The effectiveness of learning a foreign language via a distance learning tool: Testing the Duolingo application

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Abstract
This research is conducted to explore the effectiveness of studying online. Among the distance learning practices there is the Duolingo application to help users learn a foreign language. In particular, this is a case study aiming at exploring whether the Duolingo application is effective enough in learning a foreign language and developing the language skills. The data for this study was collected by researching tools such as questionnaires, interviews, and tests, before and after the learning process. 31 candidates participated in this research and talked about their experience. Collecting and analyzing the data of the study distributed into making some assumptions about the application. Taking into account the participants' opinions and suggestions, the researcher managed to identify important issues in the application. The application seems to be effective in the attempt of learning a foreign language. However, there are some issues to be explored regarding the exploration of the language skills and other technical issues on the application. These issues need to be discussed and analyzed for the further improvement of it. Additionally, the researcher gives her opinion by personal experience on using the application and then she suggests some changes to make the application more efficient.

Keywords: Duolingo, language skills, productive skills, receptive skills, effectiveness, distance learning, grammar, vocabulary, pronunciation

1 Introduction

Technology has made learning easy. The Internet, websites, programs, and applications have become significant and necessary tools during the teaching and

learning process. Online or distance learning has managed to obtain a significant role in education. Distance learning practices are proved to be practical since the limitations of time and space are no longer affecting learning. People prefer distance learning for professional or educational reasons, and they may attend courses of their interest based on their daily schedule. Certified courses are provided by institutions or universities.

The Duolingo application provides the learners with a series of courses to learn a foreign language. Duolingo exists as both an online site and application. Therefore, learners may practice on their computer, tablet or even their mobile phone. It seems that it is effective and valid for learning. However, there is no further research to support the effectiveness of the application since it is new. This application enables practice in various types of exercises. The users use language skills to complete the exercises. Do the learners actually practice and develop skills? To what extent is the language skills developed? What about grammar and vocabulary? Whether the language skills are developed through the application is debatable, and it is an issue for further research. This article is a case study. Questionnaires, interviews, and tests are applied as research tools to draw conclusions. The participants are about to use the application for a given period and then they will be asked to reflect on their experience. Then the researcher will attempt to make assumptions about its effectiveness.

2 Theoretical framework of distance learning

2.1 Re-introducing distance learning

Learning has developed beyond physical and practical borders. Learners have access to knowledge since technology and the Internet is always present in every learner's life. Learners urged by several reasons choose distance learning rather than attending classes.

King et al. (2001) provided separate definitions for the terms distance learning and education. By the term "learning" they defined the ability to learn at a distance and by the term "education" they defined the activity of learning at a distance. There is a difference between those two terms in relation to time and place. Time and place are among "the limitations" which are associated with the term distance (Guilar & Loring

2008). Therefore, distance learning is distinguished in synchronous and asynchronous education as a separate branch with distinguished methodology.

Asynchronous education is achieved regardless the place and time of attendance. The learners may attend courses according to their personal schedule. On the contrary, synchronous education is immediate and easier for the learners to interact with their instructors or co-learners. Nevertheless, distance learning is actually trying to combine characteristics of both versions.

2.2 The characteristics of distance learning

According to Institute for Interactive Technologies (2006) and Anderson & Elloumi (2004), distance learning allows the learners to have access to information anytime. Based on Vioreanu's (2016) approach, distance learning has six basic characteristics; it offers open accessibility, availability, freedom of time, place and pace and open programming. The majority of the courses does not have specific requirements. As a result, learners adjust the learning process in their personal schedule. The courses are also available worldwide, for everybody. Distance learning is not targeted for a specific group of people. Hence, knowledge is available for everybody in the best preferable way.

Among those advantages, Page-Bucci (2002) claims that learning online is a student-centred process which may be effective based on one's motivation. Although computers are widely used, Ariwa et al. (2011) suggest that learners may not have the technical skills, or may not be computer literate which automatically causes problems into the process of learning. Another drawback of distance learning practices is their "availability" to diverse groups; the fact that learners are asked to be engaged in the learning process is "ironic" when having access to technology is not an option for everybody (Davison 1996). However, these courses are still "available" to them.

