How Adult EFL Teachers Can Effectively Utilize Duolingo in Their Curriculum

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by

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"In recent years, the lives we live seem to be getting busier and busier. Technology has increasingly made its way into every part of our existence — nearly everyone has powerful smartphones in their hands, pockets, or somewhere close."

-Thatcher Wine, *The Twelve Monotasks: Do One Thing at a Time to Do Everything Better*

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CHAPTER ONE

Introduction

Introduction

In recent years, smartphones have become almost ubiquitous, making it difficult to go anywhere without seeing someone staring at the phone in their hand. Smartphones have also changed the way we think about phones - they're no longer just used for making and receiving calls. Rather, they are used in almost every aspect of people's lives. Applications, or apps, have been developed for everything from playing games to fitness to fertility tracking. It is no wonder, therefore, that apps have been developed for the purpose of learning another language.

Language learning apps have been popular, especially during the global COVID-19 pandemic. What is less clear is how effective they are, especially when compared to more traditional, teacher-led instruction. As someone who knows many people who use language learning apps, and uses one herself, I became intrigued by this question of effectiveness of these apps throughout the course of my master's studies.

This project will focus on ways teachers can use apps, specifically the app Duolingo, effectively in their classrooms. This chapter will address how I came to research this topic, why I chose Duolingo in particular, and the reason teachers might want to use apps in the first place. Ultimately, this project will address the question: *How can teachers in an adult English as a Foreign Language setting incorporate Duolingo effectively into their curriculum?*

Journey to this Question

Deciding what to research wasn't easy, but it also clearly tied to background. I am a white middle-class heterosexual woman from Minnesota. I am also in my 40s and, as such, have been around technology my entire life, though not as deeply entrenched in it as those younger than myself. I've been able to own a smartphone for a number of years now and don't think twice about using apps in my daily life. That said, my first reaction to solving a problem or learning something new doesn't involve seeking out an app. I'm more likely to use an internet search engine or learn directly from someone in a more traditional approach. I acknowledge that my ability to comfortably own and navigate technology such as smartphones and applications with little thought on usability influenced my thinking about how teachers can use this technology in their classrooms. I do understand that not all students or teachers will have access to smartphones or the technical knowledge to use them or apps successfully.

I've been a student of other languages for most of my life, starting in eighth grade, learning French in public school in Minnesota. It was easily my favorite class and it ultimately motivated me to earn a bachelor's in French studies, German studies, and history in 2010. At that time, there were no online elements of language learning in my secondary education. At university, there were some online activities, usually directly supported by the textbook company, but also including penpal services and using media available online. This media was never interactive as it usually relied on watching a video in the language being used and then discussing or doing an assignment based on what was watched. Due to this, my idea of language learning always revolved around an in-person classroom setting.

A few years after I graduated from university, I realized that my language skills were getting rusty. To combat this, I enrolled in a German class at a local non-profit organization focused on Germanic culture. It was in this class that I made a new friend. We eventually wound up taking four German classes together. Throughout this time, we often joked that we made one perfect German speaker between the two of us as my knowledge of grammar rules was excellent and his knowledge of vocabulary was extensive. One day, he told me that he had learned many of the words he knew because he had completed the German language course available on Duolingo, however he had signed up for the class because he still felt his language skills, especially knowledge of grammar, was weak.

Throughout this same timeframe, my spouse started learning German. He'd never learned another language before as none was offered in his school district and it wasn't a prerequisite for his associate's degree in college. As we were still paying off student loans, he balked at the cost of in-person classes, instead electing to purchase Rosetta Stone. At the time, Rosetta Stone was language learning software that required a computer with a disc drive and only allowed the user to learn the language they had purchased. He had some background knowledge after having taken a few trips to Germany with me, alongside some rather stilted, amateur attempts on my part to teach him German. At first, he really enjoyed it, and progressed rather quickly. Once he reached grammar concepts that were new to him, however, he quickly grew frustrated as he never knew what he was supposed to be learning. It was at this point that he signed up for Duolingo in the hopes that it would help to supplement the Rosetta Stone course.

Ultimately, even the combination of both programs failed and he enrolled in an in-person class at the same non-profit where I attended classes.

These stories seem to set up Duolingo and other apps or software as insufficient for learning another language, which makes it seem that a project based on incorporating it into the curriculum would be a bad idea. However it isn't all bad. After learning about Duolingo from my classmate, I downloaded the app myself and started using it. In some ways, it's very easy for me, as none of the grammar I'm learning is new. It's a great way to keep my skills fresh and, as the classes I enrolled in took place only once a week for three hours, it provided some much needed practice between classes. I've found that I've learned a significant amount of new vocabulary words as well. This got me wondering if it was really possible to learn a language using an app only, which ultimately led me to research showing that apps can be beneficial when used as supplements to teacher-lead language learning.

Choice of application

My own experience and familiarity with Duolingo make it an obvious choice for me to focus on, but there are many other reasons for teachers to choose to use Duolingo instead of other apps. There is a paid subscription version of the app, but there is also a free, ad-supported version. The paid version allows unlimited mistakes, while the free version only gives users five "hearts." Similar to a video game, hearts represent the number of mistakes a user is able to make before being locked out - in Duolingo's case, this means not being able to use the app for four hours, at which point the user has regained one heart. It takes 20 hours to regain all five hearts, but there is also an option to

practice earlier lessons to earn back lost hearts. Theoretically, it is possible for a free user to have unlimited mistakes if they take advantage of the practice function.

Duolingo is also the most popular language learning app, so chances are that some students are already familiar with it. There is also Duolingo's own claim, prominently displayed on their webpage, of being "the world's #1 way of learning a language. (citation)" Its format is a gamified version of language learning, so it's entertaining and includes incentives for completing lessons. These include earning gems that can be used for in-app purchases, such as Streak Freezes, which lets learners skip a day but maintain a multi-day streak. It also allows users to add other users as friends who can congratulate them on progress, compete with each other, and sometimes participate in collaborative exercises together. For example, recently a friend of mine and I successfully completed 20 perfect lessons between us, which resulted in us both earning one quest toward a monthly goal of completing 30 quests. This is another example of gamification - a reward system of badges for meeting various smaller goals each month or larger goals throughout general use of the app, such as completing 100 lessons with no mistakes. The gamification of language learning provided by Duolingo makes it an appealing app to many learners.

In addition to being free and its appeal to learners, Duolingo also has a function for teachers. Teachers can set up classes and track the usage of the app by their students, as well as their progress within it. If they so choose, teachers can assign specific lessons to their students and track who completed it, average accuracy, and the amount of time it took to complete on average. This can make it easier for teachers to assess the impact the app is having on their students' learning. Teachers who are concerned about accessibility,

especially for students without smartphones, can still involve students with computers and internet access as Duolingo has a webpage platform as well. Users can also customize the activities they see, such as turning off listening activities or simply pausing them for an hour if using the app in a place that isn't conducive to listening practice.

