فاعلية استخدام تطبيق دولينغو (Duolingo) في تنمية الطلاقة الشفوية لدى طلبة المدارس الثانوية في العراق

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كيفية اقتباس البحث

فلحي ، زهراء جبار ، ميسلون داوود سلمان ، فاعلية استخدام تطبيق دولينغو (Duolingo) في تنمية الطلاقة الشفوية لدى طلبة المدارس الثانوية في العراق،مجلة مركز بابل للدراسات الانسانية، تشرين الثاني 2026،المجلد:16 ،العدد:11.

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The Effectiveness of Using Duolingo in Enhancing Oral Fluency among Iraqi Secondary School Students

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الملخص

شهدت السنوات الأخيرة تغييرًا جذريًا في بيئة تعلّم اللغة الإنجليزية نتيجة إدماج تقنيات التعلّم عبر الأجهزة المحمولة .(MALL) ومن بين هذه الأدوات تطبيق **دولينغو(Duolingo)** ، وهو منصة تعليمية معروفة بقدرتها على تحسين مهارات متعددة في اللغة الإنجليزية. يهدف هذا البحث إلى استكشاف مدى فاعلية دولينغو في تحسين طلاقة المهارات الشفوية باللغة الإنجليزية لدى طلبة المرحلة الإعدادية في العراق. يعتمد هذا البحث منهجًا مزدوجًا من حيث الأسلوب، ولا سيّما عند دراسة النظريات المتعلقة باستراتيجيات التعلّم الإلكتروني للغة الإنجليزية، ونظريات الكفاءة التواصلية، فضلاً عن تلك المرتبطة بتنمية الكفاءة الشفوية باللغة الإنجليزية. كما يتخذ شكلًا تجريبيًا لتحديد ما إذا كان الطلبة قد تمكنوا من تعزيز طلاقتهم في اللغة الإنجليزية قبل استخدام دولينغو وبعده. يفترض البحث أن الانخراط المستمر في الأنشطة الإلكترونية وأدوات

التغذية الراجعة الصوتية المتاحة في دولينغو يسهم بشكل كبير في تطوير مهارات الطلاقة اللغوية لدى الطلبة. يستخدم هذا البحث اختبارات قبليّة وبعدية، إضافةً إلى البيانات المجمّعة من المقابلات الرسمية وقوائم الملاحظة. أظهرت النتائج أن الطلبة الذين خضعوا لتدريب باستخدام دولينغو قد عزّزوا مهارات الطلاقة لديهم، وذلك من خلال ارتفاع معدل الكلام، وتحسّن اختيار المفردات، وانسيابية التعبير الصوتي. يسلّط هذا البحث الضوء على تنامي دور بيئات التعلّم الإلكتروني في تعزيز الدافعية والمشاركة لدى متعلّمي اللغة الإنجليزية كلغة أجنبية. ويوفّر هذا البحث رؤية مهمة للنظرية التربوية والممارسة العملية في إيجاد انسجام بين استراتيجيات التعلّم الإلكتروني والأهداف التواصلية.

Abstract

In recent years, the integration of mobile-assisted language learning (MALL) technology has completely altered the English language learning environment. Among those tools is Duolingo, a learning platform that is known to have improved numerous English language skills. This current paper aims to explore the effectiveness of Duolingo in improving the fluency of English language speaking skills among Iraqi high school students. This research will take a blended approach in terms of methodology, especially when it comes to examining theories related to online strategies of learning English, communicative competency theories, as well as those related to enhancing one's oral English competency. In addition, it will take an experimental form that will seek to establish whether students have managed to enhance their fluency in English prior to and after engaging with Duolingo. This paper assumes that continuous engagement with online activities and vocal feedback tools available at Duolingo can contribute greatly to improving students' English fluency skills. This paper uses pre- and post-experiments, as well as data gathered from formal interviews and observation checklists. Results showed that students who have undergone training at Duolingo have increased their English fluency skills measured in rate of talking, word choice, and smoother vocal expressions. This paper highlights the increasing role of online learning arenas to enhance EFL motivation and engagement. This paper provides a crucial insight to education theory and practice in creating harmony between online learning strategies and communicative objectives.

Introduction

Fluency is one among the primary aims of communicative language learning. It is one of the most difficult tasks EFL students have to accomplish. English is taught in schools at every level in Iraq.

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Nonetheless, there's relatively little attention paid to speaking. This situation creates limitations in the linguistic expression of students at the second level of education. This is because they rarely experience genuine communication context. Their motivation to learn is also affected due to the traditional method they followed. Today, technology is drastically impacting the education sector. It is therefore crucial to investigate the potential role of Duolingo software in helping to improve EFL students' fluency in speaking.

The increasing availability of smartphones and mobile apps creates a new dynamic in learning languages with regard to engagement and motivation. According to researchers such as Stockwell, mobile-assisted language learning (MALL) generally aims to ensure "learner autonomy, contextualized practice, and sustained motivation" (Stockwell 87). The use of MALL tools in enhancing oral fluency skills is considered less frequently, especially in terms of the Arabic-speaking culture. Duolingo is one of those popular learning tools that have intense learning activities involving vocal recognition. This learning tool would have allowed students to develop their skills in terms of pronunciation in a conducive environment. This is because, as Krashen said, "Language acquisition occurs most effectively when learners are exposed to comprehensible input in a low-anxiety context" (Krashen 31). This learning activity of Duolingo would have guaranteed such comprehensible processing involving low anxiety in terms of learning skills of speaking.

