Effectiveness of Duolingo App in Developing Learner's Vocabulary, Grammar and Pronunciation: A Case Study of a blended TESOL Classroom

Hind A. Al Fadda and Rasha M. Alaudan
Curriculum and Instruction Department (TESOL) College of Education, King Saud University, Riyadh - Saudi Arabia.

(Corresponding author: Hind A. Al Fadda)

ABSTRACT: The advancement in technology has yielded newer methods that students can incorporate to learn new languages. This study was formulated to investigate the effectiveness of using Duolingo application in learning English in a TESOL classroom in the Saudi Electronic University SEU, which teaches through a blended learning system. The data comprises eighty participants who participated actively in the study. Participants were divided into two groups; experimental and control group; the experimental group was subjected to the use of Duolingo plus online learning, and the other group was supposed to follow the traditional methods of teaching, which is online learning and face to face classes. Quantitative analysis of the study shows that students who used Duolingo, plus online learning, registered better in vocabulary development, simple grammar sentences, and fluency in English learned. They found Duolingo easy to use and operate, and they enjoyed learning by using it because of the utilization of mobile devices in hands, gamification, and a variety of activities. A different result was obtained in pronunciation, where students using the traditional methods registered better results in pronunciation. The study concluded that Duolingo is a vital tool in learning in a TESOL classroom. A recommendation was made for future studies to look at the problems that learners encounter in using the application in learning pronunciation.

Keywords: Duolingo, TESOL, simple grammar sentences, Vocabulary learning, teacher replica approach.

I. INTRODUCTION

The advancement in technology has changed how things were used to be done traditionally. One area that has changed course in the field of education with the introduction of various innovations that set to make the learning process more comfortable. Duolingo is one way that technology has changed how learning a second language is done from the previously known traditional methods. According to [2], the application provides the best way to learn two languages simultaneously within a short time. The app offers the English learners with a platform to learn the language that is easy and friendlier through which they can learn and perfect their skill within a short time than other methods for teaching the language. The purpose of the research is to see determine the effectiveness of Duolingo in Teaching English to Speakers of Other Language (TESOL). [3] argue that "the native writers make proper use of vocabulary words, grammar, tenses and make an accurate use of academic features whereas the non-native writers do not use the academic writing style and features accurately while writing". In the classroom, various methods are fronted by the instructor to help the learners acquire English with varied proficiency outcomes that reflect shortcomings in the methods employed. The investigation adopts a quantitative study for two groups of students endeavoring to acquire the English language. During the learning of the language, one group is subject to the use of the Duolingo in their learning process, and the other group adopts the traditional ways of language acquisition. The ultimate goal is to compare the effectiveness of Duolingo in the acquisition of the English language to learners.

II. DEFINING DUOLINGO

Duolingo is a language learning app created by Luis Von and Severin Hacker in 2011 with the goal of providing free education to the world. This website has more than 30 million users at the moment, using the app for learning. This website provides services to the speakers of many languages to English, and English to other languages, [19].

This website is different for desktop and mobile versions. [19] explains that the versions in the following words,

The "tree," which contains skills, each represented by a node that changes color from grey (indicating that skill has not been started) to a color like red, blue or green (you have started the lessons within the skill), to gold (you have mastered all the lessons and vocabulary for that specific skill). Note that the gold color can "turn" back to another color if the algorithm of Duolingo establishes that you need to go back and review those nodes because you have forgotten the vocabulary or because enough time has elapsed. Duolingo has not, up to now, published the content of the tree. The only way to find out is to complete the tree yourself. Thankfully, in Spanish, there is a Google Doc, with its content. These are the components of the tree [19].

Various skills are full of illustrations such as food, animals, and modal verbs, etc.

Total of 329 lessons supplemented with different activities. Each lesson comprises eight words for the learners.

Lexical items: A total of 1571 number of lexica items are available with a strength bar to show learners' ability to memorize the word. In addition, Duolingo uses

flashcards to help the learners to memorize the word, remind if the learners forget to use it.