Significance

Mobile Assisted Language Learning (MALL) applications are a fairly recent development, so there isn't a large body of information available for teachers who want to use it. Many adult English as a Foreign Language (EFL) classes consist of students who are only in class one or two times a week and follow a somewhat rigid curriculum. This presents even more challenges to the teachers, such as increasing exposure to English outside of the classroom and motivating students to participate in using MALL outside of class. Depending on the location where the classes are taught and the demographics of the students themselves, there could also be concerns about technological literacy and accessibility. This project does not intend to address limitations in technology. Instead, it is intended to provide guidance to adult EFL teachers in areas where technology can be easily used by most of their students to aid them in learning English. Teachers in areas with limited smartphone usage can still benefit from this project, but on a more individual level with students who have access to technology and are interested in supplementing their learning with Duolingo on their own. MALL applications open up a new area that teachers can encourage students to use in order to increase their interaction with English when students aren't exposed to it on a daily basis.

Conclusion

MALL applications have become popular ways for people to learn languages, especially in a foreign language environment. Given their popularity, and the availability of smartphones globally, it can be assumed that teachers will come across students who are using them. These apps have benefits when it comes to language learning, but they also have downsides, both of which will become apparent in the review of the literature in Chapter Two. Duolingo, as an extremely popular app that is available in free and paid versions, as well as in a smartphone app and website format, makes it a worthwhile choice to focus on. Using Duolingo and MALL is an area where teachers more than likely aren't comfortable with including in their curriculum.

Chapter two will focus on MALL in general and the significant research on Duolingo in particular. Many of these studies were performed using MALL as part of the curriculum, so the impact of different ways of incorporating technology can be compared and contrasted. After analyzing this research, I will then combine this into a project meant to answer the question of how adult EFL teachers can effectively incorporate Duolingo into their instruction, an overview of which will be laid out in Chapter Three. Finally, Chapter Four will summarize what I learned from doing this research and project, address limitations and implications, and explore other areas of study that could be done to further advance our knowledge of this topic.

CHAPTER TWO

Literature Review

Introduction

Despite the ubiquity of smartphones in many cultures, the question still remains if they are contributing to learning or hampering it. As with many things, the answer is nuanced. Much of the research on MALL looks for ways for it to help learning. Indeed, Loewen et al. (2020) explicitly state that "[t]he entire field of technology-enhanced language learning is predicated, whether explicitly or implicitly, on the idea that technology can facilitate L2 development" (p. 210). It's a valid consideration with multiple answers, in spite of the relative naisance of the field. The COVID-19 pandemic also saw a sudden switch to distance learning and reliance on technology for many learners of all ages and their teachers who suddenly had to change their teaching methods and styles with little time to prepare or familiarize themselves with the technology. As the post-pandemic educational landscape starts to take shape, it can be tempting to either drop the use of technology in EFL teaching altogether or even to rely on it even more than before. It is therefore important to ask how technology can be used efficiently in EFL education. Given how broad MALL technology is, narrowing the focus of this project becomes important, which supports the question, "*How can teachers in an adult English as a Foreign Language setting incorporate Duolingo effectively into their curriculum?*"

This chapter will focus on reviewing the literature related to MALL, and then specifically to Duolingo and issues that learners and teachers might encounter when incorporating MALL into their curriculum. First, research into the effectiveness and

detractions of MALL in general will be highlighted. Then, support for choosing Duolingo for this project will be outlined. Next, student reaction, acceptance, and resistance to MALL will be analyzed. Finally, challenges related to teacher acceptance of including MALL into their teaching will be addressed.

Effectiveness of MALL

Changing curriculum to integrate new methods or technology is time consuming. It is therefore important to ensure that the changes made will be beneficial to learners and teachers alike. No matter how popular the technology is, or how much the companies boast about the effectiveness of their products, learners and teachers will abandon these new tools if they don't produce results. This section will analyze studies that have been done on the impact mobile assisted language learning (MALL) has on language learning.

While this review is not meant to go in depth into the development of MALL and the actual programming of the applications, a basic understanding of the theories that MALL developers base their programs on is important, especially for teachers considering how MALL might fit into their curriculum. A large number of MALL applications base their development on a constructivist approach to learning (Damyanov & Tsankov, 2018; Ghorbani & Ebadi, 2020; Lei, et al,. 2022; Moayeri & Khodareza, 2019). Much of this stems from the sociocultural approach to second language acquisition (SLA). This approach views language learning as not just a cognitive process, but also a social one, relying on mediation and internalization for learning to occur (Loewen, 2020). MALL applications have had to program their own form of mediated learning as users don't have the feedback that would be provided by peers or teachers on hand.

By relying on this theory of SLA, they've often also programmed their applications to slowly decrease scaffolded support of learners, provide review opportunities throughout, and limit the introduction of new concepts based on the zone of proximal development (ZPD) (Lei,2022). The ZPD requires the learner to be guided or assisted by someone with more skills when learning something new. The new concept, however, must occur within the ZPD of the learner, and not the teacher, otherwise no new learning can occur as the concept will be too difficult for the learner to grasp (Loewen, 2020). In the case of MALL, the program itself is the more skilled teacher and the way the applications have been designed purposely constructs the learning pathway in a manner that conforms to constructivist theory. In other words, most MALL starts at the most basic level, provides significant support to help to mediate the learning process, and progresses at a rate that allows students to learn without advancing at a discouraging pace.

Purpose of MALL

It is important to remember that MALL is, at its core, a commercial venture and not an academic one. These programs are developed by companies whose primary goal is capitalistic in nature, so they are intended to make a profit above all other considerations. As a result, they often cost money to download or use and are accompanied by corporate marketing campaigns making language learning sound like a fun and easy pastime (Loewen, 2020). These marketing campaigns can be accompanied by studies proclaiming to have proven how effective their product is, though these are usually internally sponsored and not peer reviewed (Vesselinov, 2012; Ziang, 2020). This is not to say that MALL serves no purpose in learning, however, just that a deeper understanding of where

apps provide benefits is needed. Even without specific research into learning gains, the ability for students to learn anywhere and at any time allows for greater flexibility and, potentially, more time invested in learning a new language. In an EFL situation, this could provide students with more exposure to hearing and reading English in their daily lives.

Impact on Vocabulary and Grammar Learning

A common theme noted throughout research, and one that seems to almost be taken for granted with regards to MALL, is its effectiveness in learning vocabulary. Lei (2022) points out that MALL and vocabulary learning, particularly in English, has been the focus of numerous studies and learners using MALL have consistently scored higher on evaluations of vocabulary over those who do not. In a 2020 study by Loewen et al., discussed in more detail later, the amount of time spent using the MALL app Babbel correlated to a larger gain between pre- and post-test vocabulary scores. Given that most MALL apps are gamified systems which present learning as a fun game and how relatively easy it is to test vocabulary gains, this is hardly surprising. The ability of an app to provide new vocabulary along with visual and auditory input, and then ask for interaction from the user, often resulting in a prize, such as praise or unlocking a new feature, can certainly help the learner to draw a connection to the word and its meaning, often in ways that are difficult in classroom settings without the use of props. MALL as a tool to learn vocabulary is therefore mostly accepted as a beneficial way for learners to build their vocabulary skills.

Along similar lines to vocabulary learning and the ease of testing for gains is grammar development. Understanding and demonstrating proficiency in grammar can

impact language learning as it can help or hinder the learner's confidence in their ability to communicate in that language (Ghorbani, 2020). There are many studies related to this, but an especially interesting one was done by Loewen et al. (2020), using the MALL app Babbel. In order to test the overall effectiveness of Babbel, 54 English-speaking university students who were not currently enrolled in any Spanish language classes and had a self-assessed Spanish level of intermediate or below studied Spanish using Babbel exclusively for 12 weeks. They were assessed with pre- and post-tests, including an oral proficiency interview, a grammar test, a vocabulary test, and background and progress questionnaires, to evaluate their progress. The results clearly showed that using Babbel increased grammar results on the test, with the more time spent using the app resulting in higher scores. What is perhaps most remarkable about this study is that it was entirely self-directed; there was no instruction or guided learning occurring outside of the time the students spent using the app.

