app once the course finishes. As a result, the Duolingo app has been perceived as an enjoyable, engaging and easy-to-use app because it immerses users in a holistic virtual learning environment. Duolingo allows students, from all ages, to manage this tool for Learning English just as easily as a videogame format experience.

4.1.3.10 Duolingo app makes the learning process enjoyable, entertaining, and motivating.

Figure 10 addresses participants' perception of Duolingo's learning process.

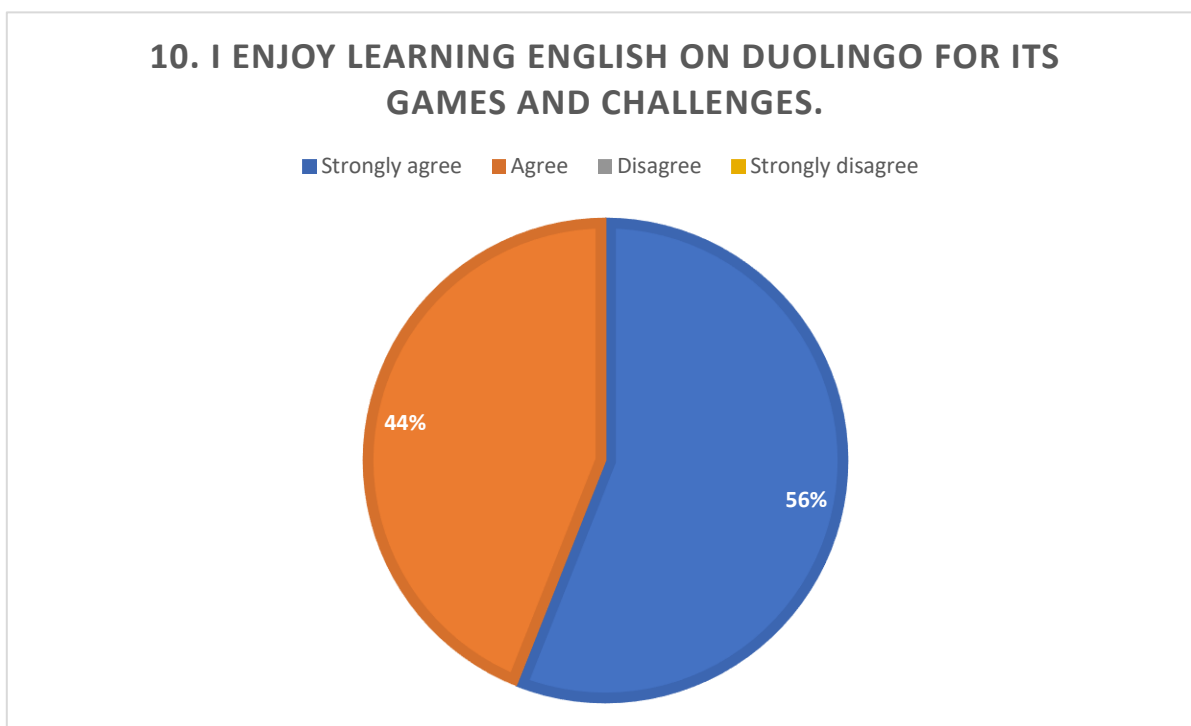


Figure 10. *I enjoy learning English on Duolingo for its games and challenges.*

Data collected indicates that 56% strongly agreed and 44% agreed that the Duolingo app is innovative and attractive enough to learn a language as it is perceived as an enjoyable and motivating vehicle that challenges users to acquire a foreign language and even improve it through games designed for different learning stages.

4.2 Qualitative data results

The instrument concerning the qualitative tradition in this study was the Focus group whose aim was to collect participants' perceptions towards Duolingo App interaction as a classroom tool. From participants' transcriptions, nine main categories were

identified, interpreted and they will be described below. The research questions will be presented by describing the categories that emerged during the analysis.

4.2.1 Students' perceptions about using Duolingo as a vocabulary learning tool.

Students' perceptions towards Duolingo app were perceived as an attractive learning tool due to its video game style and features (gamification), visual content and engagement generated from these elements. This is the result of the way the app was applied during the classes in order to provide students with enough practice during and after the lessons with a variety of exercises. The following categories are described below.

4.2.1.1 Gamification

Duolingo offers game-like features such as tracking user's progress, assessing every single task as well as adapting and reorganizing language learning content as users progress or level up in the acquisition of new knowledge. As participants become aware of their progress, this leads to learning engagement through gamification, which is a well-known positive aspect about the app, just as Gerardo stated, *"About the positive aspects I noticed when using Duolingo is that there are a lot of interactive characters and you can even level up"*. The Duolingo app as a learning tool functions as a game because it uses game-based mechanics, and the aesthetics resembles a game that engages people to learn English in different ways.

The more participants know about their performance and capabilities, the more they want to advance as it happens in video games as Valentina said, *"I used to be lazy*

but after using Duolingo I have noticed how my performance has improved”.

Gamification for learning can be suitable for teaching content as e-learning tools especially like Duolingo that is perceived as enjoyable as any traditional video game but at the same time it provides participants with learning opportunities across different levels of knowledge and complexity. Most importantly, students become aware about how much progress they have achieved in the language.