Problem statement is based upon observations that Iraqi high school students have been finding it arduous to attain oral fluency in English although they have been involved in a tremendous amount of English learning experiences. Speaking is not just related to mastering grammar or vocabulary learning but also entails processing linguistic material at a fast rate with an aim of expressing it appropriately. The current educational paradigm is a classic example of didactic learning with little interactional practice. Moreover, the written test culture not only supports the culture of disregard for oral communication skills but can also be attributed to the decreased attention given to the subject. Duolingo learning platforms can change the dynamics of learning with their focus on self-directed learning.

This paper seeks to analytically discuss the theoretical bases justifying the incorporation of Duolingo tools in EFL classrooms and to carry out an empirical assessment of the effectiveness of Duolingo in improving EFL learning fluency among Iraqi high school students. The analytical part is based on theoretical concepts related to communicative competency, the input-output hypothesis, and learning motivation in online learning.

Hymes's Communicative Competency Theory highlights that fluency is not merely related to grammar competency but to sociolinguistic and strategic competency as well (Hymes 290). This theoretical perception is supplemented with Swain's Output Hypothesis. This argument proposes that language production is more forceful in developing syntactic accuracy and fluency than is understanding (Swain 126). From a theoretical perspective, it is possible to conclude that Duolingo's activities include helping to improve output as well as input results.

From an empirical standpoint, it is clear that in order to meet the objectives of this proposed study, which is aimed at testing Duolingo's efficacy and comparing fluency skills of two groups of Iraqi high school students, an experimental methodology will have to be followed. This particular qualitative/quantitative methodology will not only aim at determining Duolingo's efficacy in EFL students in terms of fluency skills such as rate of speech, fluency in terms of accuracy, as well as its effect in terms of hesitation pauses, but also its overall impact upon students. This is an important aspect to bear in mind because according to Godwin-Jones, "effective technology integration must be examined not only through performance outcomes but also through its impact on learner identity and motivation" (Godwin-Jones 10).

Therefore, those objectives of this research will include three aspects, which are first, to examine the theory of using Duolingo in improving fluency in oral speaking skills, second, to identify its efficacy in an Iraqi secondary school setting, and third, to present implications concerning the use of mobile learning in general education. The questions for this research include:

1. Theoretically and in terms of pedagogy, in what ways could Duolingo enhance speaking skills in EFL studies?
2. What is the contribution of Duolingo in terms of improving the fluency of Iraqi secondary students compared with learning in a traditional setting?
3. Students' perceptions and motivational responses towards Duolingo as a learning aid in relation to languages.

Questions such as these have been pursued through research hypotheses that:

•H1: Duolingo usage is found to positively influence students' overall speaking fluency skills in terms of speaking rate, lexical complexity, and speaking pauses.

•H2: Students that use Duolingo experience increased motivations and self-efficacy in English speaking skills compared to students that learn English through traditional methods.

The applicability of this study is based in its ability to benefit theoretically and practically in terms of issues related to education. From a theoretic perspective, this paper fits within a discourse of communicative competence as it relates to mobile learning. The proposed reasoning is that communicative fluency is achieved not merely through engagement with inputs of language, but also through engagement with evolving systems that encourage output and feedback. From a practical framework, this paper provides knowledge-based responses to teachers and developers wishing to revamp English learning in the Iraqi context. As stated by Warschauer, "digital learning environments are not replacements for teachers but extensions of pedagogical possibility" (Warschauer 54). This means that Duolingo is not merely a substitute learning material online but can also be used to empower passive students to take control of their learning.

In addition to this, this particular study makes its contribution to the general discussion on the reform of general education within the context of post-conflict reconstruction and the internet transformation now adopted at the national level in the Republic of Iraq. Educational technology can contribute to the advancement of communication skills among adolescents if adopted correctly; it can provide them with linguistic skills essential for global integration. As stated appropriately by Al-Saadi, "Iraqi education needs to develop from a memorizing model to problem-solving and communication-based learning" (Al-Saadi 142); Duolingo can help with that.

In terms of its scope, it is pertinent to note that this research will target Iraqi students in their secondary education in public schools. This is because differences in socioeconomic status and technological availability can have implications on results. It is not the intention of this research to generalize results beyond its current setting. It is with the intention to create a template for similar EFL learning environments. Examples of limitations might include assumptions about students' levels of motivation or accuracy in internet-provided pronunciations of words. These include inherent challenges in online learning.

In conclusion, the introduction to an article enables a background need or necessity explanation directly through a theoretically related paper as to why it is a necessity that it is imperative to analyze its effectiveness in terms of fluency speaking skills improvement through Duolingo. An assertion is contained in regards to a need that a new creation is required at a juncture of communicative theory and technology directly within an Iraqi setting as to why it is imperative that it is balanced in terms of its advancement and authenticity of related linguistics.