As MALL alone has proven to provide gains in grammatical development, it is interesting to consider how this learning might be altered when included in traditional instruction. Ghorbani and Ebadi (2020) examined this in a mixed-methods study of 30 adult EFL learners in Iran, all of whom were female, of varied proficiency in English. Over 3 months, participants used Telegram, a MALL-based app popular with English learners in Iran, to communicate with each other every other evening. They were evaluated with pre- and post-tests that comply with Common European Framework of Reference (CEFR) standards and interviews. A control group used no MALL. The results were striking. The experimental group experienced gains post-test, despite all students being enrolled in courses. This result held true across proficiency levels, but was

especially noticeable in students who tested as A1, A2, B1, and B2 in CEFR levels on pre-tests. It needs to be noted, however, that most post-test gains were unchanged in both groups; some in the experimental group increased, but others in both groups regressed. Ultimately, there was a more positive movement in grammar skills among the experimental group (Ghorbani & Ebaldi, 2020). This does support the hypothesis that supplementing traditional language instruction with MALL can be beneficial.

Impact on Receptive and Expressive Language Learning

Researchers have now turned to studying MALL and its impact on specific elements of both receptive and expressive language knowledge. Kacetl and Klimova (2019) conducted a review study of 16 articles in order to determine if MALL is effective in EFL learning. They found "that mobile learning, or m-learning, is becoming a salient feature of education" (p. 182). Their position is that it is becoming increasingly difficult to ignore m-learning, so teachers should be including it, cautiously, to support their instruction (Kacetl & Klimova, 2019). This is based on findings that MALL is effective in the development of language skills and also encourages students to learn outside of the classroom (Kacetl & Klimova, 2019). The caution comes in as the effectiveness of MALL does rely on the teacher choosing an app with appropriate content and at a level that meets the needs of their students (Kacetl & Klimova, 2019). As a general review, this does show that MALL use can be beneficial in both receptive and expressive knowledge, but is limited by content and specifics in how it can be most beneficial.

A meta-analysis done by Li (2021) specifically examined MALL with regards to reading comprehension in ESL and EFL learners. The studies reviewed showed that MALL was overall beneficial to adult learner reading comprehension, but, as multiple

studies were included, different factors had different impacts. Given the importance of being able to decode meaning to reading comprehension, and the positive benefits of MALL in vocabulary building, that is one manner in which MALL assists in increasing reading comprehension abilities. Another finding was that students using MALL informally, or outside of classroom time, tended to benefit more than those who used it formally, or in the classroom (Li, 2022). Not surprisingly, duration of app use and proficiency level of the learner were also factors, with longer-term use (at least four weeks) showing increased reading comprehension than short-term (one week or less) (Li, 2022). Due to the level of complexity involved in reading comprehension, intermediate proficiency learners naturally increased their reading comprehension at a higher rate than low proficiency learners; however, both groups did see benefits after MALL intervention (Li, 2022). Instructional approaches across the apps used differed; however, they all showed benefits to learning, with the caveat that the best results were seen in studies where the MALL in question was related to the instructional goals of the class it was used in (Li, 2022). This meta-analysis supports the idea that MALL can be a beneficial tool for adult EFL teachers in supporting reading comprehension growth in their students.

The above shows that MALL is demonstrably effective with receptive language skills and discrete lexical knowledge, but proof of expressive language skill learning has been more elusive and the results have been more mixed. It's a foregone conclusion that independent-study apps that rely on demonstrating understanding and not on producing comprehensible language will produce results skewed to the side of receptive learning. These methods rarely evaluate spoken or written output, and even that is based on computer algorithms with set standards for output: a typo could result in negative

feedback. The Loewen et al. (2020) self-directed Spanish Babbel experiment did show spoken language gains, primarily dependent on learner motivation, but these weren't as strong as those of grammar or vocabulary. Evaluating spoken language without an interlocutor presents numerous challenges, so we must rely on spoken language pre- and post-tests to show divergence in spoken language, though student perception of progress is important, and will be discussed later. From an evaluative perspective, spoken language learning struggles in a MALL environment.

An interesting paradox of sociocultural and constructivist theory is that some aspects of this theory can be automated, while others require interaction. ZPD requires the teacher to understand the capabilities and limitations of the learner, which is something that a pre-programmed mobile application can never assess. Thus the paradox between MALL and traditional language learning. We, as humans, have yet to develop technology that will allow us to interact with computer learning systems as we would with a human teacher, but that technology can help teachers. A relatively simple study done by Sherine et al (2020), involving multiple MALL apps, illustrates this. They sought to discover how Smartphone usage impacts pronunciation and speaking in second language learners. Engineering students were invited to use their own choice of MALL resources accessed via Smartphone (bring your own device, or BYOD), and then record themselves speaking the language they wanted to learn. Twenty-five participants recorded their own speech in pre- and post-tests over the course of 15 weeks. Regardless of instruction or platform used, m-learning produced spoken language results. This does demonstrate spoken language gains via MALL.

While this all supports a general proclivity for MALL to increase expressive language ability, there is one quasi-experimental study that specifically supports MALL as a supplemental teaching device with regards to spoken language output. In 2019, Moayeri & Khodareza evaluated the role mobile phones played in increasing written and spoken English language skills among 35 Farsi-speaking Iranian adults, 21 of whom were female, 14 male, separated into groups of 16 experimental and 19 control. The control group demonstrated spoken English with no MALL intervention, while the experimental group was able to practice speaking with a MALL application. Pre- and post- test results were used to measure improvement in oral narrative tests. Any MALL intervention was done outside of class. The results show that MALL usage, in this case, paired narrative tasks, significantly increased the post-test results of a narrative oral test, to the point where no MALL intervention resulted in steady, but minimal, increase in spoken ability in English, from a 7.10 to a 7.57 mean (Moayeri, 2019). Meanwhile MALL intervention resulted in an increase from 6.43 mean pre-test to an 12.18 mean post-test result (Moayeri, 2019). While these results are dramatic, and may be outliers, they do show that MALL has benefits when used in conjunction with traditional teaching methods.

The Case for Focusing on Duolingo

Duolingo purports to be able to teach a foreign language, for free, in fun, bite-sized lessons, which are supported by research (Duolingo). Adult students of other languages are already challenged with multiple financial expectations, so choosing an app that has minimal financial demands on students is important. While it is possible to pay to subscribe to Duolingo, it is also possible to use it for free on an advertisement-supported basis. This does add to the amount of time spent using the app, but for students of limited

financial means, as long as they have access to a cell phone or computer, they can access the app at their convenience.

For any adult educational class, financial considerations for the students are an obvious concern. Teachers want to provide the best resources to their students, while also trying to minimize any negative implications to the lives of those students. Having a free, advertisement-supported application is a positive, but only if it meets educational expectations for the teacher and students. To that end, teachers who wish to utilize MALL in their classrooms need to know that the program they are choosing is successful and accessible to their students. This capstone project focuses exclusively on Duolingo and this section illustrates why that is an affordable and beneficial choice for their students.