4.2.1.2 Visual Appeal

As part of the Gamification features, Duolingo app offers a user-friendly interface which allows users to explore and have access to the app content easily by showing animated and charismatic characters, namely Duolingo Owl, who guides and provides useful information along the learning experience. Not only characters are the only visual appeal but also images, videos and the way the exercises are displayed as Emmanuel stated, *“It is fun to learn through images because even the exercises come with them and you can practice, repeat the phrases, get a score and know your performance”.*

Besides, Duolingo provides supportive images for memorization which are suitable for visual learners such as Joana: *“It is a good application because it teaches you through images and it is helpful to learn the verbs”* and Gerardo: *“I would describe the app as fun and entertaining because it is colorful and has many mini-games and I think you can learn better”.* Both agreed that learning specific vocabulary was easier for them due to the app’s colorful design and entertaining mini games. The visual appeal is undeniably a way to engage students into learning activities that are

adapted, designed, and displayed through a modern and colorful interface that makes students enjoy, get involved and acquire the target language knowledge.

4.2.1.3 Engagement

Duolingo app promotes learning engagement since it provides language practice and reinforcement through an attractive and user-friendly interface that, according to Gerardo, is *“fun and entertaining”* because of the resources it displays when answering exercises or the visuals which were helpful during their Duolingo’s learning experience. In addition, Alexa states that *“Duolingo app feels like interacting with a person in a fun way and it doesn’t feel like forcing learning”*. Participants perceived language learning as a daily activity, as a hobby and not as an obligation that generates a natural input for language acquisition.

The way participants stay active practicing the language before, during and after every lesson is a key to promote learning engagement (Dörnyei & Kormos, 2000) and involvement in every single activity guided by Duolingo app. For example, in the case of Alexa, she expresses that *“It is fun because the app interacts with me and also with the other ones who are learning, too, and sometimes the app hosts games to study”*. Duolingo’s engagement relies on the way users experience learning as a game which maintains them active and provides them with several opportunities to practice the language no matter the place nor time, in a community of practice.

4.2.2 Advantages in using Duolingo as a vocabulary tool.

The participants' experiences and opinions helped highlight several advantages of employing Duolingo as a vocabulary tool, which were organized into four themes. These themes show Duolingo's effectiveness within specific learning contexts, its purpose and organization which contribute to heightened student motivation. The four identified themes are as follows: learning in context, vocabulary learning aid, scaffolding method, and motivation for participation. These topics are described in the following sections.

4.2.2.1 Learning in context

Participants pointed out the advantages of using the Duolingo app in terms of their vocabulary learning because of the abilities and areas they developed during class. For example, Naomi says *“I have learned to pronounce English words a bit better and understand what the class is about”* while Alexa states *“I reviewed the verbs we learned in class”* or Joana who reports *“I have had better participation during the class”*. This shows that participants pointed out that Duolingo was effective as means of improving their pronunciation, vocabulary, translation skills, and even social skills since students were involved in a community of practice where they all experienced language learning by following the same teaching process through Duolingo and even faced similar challenges along the way.

Therefore, learning and experiencing the language as a community involved in the same context, the classroom, presented some advantages such as the fact that students enhanced their receptive and productive skills and received the same language input along with their shared experience with the app. The motivation and

engagement students showed represented one of the biggest advantages of creating a suitable learning context based on Duolingo's content and features since this helped students improve specific language skills. However, one major issue was the app would push users to practice as much as they could despite their limited access to content which impacted their motivation and engagement as well.

4.2.2.2 Vocabulary Learning Aid

One of Duolingo's main language features are the vocabulary tasks which introduce, reinforce, and assess vocabulary. Users practice word pronunciation by repetition and memorization along with provided visual aids and in-context examples. That is why participants pointed out how Duolingo impacted their English learning as the vocabulary activities allow them to acquire new vocabulary consistently. This vocabulary helps them to get ready for coming lessons as Valentina stated, *"It has helped me because I didn't know some words and after practicing with them, I could answer during the class because I knew what they mean"* or Emmanuel who says that *"Duolingo's speaking system has helped me to pronounce and express some words better"*.

In addition to this, vocabulary tasks provide different scenarios which are useful to learn and apply vocabulary in context as Alexa said, *"The app shows you verbs with different meanings, so it is helpful to know when to apply them in daily life"*. Thus, Duolingo as a learning vocabulary aid is perceived and recognized as useful and effective to learn vocabulary in isolation, in context and in different scenarios that allow users to build their communicative competence.

4.2.2.3 Scaffolding Method

In addition, lessons in the Duolingo app are structured according to the scaffolding tradition which organizes and displays learning content in a logical way, so students learn new content by building new knowledge and getting ahead in the language acquisition process. For example, Valentina recognizes the scaffolding method as useful because all her peers studied and reviewed content in Duolingo and the lessons are limited to every student's level, *“when the teacher checks the vocabulary and asks about it during class I participate because I know what to answer”*.

Every single lesson was designed following Duolingo's app content and features to what Alexa stated, *“I feel I have advanced a little more in English because I have a hint on what the coming lesson is going to be about”*, this points out how language content is displayed on the Duolingo app. By showing different levels, participants can try and cover content in advance but in a logical structured sequence that provides them with hints on what is being covered even before class.

4.2.2.4 Motivation for participating.

One of the most noticeable advantages are the learning opportunities provided by the app because this motivates students to keep on studying not only English but other languages available on Duolingo as in the case of Joana who says that *“I want to continue using the app to acquire more knowledge and even learn another language. I want to recommend Duolingo as well because it was helpful”* or as Emmanuel explains it: *“I am going to continue using the app to learn, maybe, Chinese, Japanese or speak Korean”*. Both participants are willing to continue

learning other languages through the app which shows their motivation and interest in learning languages, in general.