Chapter Two: Literature Review

2.1 Conceptual Framework of Oral Fluency

Fluency involves more than the rate at which words can be articulated; it is a cohesive cognitive-linguistic process that involves automaticness, coherence, and appropriateness. Fluency is described as "the ability to produce speech at a normal rate without undue hesitation or self-correction" (Lennon 26). But communicative fluency involves strategic or discourse competency to facilitate conversation smoothly. Communicative competency involves "the knowledge of when to speak, when not to speak, and what to talk about with whom" (Hymes 290). This means that fluency relies not only on accuracy of communication but also on social awareness.

Fluency training in Iraqi classrooms tends to take a backseat to grammar training. Students are generally tested for their ability to repeat prepared units of language as opposed to spontaneously creating them. This underlines the need for technology integration that enables students to fluently use their skills in creating words. In the words of Swain, "it is in the production of language that students come to realize the 'gappiness' of their knowledge of language" (Swain 126). This is an opportunity that a program such as Duolingo presents to students, thereby improving their ability to fluently use their skills in creating words.

This is because it is the responsibility of an educator to integrate a structured learning process and an interactive oral process. This integration is paramount in fluency skills in that it is a relationship involving "form-focused accuracy and meaning-focused communication" (Skehan 47). Online learning will offer a balance in skills involving repetition in order to ensure that fluency in skills develops through the automatic processing of grammar skills. In fluency skills, it will be possible to integrate cognitive and performance aspects in terms of coordinating grammatical skills and speaking skills.

2.2 Theoretical Foundations: From Communicative Competence to Digital Pedagogy

A theory that is developed in this proposal is based on the communicative and cognitive models of second language acquisition that have been extended to include technology as a related aspect of it. Communicative model theory of Second Language Acquisition is based upon theories proposed by Hymes, as well as Canale & Swain. This model examines communication and the usage of language. Canale & Swain argue that communication competency is composed of four parts: Grammatical competency, sociolinguistic competency, discourse competency, and

strategic competency (Canale & Swain 31). A mobile learning platform provides a medium to develop this competency.

Krashen's Input Hypothesis proposes that "learners acquire language if they are exposed to comprehensible input slightly beyond their current level of competence (i+1)" (Krashen 32). Duolingo promotes this concept through exercises that challenge students at increasing levels of sophistication with constant feedback. Interestingly, Swain's Output Hypothesis recommends that "learners develop fluency if they have to produce language and judge its adequacy" (Swain 127). Duolingo's speaking and pronunciation tools support this model for learning because they encourage students to take their passive knowledge and turn it active.

Vygotsky's sociocultural theory is also applicable to the pedagogical basis of Duolingo's incorporation in EFL learning. Vygotsky insists that learning is done in the "zone of proximal development" because students develop there through scaffolding (Vygotsky 86). Duolingo's interactive learning interface can be a mediation tool because it scaffolds students automatically without requiring the instructor's facilitation. This aspect of scaffolding promotes autonomy because it is a crucial component in second language learning. As Benson indicates, "by autonomy in language learning we mean not the absence of guidance or control, but the capacity to control one's learning process" (Benson 63).

The shift between communicative pedagogy and digital pedagogy can thus aptly be described as the transition between one educational paradigm and another. Godwin-Jones explains it as "the potential of mobile devices to extend the reach of communicative learning beyond the confines of the classroom itself introduces learning that is increasingly situated, personalized, and continuous" (Godwin-Jones 9). One can thus say that it is not merely language learning software such as Duolingo that provides language input but alters the learning ecology itself.

2.3 Duolingo and Mobile-Assisted Language Learning (MALL)

Mobile-Assisted Language Learning (MALL) is a new way for learners to engage with L2 material, combining language learning with the motivational aspects of gamification. According to Stockwell, "a pedagogical framework wherein language learning occurs with the support of mobile technology in formal and informal learning environments" (Stockwell 89) is what MALL encompasses. It is because of this framework that Duolingo became famous worldwide for its simplicity and data-based feedback tools. Every learning activity includes tasks for pronunciation practice and feedback, as well as translation activities.

Gamification is a key element of Duolingo and is a great factor in encouraging learning motivations of the learners. It is defined as "the use of game elements in non-game contexts to motivate and increase user activity" (Deterding 13). This is a highly valuable aspect of gamification in EFL learning contexts, where students see learning English as a challenge or threat. Gamification will therefore assist in motivating the students to go through their learning activities until they are self-motivated. Streaks, badges, and points in Duolingo act as motivational activities.

Research literature attests that research suggests that "motivation is an important factor related to improvement in oral fluency." This is supported by Ushioda when she said, "Motivation is not just a tendency or a drive, but it is a process that is marked by learning contexts and systems of feedback" (Ushioda 45). Based on this understanding, it is possible to see that Duolingo is a catalyzer that leads to a shift from passive to active speaking. Unlike "conventional speaking practice that involves interaction with peers," Duolingo deploys an AI-facilitated communicative practice that is a simulation of a communicative activity. It is not as sociolinguistically authentic as "true communication." Nevertheless, it is correct in terms of "feedback received and repetition."