On another note, it is doubtful whether learners achieve the same quality of knowledge both online and traditionally. Daugherty & Funke (1998) indicate that the feeling of isolation during the process may cause insecurity and lack of confidence. This is because there is no interaction between the instructor and the learner in most of the cases.

2.3 Behind-the-distance-learning-scenes: The theoretical approach

In order to understand how distance learning functions, there has to be a general understanding of what lies beneath it; the theoretical framework is derived from European and American models based on correspondence study (Simonson et al. 1999). Anderson & Dron (2011) indicate that distance learning is based on three pedagogical approaches; cognitive-behaviourism, social constructivism, and connectivism. Cognitive-behaviourism and social connectivism suggest that learning occurs when the process is learner-centred. On the contrary, connectivism puts the transmitted information at the centre of the process, laying emphasis on the interaction between the learners and the obtained knowledge.

Based on Wedemeyer's theory (1981) about independence and autonomy, distance learning covers the distance between teacher-learner overcoming any frontiers such as time and place. Learners are engaged in the process by adjusting it based on their needs and preferences. Distance learning is "learner determined" (Moore 1994) and as a result, the learners are engaged in an autonomous and self-directed process. The degree of this autonomy is the result of selecting objectives, resources, and methods of learning and evaluating. Peters' theory (1988) about industrialization promotes the involvement of the technological means and abilities into the learning process. The process is gradually structured through "mechanization and automation" (ibid.). Holmberg's theory (1986) about interaction and communication is based on the interaction between teacher - learner. Learners behave as individuals using the means they have, which are structured by "noncontiguous" means (ibid.). Learning might be the result of the combination of the theories we know, such as behaviourism, cognitivism, and constructivism. Moreover, the communication and interaction of the learner with their co-learners or the instructors is important since it increases motivation.

The theory which is followed in this research is a combination of all three methods. The learner is independent and autonomous, and the process is structured and presented through mechanized and automatic material. Communicating and interacting with other learners is available during the learning process.

2.4 Effectiveness in developing language skills via a distance learning framework

Chin & Williams (2006) claim the existence of a "holistic learning environment" which combines several kinds of environment to engage learners into the process.

Learning is the outcome of a combination of environment; instructive, situating, constructive, supporting, communicative, collaborative and evaluating. The aim of this "environment" is to provide learners with the appropriate environment to engage in the learning process (ibid.). In that way, learners have the opportunity to develop skills, practice them and eventually achieve knowledge through authentic material.

For the purpose of achieving knowledge in a foreign language course and having a successful process, there has to be an effective language learning program. The characteristics of this program should be input, output, and feedback. Nielson et al. (2009) suggest that a comprehensible input is important for an online program. A foreign language learning course ought to provide input which stands as evidence of the "correct formation" of the language. The input has to be adjusted or even simplified to be applied by the levels of language competence and proficiency, according to the CEFR Guidelines (2001).

The Input is as important as the output because learners need to produce the knowledge they obtained. In order the learners to produce output, there has to be an interaction between the learner and the input. Learners may develop and practice skills through that process. Therefore, it is through interaction that learners produce the output and then give results. A language learning course is more effective when feedback is available.

3   Massive Open Online Courses and language learning platforms

3.1 MOOCs and their characteristics

Massive Open Online Courses (MOOCs) are online courses that use both traditional and distance learning course materials such as video lectures, electronic and printed readings, solving problems, interactive exercises and challenging assignments. Built on the safe ground of instructional technology, educational technology, and traditional theoretical frameworks, most of MOOCs include structured fora and wikis to boost interactivity between students and tutors. Being part of the on-ongoing research projects in distance education, MOOCs emerged as a popular mode of learning and teaching courses. Their most common characteristics are that they do not have specific requirements from the student perspective, the courses are mostly free and available all over the world and the participants interact without any time and place limitations.

Examples of MOOC programs/applications in digital learning are *Coursera, Stanford Online, Edx, FutureLearn, Khan Academy, OpenClassrooms, Edmodo, Udacity, Codecademy, Datacamp*, among others. Based on McKay's (2013) report the manor group of "active learners" students were male and the significant majority followed undergraduate- and graduate-level courses. Finally, McKay (2013) reports very interesting statistics about the different groups of users and their actual participation (watching videos, taking quizzes and exercises, etc), and those who quickly dropped the course or occasionally watched some lectures.