Also, Duolingo works as a motivation vehicle that promotes participants' confidence when participating and interacting in the classroom since reviewing and reinforcing lessons encourages students to share what they learned and even speculate about future topics without being afraid of committing mistakes as some participants expressed. For example, Naomi says: *"I felt eager to participate because I liked how Duolingo works"*, or Joana who reports *"I felt like participating even more during the class and sharing more things with my classmates."*

Duolingo creates the learning conditions and motivates participants along its different teaching stages (introduction, practice, language production and evaluation) because the app tracks and assess students' progress as it is expressed by Patricia: *"I think my English performance has improved because when I watch a video I can understand it better and when it is class time and the teacher starts saying some words I have a hint to comprehend it better"*. Even outside the classroom, participants expressed using Duolingo to learn more as in the case of Alexa who says, *"I have improved and advanced a lot with Duolingo activities because now, even before the class, I have an idea of what it is going to be about"*. *Duolingo* helps participants to keep track of their progress and apply it in their English language learning objectives.

4.2.3 Drawbacks perceived from using Duolingo as a vocabulary tool

Although the Duolingo app can be downloaded for free and be used by everyone with a smartphone, internet connection and the willingness to learn a language, it has some limitations to fully take advantage of it. The freemium app features such as the notification features resulted in being annoying and intrusive along the vocabulary learning process.

4.2.3.1 Freemium model

Freemium apps allow users to experience the application features with certain limitations. These limitations can be removed after subscribing to a premium plan. In the case of Duolingo as a freemium app, it provided access to most of the language content namely lessons, tasks, progress and assessment features except to premium features and activities. Regarding this aspect, Cindy expressed that some activities were like a *“contest you can’t participate in if you don’t pay”*. Denying access to this kind of interactive online event represents a limitation and a challenge for participants who are eager to test their abilities and move forward in their learning but cannot afford these premium features. This can, in turn, negatively affect participants’ learning progress, engagement, and motivation to continue learning any language on the app.

In addition to this, Duolingo app is designed to allow users to level up and continue practicing depending on the number of chances they have. However, when participants have used up all their “lives” they are not allowed to continue practicing unless they pay or watch ads to get more practice opportunities. This situation made participants *“feel good and bad”*, as Valentina stated, because once participants’

progress and motivation had reached its peak they were suddenly forced to stop or wait for not meeting exercise expectations. Participants' motivation and willingness to learn consistently were affected.

4.2.3.2 App features

Freemium features discussed previously led to explain other Duolingo's app features participants noticed and experienced along with the learning content. First, online tools and apps display notifications, updates and offers as reminders which may be intrusive and annoying since they overwhelm participants. This information intends to make them use the app for specific purposes even if participants are not interested in them. As Gerardo establishes *"If you don't use Duolingo, tons of notifications start popping out to let you know that you have to use it"*.

Notifications have the objective to have participants monitor their progress and get ahead on learning along its different levels. However, these notifications were identified as something that demotivate students as they could lose progress in a short period of time if they did not use Duolingo as Valentina said *"What I didn't like about Duolingo was that it sent notifications to let me know I had lost my progress just because I didn't practice one day"*. Although the Duolingo app, as a learning tool, may be attractive to participants, the fact that it pushes them to visit it through notifications as a way to keep participants on track may be irritating and discouraging. Duolingo's gaming style may disrupt participants' learning progress due to intrusive features that not all of them may tolerate.

4.3 Summary

Chapter four presented quantitative and qualitative data results from the pre-tests and post-tests scores, questionnaire responses and the focus group discussion. Findings were described and explained as well as the graphics, charts and quotes from the participants. The quantitative data results present an overall comparison and analysis of users' improvements while the qualitative data analysis points participants' perceptions towards the app with positive and negative experiences along this study. In chapter five, the conclusions, key findings, limitations and further research will be described.

Chapter V: Conclusions

This chapter presents a summary of the key findings, including variations in progress according to the pre-test results, the effectiveness of Duolingo as a vocabulary learning tool, and certain drawbacks of the application. Additionally, it outlines the study's limitations, such as technical issues, the small number of participants, a limited timeframe, the exclusion of assessments in other language skills, and the absence of input from teachers. Lastly, it discusses directions for further research and offers a final reflection of the research project.

5.1 Summary of the key findings

The use of apps as learning tools can support the teaching and learning process as this builds a community where students experience and overcome similar learning challenges. This aligns with how the use of apps enhances vocabulary acquisition, increases confidence, and encourages class participation due to students' inclination toward multimedia into their learning experience (Rezaei, Mai & Pesaranghader (2013). In other words, participants become more confident about their knowledge as they feel part of a community where they all share the same vocabulary learning process and experience.

Participants are aware of how much they know because they followed the process and had challenges that impacted their motivation through the app's features. Engagement led young learners to keep a positive attitude towards the Duolingo app because of the digital resources it offered to promote the learning of vocabulary. Duolingo app exemplifies an efficient application of ICTs (Rank et al., 2011) because not only does it facilitate vocabulary acquisition but also nurtures meaningful

engagement, allowing learners to investigate, compose, create, reflect, evaluate, and collaborate in a technologically mediated and interconnected learning environment.

Additionally, it becomes evident that participants who achieved the highest scores in the pre-test experienced little progress in their post-test performance. Conversely, those who scored the lowest in the pre-test demonstrated significant improvements in their post-test scores. This suggests that the topics and activities offered by Duolingo may not effectively facilitate the advancement of English language skills among students with prior language knowledge. Instead, it appears that Duolingo primarily serves to reinforce and review what these students already know, as indicated in their pre-test results. On the other hand, students who initially did not have a high score in the pre-test were able to effectively learn, practice, and consolidate their knowledge of the target language with the aid of Duolingo. This translated into higher scores at the end of the study, highlighting the platform's potential as an effective tool for language acquisition among this group of students.