Effectiveness of Duolingo

While it isn't the most current research, Chen evaluated MALL apps in 2016 and came up with a series of recommendations. One of the criteria used to evaluate language learning applications was related to the ease of use of the app to individuals who might not be as technologically advanced or accepting as others (Chen, 2016). Ultimately, Chen (2016) evaluated many apps using categories such as content, pedagogy, self-correction, motivation, and others. Seven EFL apps were analyzed, including Duolingo, and ultimately, Duolingo was rated highest (Chen, 2016). This doesn't mean that Duolingo outscored every app in every field, but it earned the highest combined score. Particularly, Duolingo scored highest in Pedagogical Coherence, Feedback and Self-Correction, and Sharing. It also earned high marks in Content Quality, Motivation, and Usability, while scoring low marks in Customization (Chen, 2016). Ultimately, Duolingo scored 50 points, while Speaking English Fluently, the second place app, scored 47.5 (Chen, 2016).

It's important to note that the evaluators were Ph.D. and MA level English as a second language teachers, who commented that Duolingo "provide[s] its novice users with extensive written lessons" (Chen, 2016). This is very encouraging research, though it is tempered with the caveat that no MALL app can provide a whole language learning experience for all adult learners (Chen, 2016).

Company Sponsored Research Results

Having established that Duolingo can assist in positive second language acquisition, it's important to understand how the application can be beneficial. To begin with, there are two company funded studies designed to show efficacy. The first, by Vesselinov, done in 2012, included 196 individuals over the age of 18 who were studying Spanish at the novice to intermediate level. This study established that students believed that Duolingo was easy to use and effective. The WebCAPE test was used to assess Spanish ability at the beginning and end of the study, and it did show measurable improvement in participants, with an average of 34 hours of Duolingo being roughly equivalent to one semester of Spanish class (Vesselinov, 2012). However, it was noted that participation was inconsistent over the time of the study and that many participants dropped out (Vesselinov, 2012). Still, efficacy of the program was seen in those who persevered throughout the study.

The second corporate sponsored study established the claim that their beginning level courses in second languages are equivalent to what a student learns in four semesters of university language classes (Jiang et al., 2020). This claim has been boasted as proof of the efficacy of Duolingo on their website and in advertisements. The basis for this is the 2020 study done by Jiang et al., that evaluated 135 adult students of Spanish

and 90 students of French. The American Council on the Teaching of Foreign Languages (ACTFL) listening and reading tests were used to evaluate learning. They were administered to fourth semester university students as well as the Duolingo experimental group. The findings showed that the Duolingo students achieved comparable results after roughly half of the time needed for the university students (Jiang et al. 2020). These results are definitely impressive, but it is important to note that they are sponsored by the company and relate to reading and listening only.

Independent Research Results

To that end, Loewen et al. (2019) put those claims to the test. Nine individuals from Michigan State University, including one professor and eight graduate students, participated in this mixed-method study where they used Duolingo exclusively to learn Turkish, a language none of them had previously studied. At the end of the study, they took the university's Turkish 151 final exam, which first semester students are required to score at least 70% on in order to pass the course, with an average of 90% common among students. The goal was for each participant to reach the 34 hours of study time on Duolingo that Vessilinov found was needed to equal one semester of a university level course; however, testing was done at 12 weeks, regardless of hours spent. Participants who didn't reach 34 hours in that time were given the option to retake the test once they did reach that time. The exam tests on listening, speaking, writing, reading, and lexicogrammar, so it covers multiple areas of communicative competence in a language. In addition to using Duolingo and taking the tests, the participants journaled throughout the process.

After the first 12 weeks, the average Turkish 151 exam score for the participants who used Duolingo was 48%, with a range of 23% to 76%. The impact of where learning occurred most can be seen in the subscores, with higher scores in writing, reading, and lexicogrammar, and lower scores in oral language areas of listening and speaking (Loewen et al. 2019). Interestingly, the participants' journals showed an overall positive impression of the flexibility of the app on the part of the participants, with gradually waning motivation throughout the study, sometimes a result of the app experience itself and sometimes due to lack of intrinsic motivation to learn the chosen language. The results did show that learning happened, as all participants started with no knowledge of the language and ultimately were able to demonstrate some knowledge on the final exam, though not at the level expected of first-semester learners at that university. Ultimately, Loewen et al. (2019) were able to show that Duolingo does work as a tool to improve language learning; however, the company's claims about how quickly and effectively learning can occur with the app alone are probably inflated.

Writing, vocabulary, and grammar skills are all areas that have already shown to be areas where Duolingo can assist in language learning. These are further supported in studies done by Cesarini et al (2021), Munday (2016), and Habibie (2020). Cesarini et al. (2021) specifically focused on vocabulary learning, administering a questionnaire and vocabulary test to 10 university students in Indonesia before and after two weeks of using Duolingo to study English. In addition to clearly showing a positive impact of the app on vocabulary learning, results of the questionnaire showed that 80% of the participants found the app to be both effective and have a positive impact on their motivation to learn vocabulary.

Munday (2016) also used university students in her study, but went a step further to incorporate it into the grades of students. Forty-six A1 level Spanish students and 16 B2 level students used Duolingo for a semester, with 10% of their final grade reliant on their use of the app. Instead of grading based on results, grades for the A1 students were based on how many lessons the student did over the course of five days each week, with higher points given for completing five lessons on five different days than were given for completing all five lessons on one day only. The B2 students were asked to complete five skills a week, each of which includes multiple lessons. The majority of the A1 level students reported enjoying Duolingo and thinking it was helpful. The B2 group, on the other hand, reported it being helpful and easy to use, but only half of the students enjoyed it. The A1 group generally preferred Duolingo to their regular homework, while the B2 group was equally split. Not surprisingly, the A1 group was more likely to respond that they would continue using Duolingo than the B2 group. This does reflect the heavier workload associated with the tasks that the B2 group was asked to take on within Duolingo. Munday did recommend using Duolingo in teaching, but cautioned teachers to find a balance between how much time is required on the app versus the benefits and potential grade impact to students. This study was done when Duolingo was just launching its free educator's dashboard, so it is easier now for teachers to set goals like XP thresholds per week instead of total lessons or skills (Munday, 2016).

Finally, Habibie (2020) evaluated 40 students of English in Indonesia using questionnaires and interviews to assess learner motivation to assess how they use the application before and after three days of use. The questionnaire showed an increase in all three motivational areas measured, namely enthusiasm to learn from 74% to 86%,

desire to learn from 73% to 89%, and general positive attitudes toward learning from 71% to 82% (Habibie, 2020). Ultimately, all students reported a positive impact to their learning and motivation to learn English, especially given the grammar and vocabulary support with regards to helping them to build knowledge and confidence in writing activities (Habibie, 2020). Using Duolingo as part of a class does provide measurable skill improvement, as well as boosting learner motivation.