3.2 Language learning platforms

A blended learning approach is hidden behind the language learning platforms (LLPs) where users via a web interface are engaged in activities, theories, grammar and vocabulary. Such approaches usually combine the use of virtual worlds with other tools or more traditional elements, such as physical classrooms or pen-and-paper exercises. There are even cases of virtual environment learning platforms that are implemented in gaming environment such as Second Life or the Sims series or alternatively a few language schools give also access to virtual classes, e.g. LanguageLab and Online Teachers.

The LLPs can be considered to offer distinct learning experiences, such as immersive experience based on the interaction, social experience due to the linking and connecting with other pupils, and creative experience throughout creative and independent tasks (Chang et al. 2012; Hornik 2009; Lan et al. 2015; Rusch & Brunner 2013; Valencia 2017). Based on Lim (2009), there is the Six learnings framework, a pedagogical outline proposed for virtual world learning environment to promote exploring, collaborating, role-playing, building, championing and expressing.

Via web and the vast array of resources, there are plenty of ways language learners can learn by themselves whenever and wherever they like, Some of the most dominant and important LLPs provide several languages for free, such as *Duolingo, Busuu, LingQ, Lang8, Lingualia, Ling-U, Papora, Digital Dialects, Memise* among others.

Duolingo offers 68 different language courses across 23 languages. Duolingo provides written lessons and dictation. It has skill tree using gamification and users can progress through and a vocabulary section where learned words can be practiced (Huynh & Iida 2017; Rachels & Rockinson-Szapkiw 2017). *Busuu* contains grammar

units to learn to build sentences with advanced grammar units, official certificates to take level tests and earn official McGraw-Hill level completion certificates and a Vocabulary Trainer to make sure you never forget the words you've learned (Kétyi 2015; Valencia 2016).

LingQ includes videos that are a great resource for teachers but access to unlimited vocabulary or extra features is not provided (Liu et al. 2015). *Lang-8* is based on a community of native speakers who connect with you and correct your texts; therefore, its users should have a proficient language level in writing and reading (Buendgens-Kosten 2016; Graillet 2016; Nishioka 2016). *Papora* focuses mainly on vocabulary and it incorporates grammar so that the user can form proper sentences. The "bite-sized" lessons are easy with excellent audio guiding the users through 60 real life situations (Dan 2017). *Memrise* contains three simple ingredients are used to make it an effective language learning tool, such as science, fun, and community. When it comes to science, the team addresses the fact that the brain learns faster with the help of mnemonic flashcards, the "mems". Games and videos make learning more entertaining and playful (Calle et al. 2017; Schellander 2017).

4 The Duolingo application

Duolingo is an application aiming at learning a foreign language. This application launched in 2011, and it is available on any device and supported by any Operating System. It is free and frequently updated. The material is available for speakers of various nationalities, and it contains a variety of languages from all over the world (see image 1).

Image 1. Examples of courses

Learners log in and they create a profile to attend classes. They can attend as many classes they want to learn specific language skills and vocabulary. The users choose between two options whether they are beginners or not. This aims at distinguishing and positioning learners into the appropriate level of language.

Every new user can complete a diagnostic test in order for the application to adjust the sessions to the proper learning level. This test contains random questions related to language structures. The test takes about 5 minutes and adapts the questions to the level of the learner by getting harder or easier based on the given answers.

A beginner starts attending the sessions. The user participates in a group of lessons starting with the basic elements of a language, such as articles, and then more complex structures. Each session contains two to four lessons and at the end of each session, there is a test for revision. Since the learner is positioned at the appropriate level he is exposed to a series of lessons to learn the language and develop the language skills gradually (see Image 2).