Activity: This app works like Facebook or Instagram. It provides an option to follow others and others can follow you to discuss, and avail the opportunity to memorize the word.

Discussion: This area is specified for the learners to openly a question in the group and discuss the matter in detail to everyone.

Immersion: This section is for advanced participants aiming to upload a query and translate it directly in any language.

The Lingot Store: "Lingots" is the currency that Duolingo uses to reward its users. You get lingots when you complete a skill node or maintain a streak of days using the site. Users can also "reward" other users with lingots in the Discussion area. With lingots, you can buy several things, like a "freeze streak," which will allow you to miss a day and not lose your streak. some silly outfits for the Duolingo owl (the program's mascot), or, more important in my opinion, a progress quiz, which shows you on a scale of 0 to 5 where you currently stand in your studies.

As discussed above, Duolingo provides opportunities for face to face interaction in the learning process. This app is the gamification of modern technology to teach a language unintentionally to the learners while forgetting or negating the traditional mode of teachings. This study uses Duolingo as a tool to compare the learning of language between two groups, the experiment group, and the traditional (controlled) group.
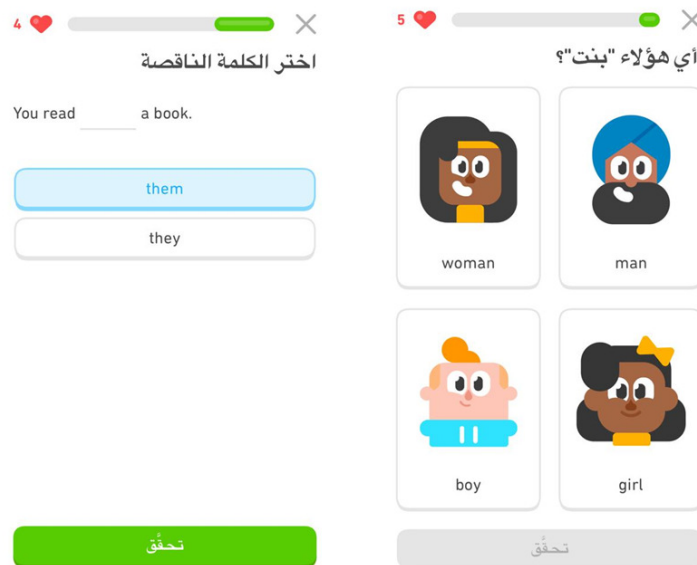
III. LITERATURE REVIEW

The advancement in technology has made available smartphones that can be described as minicomputers increased the access to application sused in the learning of other languages [4]. Duolingo came into play the year 2010 with the intent to create a better way for persons with the yearn to learn other languages to facilitate their dreams with ease [18]. After its launch, diverse people have used the application to learn their languages of choice across the world. Learninga language like any other work that an individual would like to do needs a lot of motivation. Learners need to be motivated that they are making progress in their learning process to help them push further and chive better results. The developers of Duolingo knew this as much and provided an individualized set of instructions that motivates an individual to continue learning [23]. The motivation provided by the application provides a foundation to catapult the learners to put the best in trying to learn the language. Further, the app offers a gamification option that plays like a challenge for the person learning the language. It serves as a challenge because one cannot move from one level to the next unless they gain proficiency in the level they currently reached. By so doing, learners are prompted to put extra devotion to see them move to the next level of their language acquisition process. According to [5] "many of the interaction aspects of the talk are closely related to the grammar, semantics, pragmatics, and other dimensions of discourse,"