Although apps provide free access (Gokgoz et al., 2021) to specific content, freemium apps, like Duolingo, offer basic products or services at no cost but introduce a fee for supplementary features that enhance the functionality of the free version. Some features, in the freemium models, are perceived as intrusive, and would hinder learning because of not having access to the complete range of learning options offered in the premium version. As a result, freemium apps should be used as supportive learning apps but not as the main language learning vehicle since its effectiveness relies on paying to have access to all the available resources

of the App. This is not always an option for most students, and it can definitely affect the way learning takes place as the consistency in the use of these apps is key to achieve different language levels.

Duolingo App seems to be a promising tool for vocabulary development in English language classrooms. However, educators should consider the App's advantages such as gamification and interactive exercises (Teske, 2017). Also, mobile learning is considered a powerful method of providing instruction and acquiring knowledge due to its ability to be accessed at any time and any location (Bidin and Ziden, 2013). It is also important to be aware of potential drawbacks such as small screens, data storage, multimedia limitations, and the fact that some smartphones are expensive and not available for all students (Klopfer et al., 2002) to optimize its integration and enhance language learning outcomes. Further exploration of Duolingo specific features and strategies would contribute to a more comprehensive understanding of its effectiveness in language education.

5.2 Limitations of the study

Although this study achieved the objective, there were unexpected situations that affected its development. First, a technical issue was the faulty internet connection at school that did not allow participants to fully use the Duolingo app as it requires a network connection to run smoothly. This was especially problematic because every single lesson plan was based on Duolingo's tasks and content which required the use of the app during the session and even afterwards. Having faulty internet access somewhat affected students' performance and lesson plan application as this

unexpected problem had nothing to do with the teacher's abilities at all but the school's facilities in terms of the internet service provider and the principal's support.

The number of participants represented another limitation since the sample population for this research was small. A more accurate quantitative view would require a more diverse and bigger sample size to offer more general findings of what language learners perceive about the Duolingo app. A third limitation was the time available to apply the strategy during class because it was only for six weeks. This probably impacted the results since they only presented the outcomes from a short period of time which did not allow teachers and participants to exploit all the app's features and further levels for an extended period of time.

Another limitation can be the role of both tests. These tests focused on assessing specific parts of written language and grammar but not speaking nor integrated skills. The evaluations of participants' speaking or their ability to integrate language skills across different modalities (e.g., reading, writing, listening, and speaking) would have offered more breadth of data for the study's results. This means that the study may not provide a complete picture of the participants' language proficiency development but just partially.

Not exploring teachers' perceptions and experiences by using Duolingo as a learning tool represents another relevant limitation because it cannot be possible to point out its effectiveness or drawbacks in larger and more diverse classroom contexts. This also limits the scope of understanding if the use of Duolingo app in other grades and levels in the institution could have offered equivalent results. This study did not

gather nor measure any kind of data to have a wider perspective of teaching through Duolingo or with any other similar digital resources.

5.3 Directions for further research

This research revealed how students perceive Duolingo as a tool for language learning. Nevertheless, there is still more to explore to enhance our understanding of language learning apps and how they contribute to creating better teaching strategies. Some directions for future research may be the following:

Future research can address the number of participants by incorporating larger and more diverse participant samples and by employing a more comprehensive assessment of language skills to gain a deeper understanding of the impact of Duolingo as an auxiliary language-learning tool. Another aspect for research could be to investigate the long-term impact of the app on students' language proficiency. A longitudinal study may provide a different outlook into whether skills acquired through the app are maintained and continue to develop over time, namely productive and receptive skills in isolation or integrating skills.

Duolingo is a popular language learning app, but there are other similar apps, and some others are focused on different skills. Conducting a comparative study that could assess the effectiveness of Duolingo in comparison to other language-learning tools might widen the picture. This comparison is not limited to just mobile applications, it may also include different methods such as traditional classroom instruction compared to the use of apps, or online courses plus the use of apps.

Another possible aspect to be further researched could be a study to explore the use of Duolingo with a different demographic sample. This study was focused on young learners with an A1 English level; thus, it would be advised to explore how different demographic factors such as age, and prior language-learning experience influence students' perceptions and outcomes when using Duolingo in a language class. This could represent an opportunity to widen the findings of this study and contribute to expanding on those language-learning tools for the benefit of both language learners and teachers.

Finally, contrasting teachers and students' perceptions regarding the use of digital apps in class may be a theme to develop a new brand study. Exploring a more holistic perspective on how students and teachers react to new ways of language teaching and learning and how this may impact their beliefs, conceptions and experiences could yield meaningful data about cognition and social aspects.

5.4 Reflection

The development of this thesis was an extenuating journey that made us, sometimes, doubt whether we would finish it on time. However, we learned a lot during the research process, this knowledge has become invaluable for our profession. If there is something we can affirm with certainty, it is that writing a thesis is not an easy task, as we realized the immense dedication and perseverance that it requires.

Throughout the past months of researching and writing, we faced several challenges such as the title of this thesis and its purpose, as this marks the starting point of any

thesis. Another significant challenge was the selection of the appropriate participants for the study, which we overcame by taking advantage of all the resources available to us. We gained extensive knowledge through this research project. We expanded our understanding not only of the subject matter, but we also acquired a more diverse vocabulary, as well as mastered the art of effectively expressing our thoughts. Additionally, we had to develop time management skills and cultivate discipline as we juggled with reading, writing, working, and attending all our other responsibilities.

Finally, we feel proud and satisfied to finish this research project and to be able to see the final product materialized after months of hard work and time invested. It is a rewarding experience, indeed. This thesis proves that if we set our minds to a task, we can face challenges and overcome them. Finishing this thesis was not only a requirement, but also a journey through dedication, planning, and skills development. Last but not least, this thesis taught us the importance of the pursuit of knowledge and personal growth.