Image 2. Examples of a series of lessons

The material is focused on vocabulary, grammar and language skills. Each course has a variety of exercises. There is extra theory of grammatical structures available on the Duolingo site given in the traditional approach of the grammar books. Users adjust the learning process to their program and preferences by setting reminders or certain progress to be made per day

Each lesson aims at teaching vocabulary, grammar, or language skills, such as the listening and speaking skill. Learners interact with the application by completing a variety of exercises, such as typing, translating, or even pairing elements of the language (see Image 3).
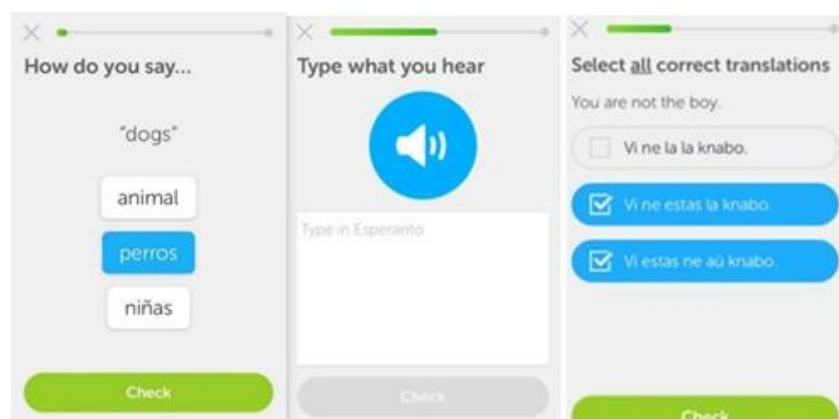
Image 3. Examples of different types of exercises

Each correction is accompanied by a translation and a grammatical rule. In the case of a wrong answer, there is a note which highlights the mistake so that the users understand the rule (see Image 4). There is also a rollover option which provides learners with the translation of the language items and assists learners identify the elements of language.
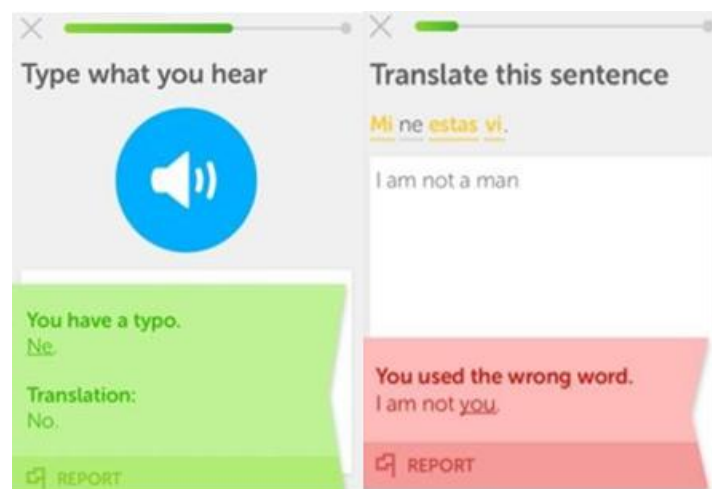

Image 4. Answers accompanied by corrections

The application is programmed to send notifications to remind learners practice. These reminders are set by the users based on their programs, preferences, and personal goals. Therefore, the application keeps a record of the effectiveness of the process in each case.

To track of the user's progress, Duolingo treats each user as a unique case based on his profile, performance, learning pace and errors. Users can also use their profile to control the pace of the learning and the notifications according to their preferences.

5 Research methodology

5.1 Research questions

The aim of the study is to explore the effectiveness of the Duolingo application in developing the language skills. More specifically, it is going to be examined the extent to which the application is useful. Hence, the results might be interesting since there is no relevant research.

1. For what reasons do people use the application?
2. How does Duolingo change the user learning attitude/behavior?
3. How effective is this application in learning a foreign language?

The outcome is expected to give answers concerning the application and the use of it such as a sufficient software to learn a new language or to refresh the memory about an already learned language Additionally, it may underline the strengths of the application and distinguish possible weak points providing suggestions for further improvement.

5.2 Description of the methodology

The researcher conducts a case study to test a product in a specific target group. The Duolingo application is applied and tested in real life conditions to investigate its effectiveness. The approach which is used to collect and analyze data is a combination of the qualitative and quantitative approaches.