The Learning Program
[7] asserts that Duolingo provides the learner with a structured course that has different levels of competency that a student needs to attain. In each level, a student needs to acquire some competence and skill before they move to the next level. Each level is detailed with the lessons that are relevant to the complexity of the competence that needs attainment at the particular level that the learner has achieved. Earlier on, concerns were raised over the issue of fluency of learning a language, for instance, in this case, English. Concerns were raised on howa student can evaluate their fluency in learning English and how the application could help the attainment of fluency when learning the language. The developers have since responded to the concerns and included features that can make individuals gain competence in the fluency of English when learning using the Duolingo. [8] researched to establish the impact Duolingo has in the learning of English for the learners that purpose to learn the language. The results indicated that persons who used

the application to learn English showed an increment of vocabulary in their learning process. Other findings from the results indicated that students who used the app showed improvements in their English pronunciations and showed significant improvement in grammatical structures that are not complex. The research suggests that the improvements registered during the study emanated from the application creating some form of appeal to the users. The appeal comes for the fact that the users made use of the Duolingo effectively because it creates an atmosphere for learning like a game [2]. Since it functions like a game, learners engage it for the user for longer hours that translates to the building of vocabulary, improving their pronunciations and sharpening their grammar.

Impact of Translation in Learning Language

According to [12], Duolingo application facilitates the learning of English through facilitating the translation from the language of the learner. The translations help the learner in learning the vocabulary of the language that they need to learn. As the leaner builds their vocabulary, they can then move to the formation of simple sentences for comprehension. The application then provides the evaluation aspect of the learning process that gives the students instant feedback on their learning progress. The instant feedback provides the platform that the students can rely on to track the mistakes made so that they master the level before moving to the next step. The features created by Duolingo tries to create a replica of the classroom environment the sets to work to improve the learning experience. Munday [19] researched the effectiveness of using Duolingo in the learning of the Spanish language. In the study, two groups of students were created, one group used the application in the leaning of the Spanish language, and the others used the traditional methods. The emphasis was made that it was not enough to cram the concepts of the Spanish but learn to comprehend the language and acquire it and make it part of them. After the successful implementation of the study, results indicated that the learners who used Duolingo for their learning registered better than the anticipated results [19]

The Replica of Teacher Approach

The other approach that the application has created that helps in the learning process is creating a feature that takes the replica of a teacher. Highlights the audio feature that provides oral sounds like what a teacher could do. The feature allows the leaner of the language to listen to how different words are pronounced, which helps in sharpening the pronunciation competency of the learner. In the learning environment, a teacher ensures that the student does not move to the next topic or objective before they show competence in one area. The same aspect is replicated in the feature where the student cannot move to the next level unless they show competence at the current level; they are already progressing in their learning [6]. It is the same with the feedback that the teacher gives to the students so that they achieve competency before the student moves to the next level. Huynh *et al.*, [15] indicate that the gamification feature which appeals to the learners and motivates them is likened to the encouragement and motivation that a teacher gives to the students. However, mistakes regarding translation exist within the

context of the approach given in the translation that can act as a barrier to learning.

Diversity in culture can play as a barrier to learning where the learners need to conform to their culture affiliations to achieve a learning outcome [24]. The culture plays a crucial role because the learners need to observe the culture from which the language one wants to learn comes originates. The use of the Duolingo has broken the challenge that is occasioned by cultural affiliations in the learning process. The application is culture neutral, which makes it practical for learning across various cultures. The breaking of cultural issues is an advantage for the use of the up in TESOL classroom to ensure that the students do not need to find ways to cope with cultures that are not appealing to them. In his study, [16] devoted to finding out the effectiveness of the Duolingo application in learning Spanish and, after that, do a standardized test to see the effectiveness of the application. The persons who took part in the study were volunteers and took the test for varied reasons. Results from the study indicated that a standard variation of 8.1 was obtained in the learning of Spanish for every hour used by the application. However, the results indicated that persons who used that application for their own reasons did not show better outcomes as compared to persons with more purpose like for travel or business. It indicates that for a purposeful setting, the application is effective in acquiring the language of interest.