Bibliography

- Aiken, L. R. (1997). *Questionnaires and inventories: Surveying opinions and assessing personality*. <http://ci.nii.ac.jp/ncid/BA32826092>
- Alghamdi, Y., Alghamdi, A. M., & Alsolami, T. (2019) English Language Teaching: Historical overview, current Issues and suggestions for enhancing speaking proficiency in EFL Contexts. *Arab World English Journal*, 10 (2) 270-283. <https://dx.doi.org/10.24093/awej/vol10no2.21>
- Alnajjar, M. and Brick, B. (2017) Utilizing Computer-Assisted Vocabulary Learning Tools in English Language Teaching: Examining In-Service Teachers' Perceptions of the Usability of Digital Flashcards. *International Journal of Computer-Assisted Language Learning and Teaching*, volume 7 (1). <https://doi.org/10.4018/IJCALLT.2017010101>
- Asgari, A., & Mustapha, G. (2011). The type of vocabulary learning strategies used by ESL students in University Putra Malaysia. *English Language Teaching*, 4(2), 84–90. <http://files.eric.ed.gov/fulltext/EJ1310802.pdf>
- Benson, P., & Voller, P. (1997). Autonomy and independence in language learning. *System*, 25(4), 584–588. [https://doi.org/10.1016/0346-251x\(97\)90167-6](https://doi.org/10.1016/0346-251x(97)90167-6)
- Bidin, S., & Ziden, A. A. (2013). Adoption and application of mobile learning in the education industry. *Procedia - Social and Behavioral Sciences*, 90, 720–729. <https://doi.org/10.1016/j.sbspro.2013.07.145>
- Brannen, J. (2017). Mixing Methods: qualitative and quantitative research. In *Routledge eBooks*. <https://doi.org/10.4324/9781315248813>
- Campbell, D. T., & Stanley, J. C. (2015). *Experimental and quasi-experimental designs for research*. Ravenio books.
- Celce-Murcia, M. (2014). An overview of language teaching methods and approaches. *Teaching English as a second or foreign language*, 4, 2-14.
- Chapelle, C. A. (2003). *English Language Learning and Technology. Lectures on applied linguistics in the age of information and communication technology*. John Benjamins Publishing Company.
- Chapelle, C. (1990). The discourse of computer-assisted language learning: Toward a context for descriptive research. *TESOL Quarterly*, 24(2), 199-225.
- Chen, Q., & Yan, Z. (2016). Does multitasking with mobile phones affect learning? A review. *Computers in Human Behavior*, 54, 34–42. <https://doi.org/10.1016/j.chb.2015.07.047>
- Chomsky, N. (1957). *Syntactic Structures*, The Hague: Mouton.

- Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches*. Thousand Oaks, CA: SAGE Publications
- Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five approaches* (3rd ed.). Thousand Oaks, CA: Sage
- Cunningham, J. W. (2001). The National Reading Panel Report. *Reading Research Quarterly*, 36(3), 326–335. <https://doi.org/10.1598/rrq.36.3.5>
- Delahunty, G. P. & Garvey, J. J. (2010). *The English Language: From Sound to Sense*. The WAC Clearinghouse; Parlor Press. <https://doi.org/10.37514/PER-B.2010.2331>
- Deris, F. D., & Shukor, N. S. A. (2019). Vocabulary Learning Through Mobile Apps: A Phenomenological Inquiry of Student Acceptance and Desired Apps Features. *International Journal of Interactive Mobile Technologies (IJIM)*, 13(07), pp. 129–140. <https://doi.org/10.3991/ijim.v13i07.10845>
- Diamond, L., & Gutlohn, L. (2006). *Vocabulary Handbook*. Brookes Publishing Company.
- Dimitrov, D. M., & Rumrill, P. D. (2003). Pretest-posttest designs and measurement of change. *PubMed*, 20(2), 159–165. <https://pubmed.ncbi.nlm.nih.gov/12671209>
- Dörnyei, Z., & Kormos, J. (2000). The role of individual and social variables in oral task performance. *Language Teaching Research*, 4(3), 275–300. <https://doi.org/10.1177/136216880000400305>
- Dörnyei, Z., & Taguchi, T. (2009). Questionnaires in second language research. In *Routledge eBooks*. <https://doi.org/10.4324/9780203864739>
- Duolingo - Learn a language for free (n.d.-b). Duolingo. Retrieved on November 29, 2022, from <https://www.duolingo.com/efficacy>
- Freeman, C. (2023, 11 octubre). *What is the Duolingo teaching method?* Duolingo Blog. Retrieved on January 19, 2024 from <https://blog.duolingo.com/duolingo-teaching-method/>
- Freeman, C., Kittredge, A., Wilson, H., & Pajak, B. (2023). The duolingo method for app-based teaching and learning duolingo research report. Retrieved on August 31, 2023, from <https://duolingo-papers.s3.amazonaws.com/reports/duolingo-method-whitepaper.pdf>
- Garrison, C., & Ehringhaus, M. (2007). Formative and summative assessments in the classroom.
- Garrison, D. R. (2011). *E-Learning in the 21st Century: A Framework for Research and Practice*, 2nd edition. *Routledge eBooks*. <https://dl.acm.org/citation.cfm?id=1996369>