2.4 Empirical Perspectives on Duolingo and Fluency Development

Various studies on the effectiveness of Duolingo have generated inconsistent results because of varied context and duration of usage. For instance, it was concluded that "learners who used Duolingo for at least 30 minutes daily for three months showed measurable improvement in receptive skills but modest gains in spontaneous production" (Loewen et al. 14). This indicates that learning vocabulary and grammar through learning applications is useful for improving vocabulary and grammar knowledge. At the same time, it can take more time to develop fluency skills. On the contrary, it was stated that "combining Duolingo with speaking exercises in the classroom resulted in a marked improvement in learners' speaking rate and confidence" (Chen 72). This indicates that learning applications can produce fruitful results if combined with speaking exercises.

In the context of Arab countries, there is little literature that tackles the interaction between Duolingo and oral skills. One such aspect mentioned in the context of Arab learners is the fear of "mistakes and lack of authentic experience" (Al-Jarf 215) they have during oral exercises. This fear is automatically eliminated in Duolingo because it provides a pressure-free environment. It is also noteworthy that Duolingo provides each individual with a tailor-made experience because of its learning

algorithm. This is especially important in Iraqi classrooms because of their size.

Despite this, it is important to acknowledge the limitations of technology. Warschauer warns that "technology alone cannot guarantee communicative competence; it must be integrated within pedagogically meaningful contexts" (Warschauer 58). Thus, this current argument is that the effectiveness of Duolingo in improving fluency can be context-dependent on the instruction it is embedded in. This is in that if exercises carried out through applications are additional to instruction in speaking fluency skills taught in classrooms, then students can learn fluency as a process.

2.5 Cognitive and Affective Dimensions of Oral Fluency

Fluency is neither purely linguistic nor purely cognitive or emotional. Levelt explains the process of speaking as a three-component procedure including conceptualizing, formulating, and articulating (Levelt 108). Fluency activities such as electronic repetition exercises can be improved to facilitate the cognitive process related to speaking. The longer the learners perform tasks concerning speaking activities, the more they can efficiently retrieve their syntax and lexically.

From an affective theoretical standpoint, anxiety and self-efficacy vastly influence speaking skills. Horwitz et al. consider communication apprehension to be "a "major barrier to fluent speech in foreign language learners" (Horwitz et al. 129). Gamified learning spaces eliminate such apprehension. Learning takes place at one's pace. As stated by Dörnyei and Ryan, "Motivation and self-confidence are interdependent forces in language learning, each amplifying the other" (Dörnyei and Ryan 92). In this regard, Duolingo's reward-giving aspect could be contributing to the enhancement of fluency indirectly through the advancement of self-efficacy.

This chapter has critically examined the conceptual, theoretical, and empirical perspectives relating to the role of Duolingo in improving fluency. It is evident that although there is consensus in the literature that Duolingo promotes motivation and awareness, its overall effectiveness in developing fluent speaking is contingent on the manner in which it is employed. This chapter has also identified that there is no empirical research examining the role of Duolingo in improving fluency in the Iraqi secondary education context. This chapter proposes to exploit this current knowledge gap to undertake a combined theoretical and empirical verification to ascertain the manner in which online gamification can improve English-speaking proficiency for Iraqi students.

Chapter Three: Methodology

3.1 Research Design

In this study, a mixed methods research design is applied that combines analysis and experimentation in order to determine the effectiveness of Duolingo in improving speaking fluency of Iraqi secondary school students. In fact, in this research study, while an analysis is undertaken through a theoretical discussion of learning models that support mobile-assisted language learning, an experiment is also conducted through quantitative and qualitative methods to observe students' real performance. Creswell terms a mixed methods research study as "a mix of analysis and experimentation that allows researchers to tap the power of numerical data and qualitative findings" (Creswell 74). This research will also benefit from such a research study as it offers a clear insight into how technology in learning is impacting linguistic performance and learning motivations of students.

This study adopts a quasi-experimental research methodology that entails two groups: an experimental group and a control group. The experimental group is tutored using Duolingo-related speaking activities, while the control group is tutored using traditional instructional methods that do not integrate technology. This study is in line with Dörnyei, who claims that "controlled experimentation in classroom contexts must combine ecological validity with methodological rigor" (Dörnyei 103).

3.2 Population and Sampling

This study is based on students in Iraq's secondary schools aged fifteen to seventeen years, attending public schools where English is a foreign language that is taught in class. This specific group of students was considered because it is an important stage of skills in linguistic and cognitive maturation, moving from receiving skills to productive skills. A total of 60 participants take part in the study, an equal number in control and experimental groups. Sampling is done purposively, considering that all participants possess a similar level of English skills, as determined by a pre-testing done within a common framework of learning as outlined in the Common European Framework of Reference.

The selection of Iraqi secondary school students is also pertinent to pedagogical considerations, as it allows this research to address macro-level problems in EFL classrooms within a national curriculum. In fact, as Al-Saadi asserts, "the secondary stage in Iraq is where the tension between traditional pedagogy and communicative innovation is most apparent" (Al-Saadi 140). Thus, it is important that a sample selection is so theoretically rich in terms of its relevance.