Language Acquisition and Language Learning

The process of endeavoring to be competent in another language can be achieved through acquisition or learning. Krashen [16] indicate that the Duolingo application makes use of conscious knowledge in helping the learners gain competence in the language learned. It has been indicated that learning is not effective in the process of wanting to gain know-how about another language. Language learning is not valid because it incorporates direct instruction about the rules of language that is learned [17]. The learning process of the language is based on the perception that the learner has some knowledge about the language that they want to learn, and it is through this knowledge that they build on their learning. Due to this, it is not deemed sufficient, considering that some learners might choose to learn a language they have never known before. Language acquisition involves the subconscious process where the learner has got no knowledge of the grammar rules for the language they purpose to acquire [10]. It involves repeating what the experts say so that they get to be part of the learning process and know what is right and what is not. Questions are rife then if the Duolingo application can be useful in a TESOL classroom basing the argument on conscious learning that the app utilizes deemed to be ineffective.

Research Questions

This research is based on two research questions which are:

1. What is the effectiveness of applying Duolingo + online learning in the achievement of learning English in a TESOL classroom?

2. Does using Duolingo application in learning English motivate learners positively in class-leading to faster acquisition than the traditional face to face method?

IV. METHODOLOGY

The study is quantitative and experimental in nature. The research questions were answered by developing a conventional quantitative method intended to find the effectiveness of Duolingo's use in learning English in a TESOL classroom. According to [21] conventional quantitative study helps relate the natural variables and how they happen in their natural setting. The quantitative research is essential to help determine the learning process of English in a TESOL classroom without changing the natural way through which learning is acquired. The study used two different groups of students with three different academic levels. The investigation was conducted in Saudi Electronic University SEU (www.seu.edu.sa), a public university that has an enrolment of over 17,000 students all over the kingdom of Saudi Arabia. Over 80 undergraduate programs and over 15 graduate programs. The University uses Blended learning, which is a combination of online learning and face to face classes, and most instructors were native English speakers. All courses are introduced in English. The study targeted the students who are studying in the English language institute in which. Students were required to get a TOEFL IBT score of 91, IELST 7, or Dlinguoe score of 100 before they can be accepted to the university program. The demographics of the learners is shown in the following table:

Table 1: Demographics of Participants of the study.

Gender Frequency	
Female	35
Male	45
Age	
(20-25)	30
(25-35)	40
Above 35	10
Educational level	
Bachelors	55
Masters	18
PhD	7

As shown in Table 1, the number of participants was 80. participants were divided into two groups, where 40 participants (control group) were exposed to traditional English learning methods consisted of online virtual classes and meeting twice a week in class (Blended learning). On the other hand, the other group, 40 participants (experimental group), were exposed to the use of Duolingo application in the learning of English out side class plus online virtual classes. All groups went through 60 hours of learning and completed the same unites of learning in the curriculum during the one month period. Learning materials were designed to cover level B2 in the standards of common European FrameWork (CEFR). The hours were informed by the way Duolingo is designed with its gamified aspect and how learning is done [20]. It shows how many days learners were active, how many lessons they completed, and how many points they were awarded while using the application. Students were asked to monitor their own activity, and involvement by the instructors was kept to

the minimum. After the 60 hours of learning, the learners were given a standardized post-test to evaluate their performance in grammar, vocabulary, and fluency. It is good too. The participants were grouped as depicted in the following Table (2).

Table 2: Participants Distribution in the two groups.

Education Level	Controlled group (Online + face to face)	The experimental group (Online + Duolingo)
Bachelors	27	28
Masters	9	9
PhD	4	3

Instrumentation: The study evaluated the learner's performance based on a 30 minutes written test for the vocabulary section and simple grammar sentences. The test consisted of 25 multiple-choice questions. The number of vocabularies and the simple grammatical structures was evaluated on the mean average scores, as shown in Table 3. Fluency and pronunciation were measured and assessed by the use of a speaking Rubric [22]. When evaluating pronunciation; the instructors focus on the student's ability to produce correct vowels and consonants sounds of English. On the other hand, fluency requires the focus on areas on which the students deliver the message. The rubric was divided into five evaluation categories: Excellent, Good, Satisfactory and Needs improvement [14]. The four points reflected very low, low moderate, and high showing the effectiveness of the method used to teach the language in the classroom.