The quantitative methodology applies highly structured techniques such as questionnaires, and the qualitative methodology uses some semistructured interviews to be more effective. Therefore, it is a mixed methods approach since multiple methods are applied. Applying the mixed methods approach benefits the researcher because it helps her explore the use of the application in real life conditions and then collecting data through questionnaires and interviews. Interviewing is the qualitative method which is used to gather information. Goulding (2002) indicates that there are

many forms of interviews: structured, unstructured, group, face to face or conducted over the phone. Using questionnaires is a quantitative procedure administered to identify attitudes, opinions, or characteristics.

The process which is followed is "analyzing, applying knowledge, reasoning and drawing conclusions" (Kardos & Smith 1979). The results from the one method could help develop or inform the results of the other method. Merriam (2002) claims that a study is focused on the interpretation of the result. Hence, the result is explored by selecting a sample, collecting data and writing up the finding.

5.3 Research tools

After a mass invitation sending for participation, the participants were 114 adult users of Duolingo. Those 114 participants agreed to give their opinion about distance learning and their experience with the Duolingo application. To gather a satisfactory amount of data, the researcher aimed at finding learners who belong to the A1-A2 level of language proficiency.

The participants are not older than 40 years old, and they come from a variety of professional backgrounds. Some participants are keen on distance learning practices or not, participants who prefer traditional learning or others who consider online learning more effective. Some of them have used the application in the past, and others have never heard of it.

The participants are asked to complete two questionnaires, the pre- and the post-questionnaire (see Psychogyiou, 2016). Each questionnaire is accompanied by a test provided by the application. They are asked to complete the questionnaires in different periods. By the end of each questionnaire, some of the participants are interviewed (see Psychogyiou 2016).

Questionnaires and interviews are the methods which are used to get an insight of the attitude, opinion, knowledge, stance, and behavior of the participants about the concept of the research. The fact that there are structured questions to answer makes it easier for them. Another advantage of using questionnaires is that they can be instantly completed at any time and any place. Most of the questions used a Linkert 5-scale option to provide reliable and concrete quantitative data for our analysis.

Interviews give extra information which does not occur in the questionnaires. The researchers can discuss, exchange ideas and understand the participants' opinion. As mentioned above, each questionnaire is accompanied by a test. The participants

take the tests in different periods. The first test is a diagnostic test which is taken before the beginning of the learning process to keep a record of the level as a starting point. The second test is taken after the practice of the language to understand how effective the application is. It is a progress test aiming to test the skills the users have learned. The test questions are the same type of questions the users have practiced during the learning process. It includes tasks such as tapping words, drilling and translating.

6 Data analysis and discussion

This chapter is the discussion of the findings taking into account the limitations of this research. The general findings point out that more than 70% believe that is very easy/ easy to use Duolingo and most of the users are more confident for vocabulary, reading and listening and less about speaking and writing. More than 85% will keep using the application, almost 80% will recommend it to others and the users are using the apps for more than 4 months (35% more than a year). Furthermore, for half of the participants, it is a daily routine.

Most of the participants felt confident about what they have managed to learn. Additionally, the researcher does not know whether the XPs each participant gathered are the result of repeating the same lesson or the product of the practice which was made from attending more than two lessons in each session. Although, there is a significant number of participants who claimed to be satisfied from using the Duolingo application, when it comes to the language skills there are some contrasting opinions about its effectiveness. In more detail, almost the half of the participants claimed that they are not confident about developing the receptive and productive skills of the language. The other half claimed that they are confident about the result.

Therefore, there is a controversial issue that needs to be discussed. Taking into consideration the participants' suggestions, the reason for this dissatisfaction may arise from the need for more practice. More specifically, some participants claimed that they needed different tasks to develop those skills. For instance, there should be a text, or dialogue to interact with. The aim of the participants is to communicate successfully with someone in real life situations. As it was mentioned in previous section, the application provides practice for the development of these skills through drilling,