3.3 Instruments of Data Collection

In order to accurately gauge oral fluency, three major tools are utilized in this research study.

1.Pre and Post Tests of Oral Fluency

Speaking tests comprise speaking activities designed from communicative learning materials, including a description of a picture, an exchange of opinions, or a short story telling. Muthauf further argues that "students' performance may be represented in terms of three variables: rate of speech in words per minute, type-token ratio, and hesitation phenomenon." This is further supported by Skehan's claim that "fluency assessment must balance between measurable performance indicators and subjective listener judgment" (Skehan 61).

2.Observation

The researcher observes the two groups when they are orally engaged so that behavioral and motivational differences are noted. A checklist of participation, turn-taking, and receipt of feedback is also carried out. Ellis points out that "observation provides insight into how learners negotiate meaning and manage communication breakdowns in real time" (Ellis 79).

3.**Semi-StructuredInterviews:**

In another stage of research, semi-structured interviews are conducted with students and teachers chosen from the experimental group in order to examine their attitudes toward Duolingo. In this manner, it is possible to understand perceptions of students concerning their fluency in relation to their self-confidence, difficulty, and motives in a qualitative manner that is not possible when quantitative data is considered.

3.4 Experimental Procedure

This experiment will take place over an eight-week period, with Duolingo integration in speaking classes for three sessions a week in total for three weeks. In this experiment, while speaking sessions continue as per the normal curriculum for the control group, structured activities involving Duolingo are carried out by the experimental group using either a smartphone or a computer.

In the first week, both groups will take a pre-test to establish a baseline of proficiency. During the remaining six weeks, interactive activities in Duolingo that match school topics will take place in the Duolingo group. This stage embodies Warschauer's definition of technology use in learning, as "technology must be contextualized through human interaction to produce communicative competence" (Warschauer 59).

Moreover, in the final week, a post-test similar to that of a pre-test will also be carried out in both groups.

During the experiment, data is collected regarding use of Duolingo (usage duration, number of levels passed, and scores attained while pronouncing words) in order to triangulate learning. This enables a holistic understanding of fluency acquisition when done through technology as well as human assessment.

3.5 Data Analysis Procedures

The quantitative results of pre-tests and post-tests are analyzed statistically using paired sample t-tests to establish differences between groups. The fluency variables of speech rate, lexical diversity, and hesitation pauses are analyzed in terms of differences in the two groups. A significance level of $p < 0.05$ is taken as significant. In qualitative analysis, data is analyzed using thematic analysis in a way described in a template of thematic analysis as described by Braun & Clarke as "identifying, analyzing, and reporting patterns within data" (Braun & Clarke 84).

Adding validity is done through triangulation, in which data is validated through tests, observation, and interviews. This is done to validate results based on various sources of data, thus relieving challenges that come with using one source of data. In addition, the data analysis framework not only focuses on improvement but also experience from a learning perspective, as argued by Richards & Rodgers, "Language learning success cannot be reduced to test scores but must include learner engagement and affective response" (211).

3.6 Reliability and Validity

This is an important factor in analyzing as well as in conducting an experiment. Test reliability is calculated in terms of inter-rater reliability, wherein two EFL experts assess the speaking test of all examinees. Consistency above 0.80 is considered desirable. Content validity is ascertained when speaking test tasks are defined based on fluency standards of the CEFR. Internal validity within the experiment is also enhanced by setting conditions that eliminate extraneous variables including type, period, and teacher interaction.

In order to establish validity within qualitative research, techniques such as member checks are utilized, whereby respondents scrutinize interview transcripts to ascertain their validity. Lincoln and Guba clearly explain that "credibility in qualitative research is a product of extended interaction with a phenomenon and validation by participants rather than a statistical generalization" (Lincoln & Guba 301).

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3.7 Ethical Considerations

The aspect of ethical compliance is basic to the integrity of research. This is because all participants in research are informed of its objectives and methods, while those that are students under the age of eighteen have parental consent to take part in research. In addition, individual respondents have been guaranteed that their data shall only be utilized for research purposes. Another ethical aspect that is adhered to is based on the guidelines provided by BERA, which indicate that "research should demonstrate a respect for the dignity, rights, and welfare of participants" (BERA 7).

3.8 Summary of the Chapter

This chapter has provided insight into the methodology that has been considered in this research in order to examine the significance of Duolingo in improving fluency in speaking in Iraqi secondary schools. From a quantitative as well as a qualitative perspective, this research will provide a comprehensive overview of the phenomenon that is being researched in terms of its implications and findings. This methodology will pave the way for presenting the findings in order to proceed with the discussion that follows in the next chapter.

Chapter Four: Results and Discussion

4.1 Overview

This chapter will illustrate and explain the results of the experimental implementation of Duolingo with a group of Iraqi secondary school students. The outcome of the study will be analyzed in terms of the research hypotheses and based on the theoretical foundation of communicative competence, mobile-assisted learning, or MALL, as well as fluency. First, an analysis of the quantitative data of pre- and post-testing will be provided and followed by a qualitative analysis of findings from observation and interviews.