V. RESULTS AND DISCUSSIONS

The results documented from the study indicating the vocabulary and simple grammatical sentences acquisition throughout the research for the two groups are provided in the tables below:

Table 3: A Table on means for experimental Vocabulary and Simple Grammar sentences performance.

Duolingo	Vocabulary	Simple sentence Grammar
Bachelor	63.7	30.7
Masters	65.8	33.7
PhD	62.6	29.6

Table 3 shows the average vocabularies and the simple sentence grammars that the learners acquired during the period by using the Duolingo application. In contrast, the following table shows the average number of vocabulary and simple grammatical sentences that the leaners obtained using the traditional methods.

Table 4: A Table on means for the controlled group on Vocabulary and Simple Grammar sentence performance.

Traditional Methods	Vocabulary	Simple grammar sentences
Bachelors	40.8	20.3
Masters	38.3	21.8
PhD	39.4	23.4

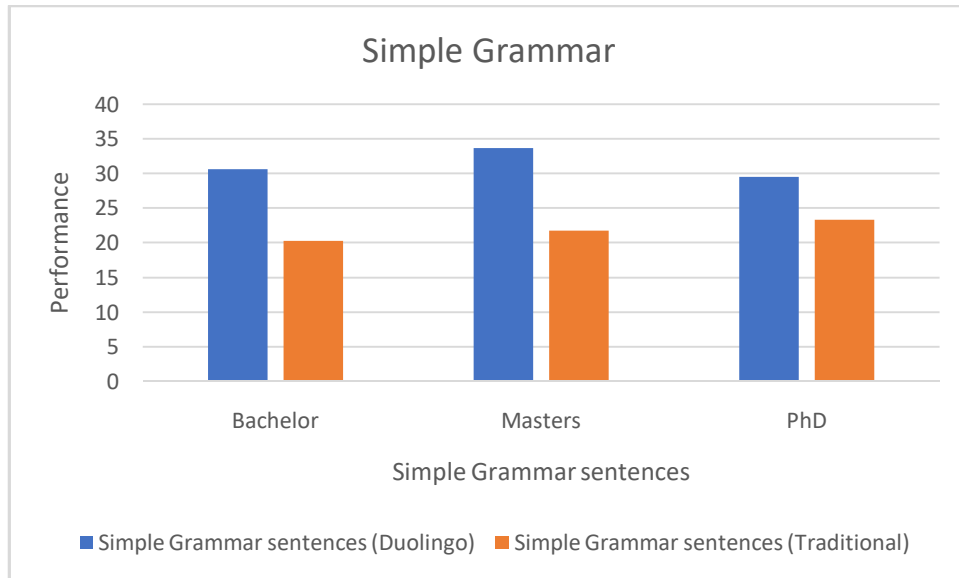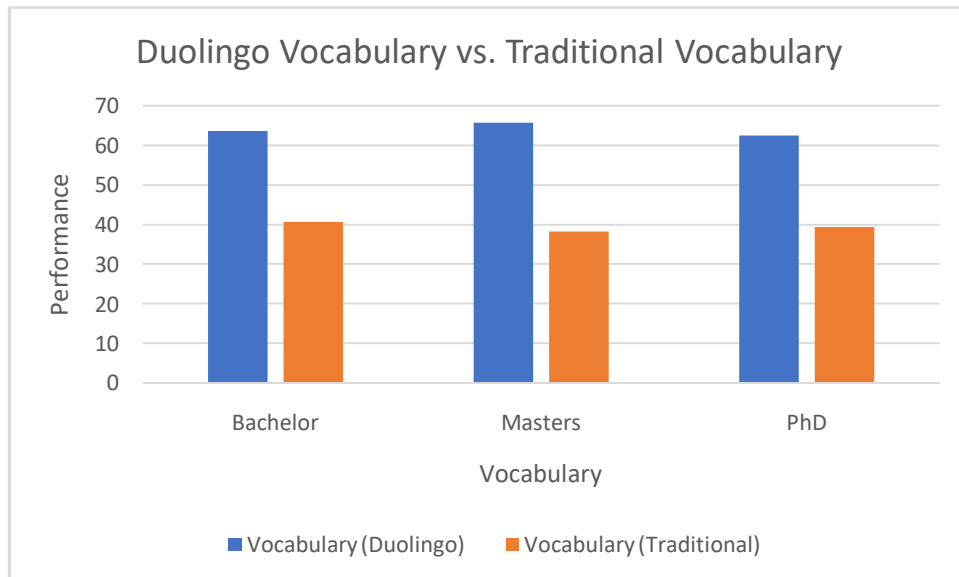**Chart 1: Comparative Analysis of Grammar Performance between control and experimental groups.**