Accessibility of Duolingo

Beyond the educational potential of MALL, the technology chosen needs to be easy and engaging to use. In addition to being free or paid, depending on the version the student chooses, Duolingo can be used in both an application basis on a smartphone and as a web-based application on a full-sized computer. This can be a benefit for learners with accessibility concerns regarding vision or typing. Falk and Götz (2016) looked to see how Duolingo supports learning and which of these features users actually use. The app uses multiple different forms of feedback, including visual prompts, audio alerts such as a negative tone for an incorrect answer and a positive fanfare for a correct one, and explanations of where errors occurred in incorrect answers. In addition to feedback, users interact with the application through the persona of Duo, an owl mascot, who functions as instructor and cheerleader. In addition to Duo and other personae in the app, users gain experience points (XP) as they progress through lessons and can earn gems, which in turn can be used to "buy" extra practice opportunities. These then function as a reward system for learning. Duolingo also allows users to find each other and add other learners as friends. Friends can encourage each other, congratulate each other on successes, and participate in challenges together. Despite being able to see friends and their progress, a

level of privacy is maintained as any mistakes or setbacks made by one user are not exposed to others, and it is up to the user to choose if they wish to share their progress. Duolingo also offers message boards where users can ask questions about what they've learned and interact with other users, thereby creating an online community discussion about the language. Falk & Götz's (2016) survey on Duolingo features that were actually used by users, however, found that interacting with other users in forums or as friends is not something that is utilized by the majority of users. Falk and Götz (2016) ultimately concluded "that the largest benefit of using Duolingo (and is probably also the key to its success) is its versatility" (p. 257). Users can choose the best way it works for them, even in the context of a class, and also choose how integrated into the broader Duolingo community they would like to be.

Furthermore, a questionnaire collected on 40 university EFL students in Indonesia showed favorable perceptions of Duolingo as a way to integrate technology into language learning (Ritonga, 2020). The assumption was that students would find that adding technology to their language learning would help to decrease the perceived difficulty in learning English by adding portable, enjoyable ways for EFL students to practice. The questionnaire was administered to 40 seventh semester students, with a goal of seeing how students already use mobile phones for learning purposes. All of the respondents reported using their phones for learning, with 30% saying they sometimes use their phones and 70% saying them often (Ritonga, 2020). When asked specifically about Duolingo, 95% of all respondents were familiar with the application, while only 5% had never heard of it or used it. All respondents felt the application could help them learn English, with 85% thinking it could be helpful in learning all skills, 10% responding it

could help them learn vocabulary, and 5% saying it would help improve their writing skills (Ritonga, 2020). This study shows that adult students are receptive to including Duolingo in their EFL learning, which further supports projects for teachers to integrate it into their EFL teaching.

How Students View MALL

Student attitudes toward MALL and its learning potentials have been partially canvassed above, however this section goes deeper into motivation, student perceptions of how MALL can help them learn, and other considerations that students have when faced with the integration of technology into their language learning experience.

An area of MALL research that hasn't been studied much is in the area of more psychological factors involved with learning. Many of the studies discussed above mention rather high attrition rates for users of MALL, including the corporate sponsored ones. This underscores the need for students to remain motivated in their learning, something that MALL programs seem to have struggled with. For teachers planning on integrating technology into their curriculum, it's important to understand how students view MALL as part of their educational experience and how apps can impact their motivation to learn.

The global COVID-19 pandemic caused a large, and often sudden, shift from in-person to online learning in many parts of the world. Smartphone apps were not developed in response to COVID-19, but instead were readily available for those interested in downloading them. This inspired research into those apps which hadn't been done before. Dolzhich et al (2021) conducted an online survey intended to gather information related to the use of MALL in an EFL setting. They surveyed 200 individuals

representing four different groups of 50 respondents each: potential employers, EFL students, teachers, and university administrative staff. The results showed a higher acceptance level of MALL use among students and potential employers than among teachers and administrators. This shows a disconnect between what students are expecting with their learning experience and what teachers view as beneficial or possible to add to their courses.

MALL and Student Motivation

Given student responses to being receptive to using MALL, it is therefore interesting to consider the attrition rate as it might be assumed that MALL usage could help to boost the motivation of learners in language learning. In general, learner motivation in language learning can come in the form of intrinsic, or internal-force driven, and extrinsic, or externally-based, factors. Hussein et al. (2020) reviewed motivational factors of Saudi Arabian EFL learners and Pakistani English as a second language (ESL) learners and found some parallels between student motivation. On both sides, intrinsic motivation was found to be a larger driving force behind student achievements and attitudes toward learning in general. These include the reason for learning, whether voluntarily because of a perceived social or occupational benefit, instead of mandatory for purposes of fulfilling certain obligations for school or work. While extrinsic motivational factors like earning a reward or avoidance of failure did come into play, they weren't seen to be as strong as intrinsic motivation (Hussein et al., 2020). Given this, it is easy to see why some students who lack intrinsic motivation would be easily discouraged and stop using MALL applications relatively soon after starting.

Looking more closely at the impact MALL can have on motivation, Dong et al. (2022) took a more psychological approach in their study. In addition to motivation, they looked at how MALL can assuage learner anxiety and encourage self-efficacy. Of note, they discuss how high levels of motivation are an indicator of learner success, however anxiety can detract from learners of any level of motivation, while self-efficacy is actually a higher predictor of language learning success. A learner with high self-efficacy is one who believes that they can succeed at their given tasks and goals, and will therefore be able to better navigate moments of anxiety in learning. Higher self-efficacy also naturally lends itself to boosting motivation as the learner believes that success in learning is possible (Dong, 2022). In order to test and support this information, and see its relationship with MALL and computer assisted language learning (CALL), Dong et al. (2022) selected 90 students in Iran, aged 16 to 32 years, and assigned them to one of three groups- MALL, CALL, and traditional language learning. Three EFL teachers with MAs in TEFL were selected to teach each group. The CALL group received instruction via the computer program Skype. This is not a MALL specific application, rather it allowed individual phone calls and conference calls for teachers to provide remote lessons to their students. The MALL group was instructed entirely via the app WhatsApp and involved no real-time interaction between the students and teacher, instead offering a more forum-based learning environment that students could access at their convenience. The final group included traditional face-to-face instruction at the language institute where all participants were enrolled. Pre- and post-tests measuring motivation, anxiety, and self-efficacy were provided to all participants. Despite the general reliance on face-to-face, traditional teaching methods, the results of the study actually showed higher

levels of motivation and self-efficacy and lower levels of anxiety in the CALL and

MALL groups than in the traditional learning group. One factor that seemed to increase

the motivation of the CALL and MALL students was the permanence of the medium: all

instructions and interactions were saved and accessible for students to review as needed,

instead of the face-to-face classroom setting which required attendance and

comprehension at the time of instruction. This indicates student support for MALL as

well as a willingness to see the benefits of use of these applications, whether exclusively

or in a blended classroom setting (Dong, 2022).

Blending Technology with the Classroom

Blended classroom support has been growing in recent years as technology

resources have been developed and become more widely available. This has resulted in

the development of the idea of mobile-assisted seamless language learning, which

essentially allows and supports teachers to combine traditional classroom learning with

an online component (Chai et al., 2016). A study of primary school students in Singapore

learning Chinese as a second language done by Chai et al (2016) measured student

motivation in a seamless learning environment. They found that motivation was high and,

particularly noteworthy in the context of the Dong (2022) findings, intrinsic motivation

and self-efficacy were highly correlated to motivation and success (Chai et al., 2016).

The researchers do make a point to note that the learning done in this study was

teacher-led, and the greatest success was found when teachers assisted in cultivating

self-efficacy and engaging learning outside of the classroom. This suggests that MALL

can be a useful way to foster learner motivation in the hands of a teacher willing to

incorporate it effectively.