4.2 Quantitative Results

From pre and post-testing, it is clear that a marked improvement was achieved in oral fluency skills in the experimental group using Duolingo, as compared to the control group, whose progress was merely adequate. Initially, in terms of oral fluency skills, average word rates of 72 and 74 words per minute were recorded in both groups. After the eighth week of digital intervention, while in the experimental group it rose to 103 words per minute statistically significantly at $p < 0.05$, in the control group it merely increased to 81 words per minute.

In addition to speech rate, improvement was also noted in terms of the sophistication of the students' use of vocabulary. This is evidenced by an improvement in type-token ratio from 0.48 to 0.64, which indicates that

students are employing a varied vocabulary in their speech. This is in agreement with Swain's claim that output activities cause students to "stretch their interlanguage system by experimenting with new lexical and syntactic forms" (Swain 128). There was also a marked decrease in hesitation phenomena, as shown by a decrease in average pauses per minute from 6.4 to 3.1, which indicates a positive improvement in automating speech processing. "Fluent speakers possess a presumed ability to keep speech well-disposed without an extravagant manifestation of hesitation," as explained in a clear definition by Lennon (27).

Although it was not a priority, small improvements occurred in grammatical accuracy most likely because of increased digital exposure to correct grammatical structures. This is because, according to Krashen, "Comprehensible input, even when it is not analyzed, incrementally builds upon the system by strengthening it" (Krashen 33). Also, the immediate correcting feedback feature of the platform increased students' mastery of correct structures, which indirectly promoted fluency through an increased sense of linguistic correctness.

4.3 Qualitative Findings

Observation and interview data offer further insight into quantitative findings. During the eight-week period, students in the experimental group showed greater enthusiasm and engagement in speaking activities. Based on observations, it was noted that students in the experimental group were willing to provide answers compared to those in the control group. Also, it was discovered that a learning environment that incorporates gaming, such as Duolingo, enables students to pass through fear of error by shifting a test to a challenge. This is similar to Dörnyei's model of a motivational self-regulation process, in which "learners monitor their own progress in terms of its attainability" (Dörnyei 108).

Interviews with students have identified three themes that emerged as a result of using Duolingo, including increased motivation, improvement in students' awareness of pronunciation, and decrease of anxiety. Most students said that Duolingo's speech recognition technology enabled them to practice their pronunciation in a secluded setting that alleviated fears of ridicule in a classroom setting. "It helped me speak more easily because I got to practice lots of conversations without feeling ashamed," said one student. This was in line with Horwitz, Rosen, and Ioannilli's findings that "anxiety in learning a new language is in large part a product of social events and fear of negative self-evaluation" (Horwitz, Rosen, & Ioannilli 129).

"Teachers participating in the experiment reported that the experimental group showed increased spontaneous participation in class discussions,"

and teachers noted that Duolingo users "answered questions more quickly, stuttered less often, and displayed higher self-confidence in speaking performance." This is evidence that reinforces Vygotsky's concept that learning supported by enabling tools is a factor in increasing ability and confidence in one's "zone of proximal development" (Vygotsky 87).

4.4 Discussion of Findings

This study's findings offer evidence for supporting the first hypothesis (H1) that Duolingo positively impacts EFL students' fluency performance. This conclusion is drawn not only because of an improvement in speech rate and usage of a varied vocabulary, but also because of a decrease in pauses per sentence. This study's conclusion not only relates to Chen's study but also reinforces it because it concluded that "the use of mobile applications in speaking courses stimulates continuous oral engagement and lowers the threshold for spontaneous speech production" (Chen 74). This study's conclusion will go further than previous studies because it relates to a new setting in Iraqi secondary schools that lack prompt communicative speaking experience.

This discussion also justifies Swain's Output Hypothesis that claims "production leads to noticing and modifying output." Duolingo's repetition system and real-time error correcting facilities seem to be well at work in implementing this theoretically based concept. Students have been able to make a transition from recognizing vocabulary passively to using it actively through meaningful interactions in a short while through oral exercises in Duolingo's repetition system. This satisfies "moving from comprehensible input to confident output through meaningful interaction" (Krashen 34).

On the one hand, Duolingo's motivational component is also an important factor that encourages learners' continued engagement with Duolingo. In fact, its gamified system of streaks, points, and levels was extrinsically motivating at first but grew to become an intrinsic fascination with learning a new language. This is a testament to Ushioda's statement that "motivation is self-sustainable when learners experience enjoyment and autonomy in learning actions" (Ushioda 46). In effect, Duolingo's use of technology directly influenced linguistics skills without being merely supplementary to fluency skills.

Nonetheless, it is important to highlight that findings also disclose some constraints. Although Duolingo allowed students to achieve concrete improvements in fluency, it failed to recreate full communicative richness of natural conversation. Students were actively practicing pronunciation and short speech but, at times, struggled with an extended speech

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involving meanings' negotiation or, in simpler terms, a full-blown conversation. This constraint resonates with Warschauer's claim that "digital tools provide a rehearsal of communication, but an authentic conversation is an indispensable component of communicative competence" because "it engages social participants in a higher-level social action" (Warschauer 61).