Simple Grammar

Chart 2: Comparative Analysis of vocabulary between control and experimental groups.

Duolingo Vocabulary vs. Traditional Vocabulary

The means obtained from the two groups from all the leaners indicate that the leaners who used the Duolingo application received higher means in the number of vocabularies during the period of study. For instance, the average number of vocabularies that the bachelor students acquired during the period of learning is 63.7, while those from the traditional methods is 40.8. The average results on vocabulary from other groups from masters and Ph.D. participants generally showed that those who used Duolingo application amassed more vocabularies than those in traditional methods in the same period. The results imply that the use of Duolingo application in the TESOL classroom yielded better English performance outcomes than the use of the traditional methods in the classes. As a result of the results documented on vocabulary, the research question on the effectiveness of Duolingo in the TESOL setting was answered to the positive.

The results showed that Duolingo uses in learning English led to faster and more acquisition of vocabularies in the classroom. It implies that the application is effective in helping learners of English build their vocabularies that lead to better learning outcomes in the language. The results showed consistencies through the close averages obtained in the two groups depending on the method used that depicted the validity and reliability of results obtained (BC Campus, n.d).

The second variable intending to answer the research question on the effectiveness of the Duolingo application in the TESOL classroom is the use of the construction of simple grammar sentences during the period of study. The sentences were summed up and averaged at the end of the period of learning. The mean grades obtained showed that the students who used Duolingo in their learning process achieved higher

means than those using the traditional methods. Looking at the results from the means of grammar sentences obtained by Masters students showed that 33.7 sentences were developed in Duolingo cohort. When the results are compared to those of the Masters' learners using the traditional methods, obtained an average of 21.8, during the period of study. The results indicated that while using the Duolingo application in the TESOL classroom, the learners using the app learned more simple grammar sentences than those using the traditional methods. The results indicated that Duolingo application is effective in the attempts to help learners develop their grammar in the English language. The time that the learners from the two groups were subjected to in learning grammar wasthe same. The question then arises on why the average number of grammar sentences learned by the Duolingo leaners are higher than those using traditional methods. One then can conclude that the use of the application is effective in learning grammar in a TESOL classroom. This can be linked to the features of the application that motivate the students to put extra effort into mastering a particular level before moving to the next.

Fluency and Pronunciation Results and Discussions
The evaluation of the learner's performance on fluency and pronunciation was made possible by the use of the four-point Linkert scale. All the students were given the same standardized, two paragraphs reading test. Depending on the number of errors made by the students in pronunciation and fluency, grading was made using the Linkert scale. They were graded as being very low, low, moderate, or high regarding their fluency and pronunciation. Using the scale on fluency indicated that most of the students that used Duolingo registered means scores that depicted moderate and high fluency. Out of the 40 students evaluated on fluency in using Duolingo, 28 learners registered an average of moderately fluent scores in the Linkert-type of scale. The rest of the 12 students were graded as

being high in the regarding their fluency in speaking the language. On the other hand, three students were graded as being highly fluent, 20 students moderately fluent, and 17 registered a low grade in being fluent. The results indicate that when it comes to developing fluency in the TESOL classroom, the Duolingo students performed better than those using the traditional methods. The results generally arise from the fact that Duolingo gives varied examples, and the audio sound feature that the application uses helps the students have a wide scope of models that they use to perfect their fluency in talking. Going by the registered results, one can conclude that the Duolingo application is effective in teaching fluency in a TESOL classroom.