- Gips, A., Dimattia, P., & Gips, J. (2004). The effect of assistive technology on educational costs: two case studies. In *Springer eBooks* (pp. 206–213). https://doi.org/10.1007/978-3-540-27817-7_31
- Gokgoz, Z. A., Ataman, B., & Van Bruggen, G. H. (2021). There's an app for that! Understanding the drivers of mobile application downloads. *Journal of Business Research*, 123, 423-437. <https://doi.org/10.1016/j.jbusres.2020.10.006>
- Howatt, A. P. R. & Smith, R. (2014). The History of Teaching English as a Foreign Language, from a British and European Perspective, *Language & History*, 57:1, 75-95
- Hunt, A. W., & Beglar, D. (2002). Current research and practice in teaching vocabulary. In *Cambridge University Press eBooks* (pp. 258–266). <https://doi.org/10.1017/cbo9780511667190.036>
- Islam, R., Islam, R., & Mazumder, T. (2010). Mobile application and its global impact. *International Journal of Engineering & Technology*, 10(6), 72-78.
- Januszewski, A., & Molenda, M. (2013) *Educational Technology: a definition with commentary*. Routledge.
- Kemp, S. (2022). The Global State of Digital in July 2022. Data Reportal – Global Digital Insights. Retrieved August 22, 2022, from <https://datareportal.com/reports/digital-2022-july-global-statshot>
- Kim, H. (2002). Teachers as a barrier to technology-integrated language teaching. *English Teaching*, 57(2) 35-64
- Klopfer, E., Squire, K., & Jenkins, H. (2002). Environmental Detectives: PDAs as a window into a virtual simulated world. *Proceedings. IEEE International Workshop on Wireless and Mobile Technologies in Education*, 95–98. <https://doi.org/10.1109/wmte.2002.1039227>
- Lantolf, J. P., & Appel, G. (1994). *Vygotskian approaches to second language research*. Praeger.
- Larsen-Freeman, D., & Anderson, M. (2013). *Techniques and Principles in Language Teaching 3rd edition - Oxford Handbooks for Language Teachers*. Oxford University Press.
- Levy, M. (1997). *Computer-Assisted language learning: Context and Conceptualization*. Oxford University Press.
- Llombart-Huesca, A., & Zyzik, E. (2019). Linguistic factors and the spelling ability of Spanish heritage language learners. *Frontiers in Education*, 4. <https://doi.org/10.3389/feduc.2019.00150>

- Mahdi, H. S. (2017). Effectiveness of Mobile Devices on Vocabulary Learning: A Meta-Analysis. *Journal of Educational Computing Research*, 56(1), 134–154. <https://doi.org/10.1177/0735633117698826>
- McCracken, G. (1988). *The long interview*. SAGE.
- Merriam-Webster. (n.d.). Technology. In *Merriam-Webster.com dictionary*. Retrieved January 20, 2023, from <https://www.merriam-webster.com/dictionary/technology>
- Messick, S. (1989). Validity. In R. L. Linn (Ed.), *Educational measurement* (pp. 13–103). Macmillan Publishing Co, Inc; American Council on Education.
- Motteram, G., & Sharma, P. (2009). Blending learning in a web 2.0 world. *International Journal of Emerging Technologies & Society*, 7(2), 83–96.
- Nation, P. (2007). The Four Strands. *Innovation in Language Learning and Teaching*, 1(1), 2–13. <https://doi.org/10.2167/illt039.0>
- Nation, P., & Chung, T. M. (2009). Teaching and testing vocabulary. In *Wiley-Blackwell eBooks* (pp. 543–559). <https://doi.org/10.1002/9781444315783.ch28>
- Newport, E. (1991). Contrasting conceptions of the critical period for language. *The epigenesis of mind: Essays on biology and cognition*, 111-130.
- Northrup, D. (2013). How English became the global language. In *Palgrave Macmillan US eBooks*. <https://doi.org/10.1057/9781137303073>
- Piaget, J., & Mussen, P. (1983). *Handbook of child psychology. History, theory, and methods*.
- Poudel, A. (2022). Information and Communication Technology in English Language teaching: Some opportunities and challenges. *Comparative & International Higher Education*, 14(4). <https://doi.org/10.32674/jcihe.v14i4.3874>
- Prasad, M. (2017). How to conduct a successful focus group discussion. *Atlan | Humans of Data*. <https://humansofdata.atlan.com/2017/09/conduct-successful-focus-group-discussion/>
- Price, D. (2022). The 20 most popular Android apps in the Google Play Store. *MUO*. Retrieved September 02 2022, from <https://www.makeuseof.com/tag/most-popular-android-apps/>
- Raja, R., & Nagasubramani, P. C. (2018). Impact of modern technology in education. *Journal of Applied and Advanced Research*, S33–S35. <https://doi.org/10.21839/jaar.2018.v3is1.165>
- Rank, T., Millum, T., & Warren, C. (2011). *Teaching English using ICT: A Practical Guide for Secondary School Teachers*. A&C Black.