As important as self-efficacy appears to be in student motivation, it can be difficult to identify what helps students to develop that skill and therefore improve motivation. The previously discussed study by Habibie (2020) concluded that Duolingo helped students to improve their grammar and vocabulary, which in turn boosted their motivation in writing. The confidence boost provided by this increase in language skills can be seen as a way to develop that self-efficacy so crucial to motivating students. Hidayti and Diana (2019) studied the effect motivation had on students' time commitment to Duolingo and Hello English, another MALL application. Students were found to be enthusiastic about using MALL outside of class, however they also didn't explore the apps too deeply or immediately adapt to the flexibility of learning outside of the classroom (Hidayti & Diana, 2019). Interestingly enough, there was no correlation between students who were highly motivated and the amount of time they spent using the app (Hidayti & Diana, 2019). Again, these results demonstrate positive learner reaction to MALL while also underscoring the importance of teacher support.

Virtual Learning Opportunities with MALL

Formal learning environments aren't the only choice that learners have for learning a language. MALL programs are often geared towards individual learners on an independent course of learning. Some of these programs, including Duolingo, are increasingly understanding the importance of community-based learning as well as exploring other areas to keep learners engaged. One such app, Babbel, launched a virtual-classroom program for corporations who wish to assist their employees in learning a foreign language (de Oliveira et al, 2021). A study was done on this program to see how user beliefs, motivation, and occupational language requirements drive

learners in conjunction with Babbel's MALL system. In addition to the lessons available on the app, participants had access to online 1:1 lessons with qualified teachers to supplement their learning. Surveys and interviews were conducted on German adult EFL learners who were employed at companies in Germany who had purchased this program for their employees. Learners reported needing to use English professionally, but were hindered by lack of knowledge, particularly in the areas of vocabulary and grammar (de Oliveira et al., 2021). Most participants reported their desire to use Babbel as being extrinsically motivated as a way to improve their professional situation, but they still had mostly positive reactions to the program, particularly the 1:1 sessions with a teacher. In general, they associated the teacher-led sessions with personalization of their learning and the ability for the learners to identify and work on areas of struggle that they wouldn't necessarily get help with in other MALL situations. Additionally, these sessions combined with the self-paced lessons resulted in increased self-regulation and self-efficacy, which in turn contributed to higher levels of motivation and lower levels of attrition among these learners (de Oliveira et al., 2021). By following a hybrid program, these learners were able to take a primarily extrinsic reason for learning a language and start to apply intrinsic motivation to continue and succeed.

Demotivation as a Concern with Voluntary Learning

The issue of motivation in learners has a reverse side: a lack of motivation and self-efficacy can lead to demotivation, which could ultimately lead to dropout. EFL for adult learners is often voluntary and not compulsory, so demotivation is a legitimate concern and student dropout a definite possibility. To that end, Evans and Tragant (2020) studied adult EFL learners at a language school in Spain, 106 who continued their studies

and 154 who dropped out, in order to better understand demotivation in language
learning. They administered two questionnaires, one for the continuers and one for the
dropouts. They identified four groups of students: dropout and demotivated, dropout and
motivated, continuer and demotivated, and continuer and motivated. What they found
was that in both groups of dropouts, the main reason given for leaving their studies was
lack of time. For the motivated group, this was followed by personal reasons and lack of
relevance for their work. For the demotivated group, however, the second reason for
dropping out was the method used in the class. It's not surprising that adult learners
taking courses voluntarily would find it difficult to continue due to time constraints, but it
is interesting that the students who became demotivated did so because of the teaching
methods. This study suggests that it is important to keep resources such as time in mind
when developing adult EFL curriculum, and also that teachers should consider the value
perceived by their students in the methods and materials used in order to prevent
demotivation as much as possible (Evans & Tragant, 2020).

When considering adding MALL to an EFL course, it is clear that students need
to enjoy working with it and they need to provide a clear value to the students. Some
studies have looked into specific skills results and MALL. Lei et al. (2022) experimented
with a one year intervention of MALL use, focusing on vocabulary. A total of 139
participants took two assessments at the beginning and end of the study, the vocabulary
learning attitude scale (VLAS) and self-regulating capacity in vocabulary learning scale
(SRCV) to assess their attitudes towards learning vocabulary and if MALL use changed
that. What they saw was that MALL intervention increased both motivation for learning
vocabulary and self-regulation in learning (Lei et al., 2022). The self-regulation is

important as it is related to self-efficacy and the ability to stay on task and learn outside of the classroom.

Student Perceptions of Benefits

Attitudes toward grammar development is another area that has been tested recently. In a mixed-method study, Ghorbani and Ebadi (2020) tested grammar skill improvement and learner perspective towards MALL after 3 months of use of Telegram, a popular MALL program. The participants were 30 adult EFL learners in Iran and there was a control group of 10 volunteers who did not use via MALL. At the end of the study, the MALL group showed a significant improvement in their grammar skills, while the control group showed no statistically significant change. Additionally, the survey administered at the end of the study reflected a high level of interest in the participants for using the app, 93% responded that they felt the use of Telegram helped them learn, and 88% felt that the combination of Telegram and teacher support helped them improve their grammar skills (Ghorbani & Ebadi, 2020). The positive perception of MALL as well as the clear improvement in skills shows that using the app effectively, with appropriate teacher input, can help with learning and keep motivation high by way of positive reinforcement.

For all of this research on benefits and perceived student acceptance of MALL, actual usage hasn't yet been addressed. A large-scale field trial was conducted in 2018 in the United Kingdom on a European project called MASELTOV, a MALL project aimed at assisting immigrants in language learning and with daily activities (Jones et al.). Over the course of one month, thirteen participants used a specially designed MALL app in the city of Milton Keynes, and then attended a final workshop and interview. The goal was to

see if use of the app would be helpful and to see how often it was used. In addition to the

participants, there was a facilitator whose role was to assist with technical problems and

post prompts and responses in the related forum. Researchers found that although MALL

allows for learning on the go, most participants chose a private environment to interact

with the app instead of a public forum. Despite this, use of the app was high and the users

reported more motivation and confidence with interacting with others in public because

of it, with one user reporting in the interview stage that they were able to understand their

doctor better. The facilitator also made sure that the forum was active with a lot of

interaction, so the users reported enjoying the feeling of the support of a community.

Again, the interactions and the app were beneficial, but facilitator or teacher support was

essential to the success of the trial (Jones et al., 2018).

Going one step further, Garcia Botero et al (2019) decided to test the evidence

that students welcomed MALL by asking "do students walk the talk?" (p.71) with

actually using it. High attrition rates have been noted, but this seems to directly contradict

the overall high attitudes learners have when asked about using MALL. A large group of

574 English and French learners at a university in Colombia were introduced to Duolingo

as part of their instruction, however downloading and using the app was completely

voluntary. Of these potential participants, 273 never used the app, 149 stated they used it

after the introduction, and 118 agreed to have their Duolingo usage tracked for one year.

Activity was tracked via the app's teacher dashboard, which all participants joined.

Results showed that 73 users used the app fewer than 10 days in that year, 31 used it

between 10 and 50 days, and 14 used the app 50 or more days in the year in question.

Five students from each group were randomly selected to participate in interviews at the

conclusion of the data collection. The interviews revealed that motivation and self-regulation were key in those who used the app more frequently than others. Most users did still have a positive viewpoint of the app, even those who rarely used it, but time was an issue. All three groups reported that there should be teacher intervention and guidance alongside using the app, something that was not included in this study (Garcia Botero et al., 2019). This clearly shows the continuing trend of positive learner attitudes, mixed with a need for teacher guidance and motivational support for the learners.