Table 5: A Table on the results of the fluency of two groups.

Fluency	Experimental group	Controlled group
High	12	3
Moderate	28	20
Low	7	17
Very Low	0	0

The results on pronunciation showed inconsistency from the results of the other variables studied. The results showed that the students leaners who used the traditional methods registered better pronunciation than the ones who used the Duolingo application. For instance, 25 students were ranked high in the Linkert-scale as opposed to 18 students using the Duolingo application. The results were spread to other levels where the students from traditional methods registered better pronunciation ratings than those using the Duolingo application. The better outcomes in pronunciation registered from the traditional methods are associated with the impact of face to face contact with the teacher, ensuring effective pronunciation is achieved.

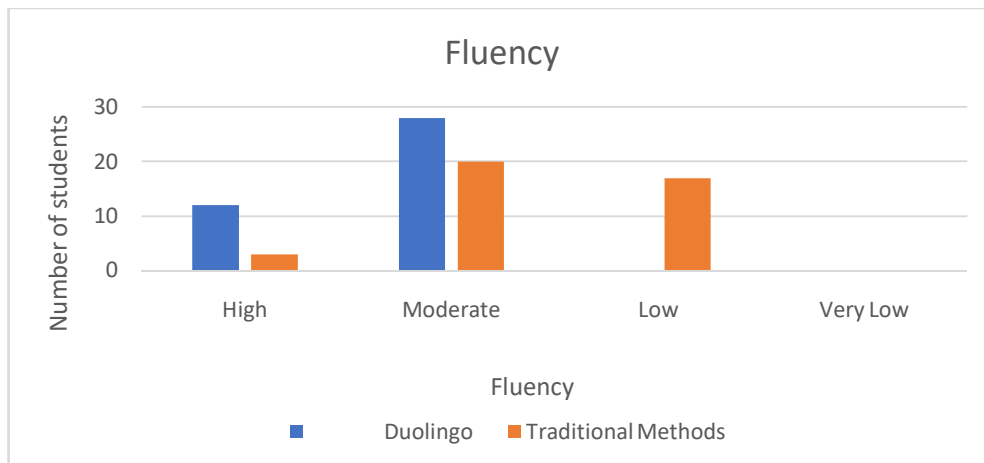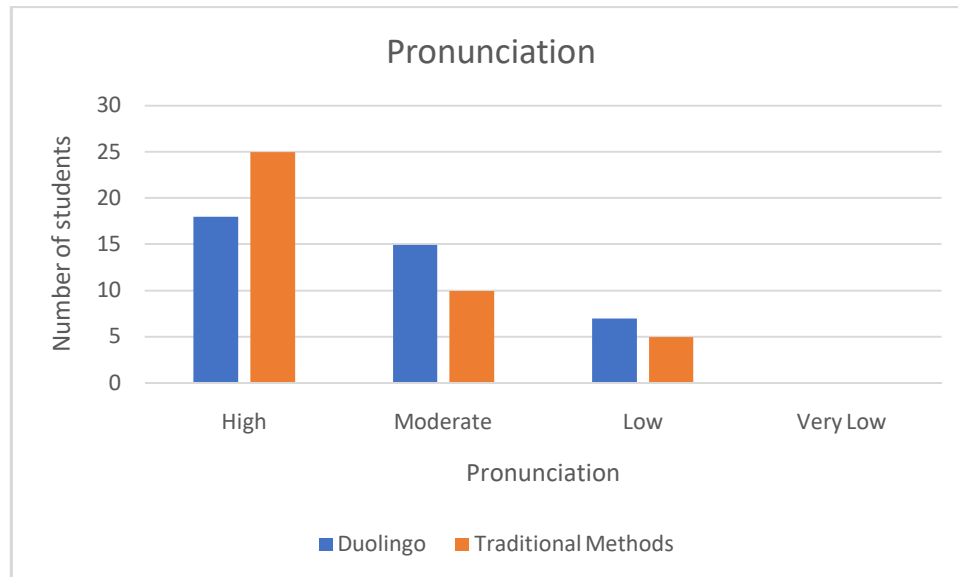**Chart 3: Comparative Analysis of Fluency between control and experimental groups.**