- Read, J., & Chapelle, C. A. (2001). A framework for second language vocabulary assessment. *Language Testing*, 18(1), 1–32. <https://doi.org/10.1177/026553220101800101>
- Rezaei, A., Mai, N., & Pesaranghader, A. (2013). Effectiveness of using English vocabulary mobile applications on ESL's Learning performance. *2013 International Conference on Informatics and Creative Multimedia* (114-118). <https://doi.org/10.1109/iciem.2013.27>
- Richards, J. C., & Rodgers, T. S. (2014). *Approaches and methods in language teaching*. <https://doi.org/10.1017/9781009024532>
- Richards, J. C., & Schmidt, R. (2013). Longman Dictionary of Language Teaching and Applied Linguistics. In *Routledge eBooks*. <https://doi.org/10.4324/9781315833835>
- Shek, D. T. L., & Zhu, X. (2018). Pretest-posttest designs. *The SAGE encyclopedia of educational research, measurement, and evaluation*, 1, 4.
- Siemens, G. (2005). Connectivism: a Learning Theory for the Digital Age. *International Journal of Instructional Technology and Distance Learning*, 2(1). http://jotamac.typepad.com/jotamacs_weblog/files/Connectivism.pdf
- Skinner, B. F. (1957). Verbal behavior. In *Appleton-Century-Crofts eBooks*. <https://doi.org/10.1037/11256-000>
- Stolyar, B. (2019). Apple unveils the most popular iPhone apps of 2019. *Mashable*. Retrieved on September 02 2022, from <https://mashable.com/article/apple-most-popular-iphone-apps-2019>
- Taras, M. (2008). Summative and formative assessment. *Active Learning in Higher Education*, 9(2), 172–192. <https://doi.org/10.1177/1469787408091655>
- Teske, K. (2017). Duolingo. *The CALICO Journal*, 34(3), 393–401. <https://doi.org/10.1558/cj.32509>
- Tümen-Akyıldız, S., & Ahmed, K. H. (2021). An overview of qualitative research and focus group discussion. *International Journal of Academic Research in Education*, 7(1), 1–15. <https://doi.org/10.17985/ijare.866762>
- UNESCO Institute for Statistics. (2009). *Guide to Measuring Information and Communication Technologies (ICT) in Education*. <https://unesdoc.unesco.org/ark:/48223/pf0000186547>
- Vygotsky, L. S. (1978). *Mind in Society: the development of higher psychological processes*. <https://ci.nii.ac.jp/ncid/BA03570814>
- Van Dijk, J. A. (2013). 2 A theory of the digital divide1. *The digital divide*, 29.

- Warschauer, M., & Healey, D. (1998). Computers and language learning: an overview. *Language Teaching*, 31(2), 57–71. <https://doi.org/10.1017/s0261444800012970>
- White, M. G., MA. (2021). How to assess Vocabulary: Ideas for measuring progress. In *YourDictionary*. <https://reference.yourdictionary.com/resources/how-to-assess-vocabulary.html>
- Wisker, G. (2001). *Sylvia Plath: A Beginner's Guide*. Hodder Education.
- Wright, W. E. (2019). *Foundations for teaching English language learners: Research, Theory, Policy, and Practice*. Brookes Publishing Company.

Appendices

Appendix A

Pre-test and post-test

Este instrumento pretende recolectar y registrar información para desarrollar un proyecto investigativo. La información recabada será tratada de manera confidencial.

Nombre:

Edad:

Grado escolar:

Sexo:

Correo electrónico:

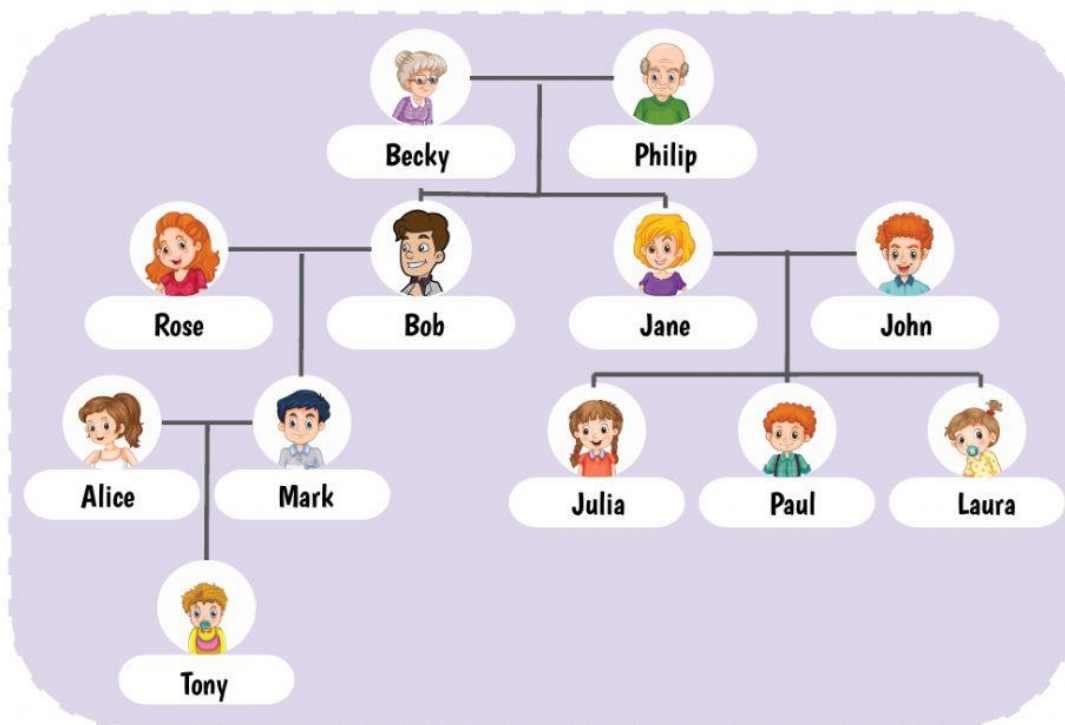
A. Look at the picture and fill in the blanks with the words given.

A. Mira la imagen y completa los espacios en blanco con las palabras dadas.

Worksheet 2 : Family Tree



Activity 2.1 Look at the picture and fill in the blanks with the words given.



1. Becky is the _____ of Alice.
2. Jane is the _____ of Mark.
3. Laura is the _____ of Rose.
4. John is the _____ of Bob.
5. Julia is the _____ of Mark.
6. Tony is the _____ of Philip.
7. Paul is the _____ of Julia.
8. Tony is the _____ of Rose.
9. Rose is the _____ of Jane.
10. Bob is the _____ of Paul.