Issues of Accessibility

A final consideration of student engagement with apps is accessibility and challenges there. While it is outside the scope of this project, financial impact and internet accessibility are issues that teachers need to address in their own situation. The learner's own acceptance of technology is important when incorporating technology successfully. Much of the research has focused on university to middle-aged adults, with little focus on older adults. Puebla et al. set out to correct that with a study in 2022 on senior perceptions of MALL. Using surveys and interviews, 208 adults aged at least 60 years and residing in Germany were asked about their feelings on computers and language learning. It was noted that Germany has a high level of internet access with 96% of the population having access, and the participant group was in line with this number. Due to this, the trend in computer literacy in the respondents was rather confident and most actively used technology in their daily lives. The general perception of participants was positive toward using MALL for language learning, though they were discouraged by certain features of apps they'd used, preferring more interaction and a lack of personalization. Ultimately, age was not found to be a hindrance to learners

wanting to use MALL. As with students of other ages, motivation and perceived value of the app were seen as the most important factors (Puebla et al., 2022).

Overall, student support of MALL is high, with a trend to needing more support while using it. While it is often billed as an independent learning method, only the most highly motivated students tend to succeed using it as such. Learners can see the benefits, but need guidance on how to use it appropriately in a manner that builds their self-efficacy and self-regulation in doing out of classroom work. If the chosen MALL method is adequately supported and incorporated into the curriculum, it is likely that students will see an increase in skills and possibly even an increase in motivation to learn the target language.

Teachers and MALL

The final component, and arguably the most important one, is the role of teachers in adopting MALL. Learners have already been seen to be receptive to it, but they have struggled when using MALL without teacher support. The 2021 Dolzhich et al. study already showed a gap in learner acceptance and teacher and administrator acceptance of MALL. Teacher reluctance could therefore provide a hindrance to effective MALL inclusion, as well as a lack of understanding how to incorporate it into their teaching.

Teacher use of MALL

Garcia Botero et al. (2021) set out to measure teacher use of mobile technology in education, as well as their attitudes towards it. They surveyed 89 university teachers in Colombia. The vast majority of respondents, 90%, reported using apps in teaching on a daily basis, while 94% used them weekly. It is important to note that MALL apps included language apps like Duolingo, as well as music apps, video chat, social media,

and others (Garcia Botero et al., 2021). The survey also measured intention to use MALL alongside actual use, with a similar result to student usage: teachers with a higher intention to use MALL in teaching used it less often. This echoes previous research that indicates that teachers need to be aware of the advantages of using MALL in order to successfully use it, and encourage beneficial use in their students. When combined with Garcia Botero's 2019 study about actual student use of MALL, there is a clear disconnect between teacher use of MALL and student use of MALL outside of class. Professional development would help to bridge the gap between this discrepancy.

While Garcia Botero et al. (2021) showed that teachers do use MALL in teaching, Hoi and Mu (2021) looked at student expectations with regards to integrating MALL. The study was conducted in Vietnam, where recent research showed a lack of technology adoption in language teaching, which resulted in countrywide teacher training. The training, however, didn't produce an increase in teacher acceptance of MALL as time, a perceived lack of guidance, and irrelevant technological resources were seen to be hindrances. Considering the technology acceptance model (TAM), they determined that students rely on teachers for affective support, or encouragement and explanation of benefits of the technology, capacity support, or teach guidance on use of technology, and behavior support, or clear guidance on how to use technology in language learning. A questionnaire sent to 293 university students in Vietnam measured the students' perception of their teacher's support based on these three factors of TAM. Hoi and Mu found that affective and behavior support from teachers were strong in encouraging student adoption of technology. Teacher support was critical, therefore, in MALL acceptance and use among students, but the lack of adequate support from teachers had

already proven to limit technology acceptance in language learning in the country as a whole. This does add the element of teacher confidence in using the technology in the first place, while also being able to assist students in using it effectively and encouraging behaviors to promote self-regulation outside the classroom.

Making MALL fit Collaborative Learning

Another disconnect for teachers integrating technology is a discrepancy between their curriculum and pedagogical approaches and what the technology currently offers. Kukulska-Hulme and Viberg (2018) did a review of mobile collaborative learning studies to assess how technology that has been developed fits into a collaborative learning environment. They noted that the majority of MALL apps are not centered on collaborative learning and instead focus on individual learning only (Kukulska-Hulme & Viberg, 2018). This puts the burden of adapting the curriculum to fit the technology, as well as demonstrating technology's usefulness towards learning outcomes, on the teacher, instead of the teacher being able to easily fit MALL into their teaching methodology. The review did show that social constructivism is the theory most commonly used in MALL apps, with game and task-based learning being the main function supporting this theory. Knowing this can help teachers better understand how they can incorporate technology into their teaching, while also acknowledging a need for better collaboration between MALL companies and teachers in developing worthwhile programs that are easy for teachers to use (Kulkuska-Hulme & Viberg, 2018).

Any reluctance aside, it is obvious that teacher support and their exertion in integrating MALL is incredibly important to using the technology well. What is less clear is how this can be accomplished. We've seen from Munday (2016) that including MALL

as a part of a grade can be both motivational and beneficial to students, but assigning too much can cross the line into adding a source of stress and demotivation. A balance needs to be found. A grade reward as motivation probably won't be as effective for adult EFL teachers, however, as these courses typically aren't graded and are voluntary in nature. This indicates that adult EFL teachers need to find different ways to promote motivation and the use of MALL in their students. Lei (2022) showed a correlation between using MALL and an increase in motivation and self-regulation among students. This study showed that teachers being involved in MALL use, especially with scaffolding both before and during use, can be what students need to encourage effective app use. Technology and MALL in particular rely on a level of self-directed learning, but many students haven't been set up to learn that way historically. It's not enough for teachers to assign MALL assignments, they have to model use of the app, monitor it, and provide feedback throughout. Thankfully, apps like Duolingo provide a teacher dashboard that allows them to monitor use and progress to better direct their support of their students.

Technological scaffolding is therefore important, but not the only element that teachers need to be aware of. Jafari et. al (2020) researched multiple different types of scaffolding on adult EFL speaking improvements. In addition to technology-based scaffolding (TBS), they also reviewed motivational-based scaffolding (MoBS) and metacognitive-based scaffolding (MeBS). MoBS was defined as scaffolds that boosted learner confidence and made progress more evident. MeBS was defined as scaffolds that promote socially-shared metacognition. The study included 90 adult EFL learners in a private language school in Iran who were given a pre-test and a post-test using the International English Language Testing System (IELTS) for their Certificate in Advanced

English (CAE). They were divided into three groups, one taught with TBS, one with MoBS, and the other with MeBS teaching methods. The results showed a statistically significant increase in speaking scores among the TBS group, however the strongest results were in the MoBS group (Jafari et al., 2020). Interestingly, this study shows that integrating technology can help with speaking if it is scaffolded well and implies that a combination of TBS and MoBS could be very effective, though more research is needed to that effect.