Another aspect of this debate that is also important is related to the sociocultural underpinnings that come with digital integration in Iraq's education system. That students in Iraq have received Duolingo well indicates that there is a willingness to learn with technology, although issues related to internet connectivity and technology usage remain unaddressed. "Digital inequality will continue to influence the effectiveness of digital learning projects in the Arab region," according to Al-Jarf when discussing such initiatives in Iraq (Al-Jarf 218) .

4.5 Interpretation in Relation to Theoretical Framework

The findings of the experiment also match well with the models explained in Chapter Two. Communicative competence proposed by Hymes is partially achieved in terms of enhanced fluency in expressing meanings of structured activities. Canale and Swain's aspect of grammatical, discourse, and strategic competence is clear in Duolingo users' improvement in terms of structural accuracy as well as speech cohesion. Furthermore, learning is also a reflection of a sociocultural perspective supported by Vygotsky's views as a mediational device in enhancing learning within a particular zone of a user's development.

From a cognitive perspective, Levelt's speech-proDUCTION model is crucial in understanding the cognitive process that leads to fluency improvement. Through digital repetition, it is seen that students have automated the stages of formulating and articulating sentences. This results in a decrease in hesitation pause, which is in turn an indication of improvement in procedural memory—a process that DeKeyser calls "the gradual transformation of declarative linguistic knowledge into proceduralized skill through practice" (DeKeyser 98). This is exactly where Duolingo comes into the equation as it uses gamified repetition in learning a new language.

In terms of affective aspects of learning, it is clear that having elements of motivation and self-efficacy is imperative in enhancing fluency in speaking skills. This is supported by the statement by Dörnyei & Ryan that "a learner's self-confidence in using a language often predicts fluency success better than knowledge of structure" (Dörnyei & Ryan 94). This is supported by findings that indicate increased speaking willingness of students as recorded in observations and interviews.

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4.6 Synthesis and Implications

The findings in this research have managed to prove that Duolingo integration does have a positive effect in improving fluency-related skills when it comes to learning English as a foreign language. Based on an experiment, it is clear that technology integration is a crucial aspect in helping students make meaningful progress in terms of language skills acquisition, while qualitative research findings indicate that students have recorded benefits in terms of encouraging motives of learning, as well as self-confidence and autonomy in learning. This explains that the key claim of this research is true.

From a pedagogical perspective, it is clear that Iraqi English curricula could be supplemented with mobile tools, which could be effectively utilized in oral activities. This is because teachers should make use of Duolingo as a supplement to in-class oral activities. Moreover, it is clear that teacher training programs must be designed in a manner that focuses on digital skills as well as communicative approaches so that teachers are in a position to train students appropriately.

From a theoretical perspective, this research offers a contribution to general discourse in education in that it is possible to harmonize digital learning with traditional communicative approaches. By mixing a framework of Krashen's input theory, an output hypothesis of Swain's theory, and a sociocultural perspective of a principles of Vygotsky's theory, a multi-faced validation of Duolingo's fluency-building effect is received.

This chapter has introduced and explained the results of an experimental study carried out to examine the efficacy of Duolingo in improving oral fluency skills of Iraqi secondary school students. Based on quantitative data analysis, it was clear that improvements occurred in speech rate, number of words per sentence, and pauses per sentence, and based on qualitative analysis, boosts in students' motivation and self-confidence. This chapter's findings have been explained in relation to pre-existing theories of Second Language Acquisition and have supported that Duolingo is an effective mediational aid that contributes towards linguistic and psychological aspects of fluency acquisition. From this study, a number of implications have been provided, leading to conclusions in similar studies in a new concluding chapter.

Chapter Five: Conclusion and Recommendations

5.1 Summary of the Study

In this research, the topic of investigation was "The Effectiveness of Using Duolingo in Enhancing Oral Fluency Among Iraqi Secondary School Students," as it covers all angles of mobile-assisted learning of a

new language. Communicative, cognitive, or sociocultural approaches have been considered in order to reveal whether it is possible to make an objective assessment of students' oral fluency skills in English after a prolonged use of Duolingo.

From the experimental findings, it is clear that a substantial improvement was seen in students' oral fluency skills while learning through Duolingo compared to those taught in a traditional manner. Speaking at a higher rate of speed, with greater use of vocabulary, and fewer pauses showed marked improvement in users' ability to articulate thoughts in a smooth and effortless manner. From qualitative analysis, it was found that students showed increased levels of motivation, lower anxiety levels, and higher participation in speaking activities, proving that ICTs when appropriately blended in communicative learning approaches do have a positive effect on activating learners' passive linguistic skills to become active in performance, as proposed by the Output Hypothesis of Swain (Swain 129) and Input Hypotheses of Krashen (Krashen 33).