Table 6: A Table on the results of the pronunciation of two groups.

Pronunciation	Experimental group	Controlled group
High	18	25
Moderate	15	10
Low	7	5
Very Low	0	0

Chart 4: Comparative Analysis of Pronunciation of control and experimental groups.

The results documented from the study answered the first research question on the effectiveness of using the Duolingo application in TESOL classrooms. The results obtained show that the application is useful in helping students develop vocabulary in English, develop simple grammar sentences, and achieve fluency competency in learning the language in class. Even though the results on pronunciation showed some lower grades than those of traditional methods, overall, it has been shown that the application is effective in the acquisition of English in TESOL classrooms. Lastly, the research answered the second question to the affirmative that the application is motivating to learn because it creates a challenging atmosphere. The fact that one learns like they are gaming, it makes the learning interesting and amusing that learners do not develop boredom or loose interest in learning [11]. In a nutshell, the use of Duolingo application is effective in the TESOL classroom in teaching the English language because it creates a motivation factor for students for learning that leads to better English skills learned.

As mentioned above, Duolingo offers the delivery of various activities such as multiple-choice questions (MCQs), flashcards, pairing of words, and translations. Therefore, this application provides a wide range of applications in the teaching environment. The novel approach was introduced in 2015 and allowed tutors to facilitate their learners and monitor their daily progress. According to [9] several strategies were introduced based on Duolingo at Coventry University, and it incorporated good Employability. García [13] that Duolingo is much useful app for the teachers because it provides quick feedback and an option to negotiate the problems to find a solution to the occurring problems [3] discuss the importance of language that "A language is interpreted as a system of meaning accompanied by forms through which the meanings can be expressed". So, the results of the study present that Duolingo promotes self-directed learning beyond the course's requirements, although more research in this area is needed. However, the study also highlights some of the shortcomings of using Duolingo. First is the accuracy of the translation.

Secondly, the mobile version doesn't provide similar results as that of the computer version due to the difference in format. Whereas, incorporation of Duolingo requires the keen interest of language teachers and the availability of materials such as computer labs or laptops for the learners in an equal environment for the utilization of the app in a successful manner.

The results from the study indicated that the pronunciation factor in learning English by using the Duolingo application did show some incompetence for learners who used it. The study recommends that future studies should investigate the lapses that the form has that do not help students achieve better competence in pronunciation.

VI. CONCLUSION

This paper concludes that learning a language through Duolingo provides a significant contribution to language transfer. The study answers the questions by giving a statistical correlation between traditional and Duolingo approaches. In addition, the use of Duolingo shows a many of the learners gained higher tendency and interest and revealed the significant results. While using Duolingo, learners showed complete freedom in the expression of thoughts, improving vocabulary, and pronunciation with motivation. The evaluation of the learners was grounded on the targeted skills such as grammar, pronunciation, and fluency in a foreign language. Learners showed a higher interest in the effectiveness of the Duolingo approach in a language classroom.

In the end, the study is limited to a small sample based on two groups; each group comprised of 40 participants. However, this study can be further extended to a large scale and can also be adapted to other language applications such as the Busuu language learning application, which has similar features of Duolingo. We recommend that the study be conducted on a different sample of middle and high schools.

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