repeating, spelling and translating from L1 to L2 and vice versa. That kind of tasks seems to be more efficient in learning and practicing grammar, vocabulary, and pronunciation. On the contrary, those types of exercises do not seem sufficient in developing the language skills such as reading, speaking, writing and listening. It might be more effective if there would be texts or listening inputs of different genres to interact with.
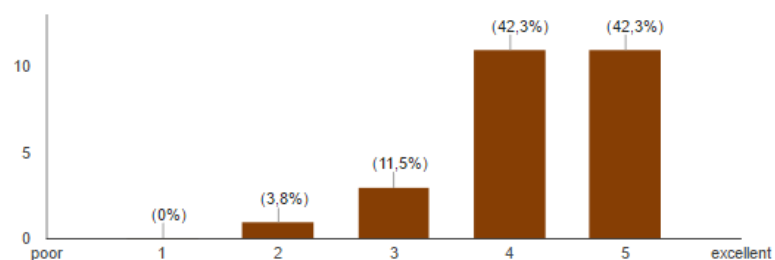
To what extent are you confident about Vocabulary?
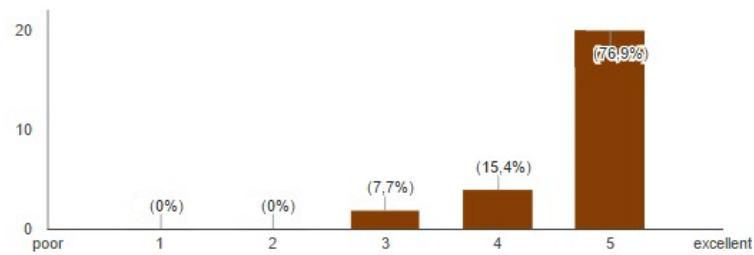
To what extent are you confident about Pronounciation?
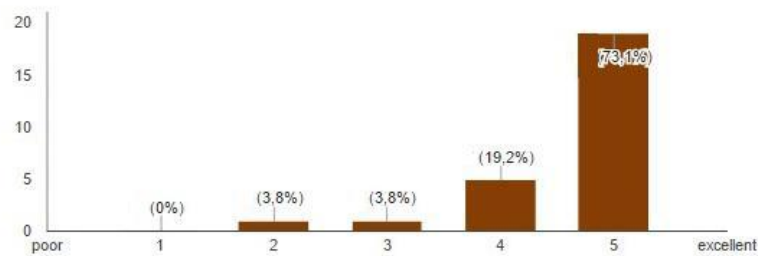
Do you feel confident about the result?

To answer RQ1, the data point out that the users are keen on distance learning practices, feel confident, and they use it for several reasons. Usually, they aim at learning and practicing a FL and developing the language skills. They confirm that an unsupervised language learning course is quite helpful and efficient.

Studying *how people use the application and how it changes their learning attitude and behaviour*, it seems that their use is based on their schedule and

preferences. They enjoy the absence of limitations (time, space, pace) and the option to adjust the courses. The freedom of user-centred learning process seems to boost their confidence and self-dependence which are main conditions for a distance learning procedure. Additionally, although most of the Duolingo participants are learners with prevalent traditional learning tactics, they adopt new techniques and new learning strategies more easily than they expected to do.

Moreover, the research data about *how effective is the application for users learning a FL*, showed that the participants had a significant feeling of confidence, they felt efficient in practicing the skills and more specifically, significant in learning vocabulary, grammar and pronunciation. Nevertheless, the users require more practice through different and various types of exercises; they needed more guidance when learning grammar. Moreover, they required a change of the test format, more interaction involved in the learning process, since the minimal supervision of the learning process and the lack of a statistical analysis of their mistakes caused a considerable level of uncertainty.

7 Conclusions

The purpose of this article was to explore the effectiveness of the Duolingo application in learning a foreign language and developing language skills. The majority of the participants prefer distance learning for professional and educational purposes. Then they stated some of the advantages and disadvantages of studying online based on their personal experience; they claimed that distance learning is an easy, free and practical learning process. It is important that the learners have the opportunity to adjust the process according to their schedule and preferences.

The vast majority of the participants was confident about the result. However, when it comes to the development of the language skills, in particular, there are some contrasting views which cause a debate about the effectiveness of the application. The users were pleased with learning new vocabulary and pronunciation. On the other hand, some users suggested that the way grammar is "taught" on the Duolingo application needs improvement. Cross-evaluation with Duolingo classes is needed and comparative evaluation with other language learning platforms. It is important that there are such applications as Duolingo and other online platforms to support learners

in the learning process. Evaluating and constantly developing new ways of learning will only have positive results having in mind the learners needs.

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