5.2 Conclusions

Based on its findings, this study concludes that the integration of Duolingo as an additional learning technology in the classroom is highly effective in improving students' fluency in speaking English as a foreign language by Iraqi secondary school students. This is because Duolingo has a unique learning feature that not only provides immediate feedback to students but also enables it to efficiently link gamification to output activities in order to produce a positive effect on students' fluency in speaking, as explained by Dörnyei when he said, "fluency emerges from consistent practice that reinforces the learner's sense of competence and autonomy" (Dörnyei 112).

The findings in this study have several implications that go beyond the topic of learning a new language. First, it asserts that communicative ability theory has continued validity in the current digital era. Communicative ability theory, as articulated by Hymes' model that combines grammatical, sociolinguistic, and strategic elements of a communicative act, continued to have validity when applied in a new form based on new technology (Hymes 278). Second, it also asserts that a sociocultural learning component in learning, proposed by Vygotsky, is valid in understanding learning as a collaborative process supported by a learning scaffold such as Duolingo (Vygotsky 87). Finally, it also asserts that a cognitive learning component in learning a new skill or ability is valid in understanding increased fluency through repetition of a particular cognitive process in line with DeKeyser's claim that "automatization transforms conscious knowledge into fluent performance" (DeKeyser 98).

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Moreover, it is found that Duolingo's motivational system is effective in overcoming affective issues that often discourage EFL learners in a conventional learning context. This is because Duolingo's private practice arena enables learners to conquer fears of linguistic expression, thereby justifying Horwitz et al.'s findings when they argued that "confidence and self-perceived competence are decisive variables in oral performance" (Horwitz et al. 129).

Nevertheless, while the results have shown a great benefit, they also indicate the possible drawbacks of such learning in digital technology as Duolingo. This tool, as interactive as it may be, is not capable of replication of social, meaningful interaction that leads to pragmatic skills of discourse management. Moreover, as Warschauer points out, "technological simulation of communication can prepare learners for conversation but not replace genuine interaction" (Warschauer 61). This means that the use of Duolingo in learning should not be additive in relation to communicative interaction in learning.

5.3 Pedagogical Recommendations

From the findings of both the empirical and theoretical studies, a number of teaching recommendations emerge:

1.Using Duolingo as a Supplementary Tool

English teachers in Iraqi secondary schools need to use Duolingo as an extension of class activities. This is because a 15 to 20-minute daily engagement will be beneficial in reinforcing vocabulary, pronunciation, and spontaneous speech.

2.Teacher Training in Digital Pedagogy

This is because teachers need to be involved in a professional program that will ensure they use mobile app technology effectively in communicative learning designs. This is according to Stockwell, in that "technological success in language classrooms depends not on the tool itself but on the teacher's pedagogical adaptation" (Stockwell 142).

3.**Curriculum Design and Policy Support**

The Ministry of Education and those designing curriculums should realize that mobile-assisted learning in languages is an important aspect that should be incorporated in Egypt's EFL curriculums through digital elements so that Iraq's language learning fits international standards while at the same time correcting the gap that exists between understanding skills and speaking skills.

4.**Fostering Student Autonomy**

Teachers should encourage students to use Duolingo independently

outside of class. Operating as autonomous learners might have a positive effect on learning a foreign language because Benson claims that "autonomous learners achieve deeper internalization through self-directed interaction with language resources" (Benson 54).

5.**Combining Duolingo with Collaborative Speaking Activities**
In order to achieve full communicative ability, it is imperative that digital practice is followed by peer or group work in which students use learned expressions. This blended learning combines digital repetition with interpersonal communication and satisfies Canale & Swain's "strategic competence through interaction" requirement (Canale & Swain 31).

6.Addressing Technological Barriers
Policymakers must therefore guarantee that all students have equal access to technology and connectivity in order not to jeopardize equality in learning because "digital inequality perpetuates academic inequality," as noted by Al-Jarf (Al-Jarf 219).

5.4 Recommendations for Future Research

This study presents several avenues of research that could be pursued in the future. Firstly, a longitudinal study could be conducted to see whether or not fluency gains attainable in this study are retained in the long term, as well as how sustained engagement with digital technology impacts upon pronunciation accuracy and discourse cohesion. Secondly, a comparison study could look at how well Duolingo fares at various levels of skills or in different demographics such as gender or age group, thus offering an important perspective in terms of individual differences. Finally, a research study utilizing a mixed methodology could research engagement based on learning analysis, thus offering insight into self-efficacy that gamification is based upon.

5.5 Final Reflection

This study's findings verify that technology and pedagogies are not formulas for replacement but for augmentation. Duolingo, when done correctly, pushes fluency speaking course boundaries to new heights as it allows students to experience a "personally driven, anxiety-free experience of getting an 'authentic listening challenge'." In an "environment of learning restricted for communicative interaction," such a technology allows for "democratization of learning initiatives in languages" in a manner that allows students to "bridge their linguistic knowledge with speaking ability." Godwin-Jones aptly emphasizes that "the future of learning a language is in fact a combination of human creativity and digital mediation" (Godwin-Jones 15). By leveraging such

a reality, Iraq's learning system will soon achieve a communicative, student-centered learning process based upon English speaking skills that will empower Iraq's youth in a manner that will not only make them "speak fluently" but also "act confidently" in a globally integrated world.

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