- aunt
- cousin
- niece
- uncle
- brother
- nephew
- grandmother
- great-grandson
- sister-in-law
- brother-in-law

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grandmother - aunt - niece - cousin - brother - grandson - uncle

1. Becky is Alice's _____.
2. Jane is Mark's _____.
3. Laura is Rose's _____.
4. Julia is Mark's _____.
5. Paul is Julia's _____.
6. Tony is Rose's _____.
7. Bob is Paul's _____.

B. Translate the sentences into Spanish.

B. Traduce las oraciones al español.

8. It is very expensive.
9. What is your address?
10. My first name is Alex.
11. I need a passport.
12. My last name is Turner.
13. A large sandwich and a small salad.
14. Hi, I'm from Canada, too.

C. Translate the sentences into English.

C. Traduce las oraciones al inglés.

15. Yo tengo un boleto.

16. Un autobús y un tren.

17. Perdón, necesito la cuenta.

18. Bienvenido a México.

19. El pasaporte está en el hotel.

20. Sí, tengo una reserva.

21. Soy de España

D. Complete the sentences below with the appropriate word.

D. Completa las siguientes oraciones con la palabra apropiada.

22. Welcome! Good _____! MORNING - WITH - SUGAR

23. I need a train or a _____. YES - BUS - MILK

24. I have a _____ with my boyfriend. DATE - CHEAP - WEEK

25. Coffee with _____, please. TABLE - MILK - GAME

E. Match the pairs.

E. Une los pares.

26. Cariño

Bienvenido

27. Partido	Honey
28. Novio	Expensive
29. Caro	Cheap
30. Barato	You're welcome
31. Welcome	Boyfriend
32. De nada	Game

F. Complete the sentences with the appropriate words from the box.

F. Completa las oraciones con las palabras apropiadas de la tabla.

birthday - girlfriend - jacket - thanks - tired - good - milk

33. Sorry, honey. I'm _____. I work a lot!

34. This is my _____, Shelly.

35. I want to buy this _____.

36. But Lily, today is my _____.

37. Good, _____. And how are you?

38. Your English is _____, too.

39. With _____ and sugar, please.

G. Write the name of the following pictures in English.

G. Escribe el nombre de las siguientes imágenes en inglés.



44.



=

45.



=

Appendix B

Questionnaire

1. Pienso que los ejercicios interactivos de Duolingo (traducción inversa, escuchar y escribir, conversación, ordenar las oraciones, etc.) son entretenidos para aprender inglés:

Muy de acuerdo___ De acuerdo___ En desacuerdo___ Muy en desacuerdo___

2. Creo que Duolingo es útil para aprender vocabulario en inglés:

Muy de acuerdo___ De acuerdo___ En desacuerdo___ Muy en desacuerdo___

3. Ha mejorado mi desempeño en las clases de inglés usando la aplicación de Duolingo.

Muy de acuerdo___ De acuerdo___ En desacuerdo___ Muy en desacuerdo___

4. Opino que los ejercicios en Duolingo son más divertidos y atractivos que los ejercicios en papel ya que su contenido multimedia los hace más interactivos:

Muy de acuerdo___ De acuerdo___ En desacuerdo___ Muy en desacuerdo___

5. Creo que Duolingo hace que el aprender inglés sea más fácil por su sistema de juego con ejercicios interactivos y recompensas.

Muy de acuerdo___ De acuerdo___ En desacuerdo___ Muy en desacuerdo___

6. Me siento motivado para practicar inglés en Duolingo en mi tiempo libre:

Muy de acuerdo___ De acuerdo___ En desacuerdo___ Muy en desacuerdo___

7. Considero que Duolingo es una herramienta fácil de usar por su interfaz intuitiva y facilidad de acceso a la plataforma.

Muy de acuerdo___ De acuerdo___ En desacuerdo___ Muy en desacuerdo___

8. Siento que Duolingo me ha ayudado a aprender vocabulario durante estos dos meses de curso gracias a la variedad de ejercicios, el refuerzo constante del vocabulario que ya conozco, y la enseñanza de palabras y frases dentro de un contexto.

Muy de acuerdo___ De acuerdo___ En desacuerdo___ Muy en desacuerdo___

9. Pienso seguir usando Duolingo después de este curso.

Muy de acuerdo___ De acuerdo___ En desacuerdo___ Muy en desacuerdo___

10. Me gusta aprender inglés usando Duolingo porque utiliza juegos y desafíos que hacen que el aprendizaje sea más ameno, entretenido y motivante.

Muy de acuerdo___ De acuerdo___ En desacuerdo___ Muy en desacuerdo___

Appendix C

Focus group questions.

- 1.- ¿Cómo describirías tu experiencia al utilizar Duolingo como herramienta de aprendizaje de vocabulario en inglés?
- 2.- ¿Crees que Duolingo ayudó a mejorar tu vocabulario en inglés?
- 3.- ¿Hay algo que no te gustó al utilizar la aplicación Duolingo?
- 4.- ¿Crees que el uso de Duolingo ha mejorado tu desempeño en las clases de inglés de la escuela?
- 5.- ¿Te gustó usar Duolingo durante tus clases de inglés?
- 6.- ¿Tuviste algún inconveniente al usar la aplicación de Duolingo?
- 7.- ¿Cómo te sentiste usando Duolingo en tus clases para aprender inglés?
- 8.- ¿Qué cosas buenas o negativas has notado al usar Duolingo?
- 9.- ¿Hay algo más que deseen comentar acerca de la aplicación de Duolingo?