In addition to scaffolding, other methods are possible. Yeşilçınar (2019) investigated using a flipped classroom technique to improve adult EFL speaking skills. A flipped classroom relies on using technology outside the classroom to encourage learning, allowing for more tech-based learning to be done independently outside the classroom and more practice during class time. This study included 22 learners assigned to two groups, one traditional, one flipped classroom. They were given pre- and post-tests in speaking using IELTS to assess progress. The results supported the use of technology in learning outside the classroom as in the flipped classroom, students not only improved their speaking scores more than the traditional students, they also reported feeling more positive about their speaking ability as a result. They also reported increased motivation and participation in class. This study supports the concept that teachers could use MALL to set up practice and learning time outside of class, and then use the classroom time to support that learning and even personalize it to areas that learners found difficult. Being mindful of time constraints, adult EFL teachers could successfully incorporate MALL into a flipped classroom environment.

The ubiquity of smartphone use makes it difficult for teachers to ignore MALL and its influence on students and learning. Damyanov et al. (2018) mention that many teachers still view smartphones as distractions in the classroom, but their study indicated that students prefer smartphones and other mobile devices over other technology, such as personal computers or e-books. The majority of the respondents, 76.8%, use their smartphones in school, however only 9.4% report using it for educational purposes (Damyanov et al., 2018). This is a huge area of opportunity for teachers to tap into devices that are already being used and making them a tool for learning. It's up to the teachers to harness that.

Summary

The literature tends to show an overall benefit to using MALL to assist with teaching a second language. The strongest benefit seems to be with receptive language skills and grammatical and vocabulary knowledge. While there are benefits seen in expressive language use, these are more limited. Regardless, an underlying theme in much of the research is that the most beneficial use of these apps is as supplementary to, and not as a replacement for, teacher-led instruction. It is therefore up to the teacher to successfully incorporate their chosen MALL program into their curriculum. Beyond the integration, another issue a teacher has to navigate is the motivation of students in general, while also encouraging the use of MALL to learn and practice the target language.

Chapter Three will lay out the scope of this project, the rationale behind its method, and the framework guiding the content development. This will allow teachers to hear directly from students who have learned via Duolingo and traditional methods so

they are better informed about the benefits and downfalls of using the app. Additionally, this project will provide ideas for the integration of Duolingo into their curriculum.

CHAPTER THREE

Project Description

Introduction

For my project, I created a podcast with a supporting website that adult EFL teachers can use to learn more about Duolingo and how to integrate it into their curriculum. The literature review has shown that using MALL as a supplement for adult EFL teaching can be beneficial, but it needs to be adequately supported. The rationale will provide support for why a podcast and website works for this purpose, based on the intended audience. The content and timeline will be described, as well as the framework which informs it. Ultimately, this chapter will lay out how this project can answer the main question posed: *How can teachers in an adult English as a Foreign Language setting incorporate Duolingo effectively into their curriculum?*

Audience

Before addressing the rationale of choosing a website and podcast, the intended audience needs to be understood. Outside of structured institutions, such as universities or language schools, many foreign language learning settings involve individual teachers designing classes for individuals or groups of students. Many adults learning English around the world are learning it in an EFL setting, and not an immersion context. It is therefore important that the teacher attempt to make the practice of the language outside of class as easy, accessible, and immersive as possible.

The intended audience of this project was, therefore, worldwide and in a variety of different settings. Some teachers will be working for non-profit organizations, some for private language schools, some directly for companies hoping to improve the English

of their employees, and others as private tutors. It's a broad category, but all work with adults in an EFL environment. This poses many issues with professional development for teachers in this setting. Many of these teachers will be in multiple different time zones, making a synchronous classroom format difficult. Additionally, they may have schedules that vary on a daily basis, making a multi-day course infeasible. They might not be part of a school or company that supports professional development, so they are doing this all independently for their own, and their students' enrichment.

Rationale

With the intended audience in mind, an online resource is best. Adult EFL teachers can access it when they want and are able to. They can pace themselves accordingly. As long as the content is accessible and easy to use, this form of optional professional development should appeal to a wide range of adult EFL teachers. Further, this project aims to show how incorporating MALL effectively can boost learning, so it follows that teachers interested in teaching with technology may turn to digital resources for ideas. Another benefit of an online resource is that teachers can return to the resource and review as needed, gradually building their skill sets and being able to fine tune them over time, instead of having to remember everything all at once.

This project provided suggestions to teachers on how to effectively incorporate MALL, Duolingo in particular, into their teaching. However, it did not intend to give a solid, strict curriculum to follow. Given the wide variety of adult EFL learning situations, it is important for teachers to be informed on, and inspired by, how Duolingo works and how it can work for them, while also allowing teachers to decide for themselves which implementation method works best for their environment. This includes possibilities for

them to develop their own system, with the solid background knowledge of the benefits and drawbacks of MALL and Duolingo.

Framework

This project is built around the information provided on digital pedagogy from the University of Toronto, Scarborough (2022). This is a website guide that assists teachers in making sure they use technology purposefully and effectively, and not only using it for technology's sake. In an increasingly connected world, with a lot of emphasis on technology in education, the workplace, and daily life, it can be tempting for teachers to use a technological resource without thinking about the impact it has on learning or the relevance to their students. This resource is focussed on getting teachers to think about using technology in a critical way, and has direct correlation to EFL teachers bringing Duolingo into their classrooms.

The University of Toronto, Scarborough, guide includes summaries of articles that provide ideas for best practices for digital pedagogy. Perhaps the most important to remember is inclusion, which both Morris and Ford highlight (as cited in University of Toronto, 2022). This encompasses both the teacher and student's access to the technology and ability to interact with it. To this end, it is important that this project be accessible to teachers of varying levels of technological abilities. There are also other accessibility issues to consider, such as visual and auditory limitations. To this end, this project needs to be able to incorporate elements such as ALT text for slides and photos, and subtitles for any videos. It also needs to address how a teacher can modify Duolingo to meet the needs of an individual student who may have some limitations.

Another aspect pointed out by Morris (as cited in University of Toronto, 2022) is that the content needs to be interesting to the students. Chapter Two laid out the appeal of Duolingo to students and how it can make learning outside the classroom fun and beneficial. Ultimately, though, it was found that teacher assistance was essential in helping students with motivation and learning. It follows that simply assigning students to work in Duolingo outside of the classroom is insufficient to get them to use the tool effectively. There needs to be a level of interest involved, too. The website will give teachers the flexibility to decide what makes Duolingo applicable for their class, depending on the context of their course. Some teachers will have graded classes, others might find benefit in creating competitions or group collaboration among their students. A limitation of Duolingo is that the teacher doesn't set the content, but they can set the context in which the app is used. It should be foremost in their consideration that its use is of interest to their students as that will increase student engagement and motivation.

Website Format

As someone with no previous experience in website design, choosing a platform and learning about effective design was important. I chose to use Google Sites to create the website and used the available Hamline University Google Sites domain. Google Sites is an easy-to-use platform that includes ready to use templates and allows users with no programming experience to create professional looking websites. As Hamline offers a free hosting option in conjunction with their Google Suites, this is the easiest method to publish a website. Additionally, as it is affiliated with the University, it lends some gravitas to the content and is therefore more likely to be viewed as valuable content versus using other free hosting platforms that are available.

For the formatting, I followed the principles of Steve Krug in his 2014 book about website design and usability *Don't Make Me Think, Revisited: A Common Sense Approach to Web and Mobile Usability.* Throughout the entire book, Krug addresses how to design a website that is easy to use, which in turn makes it more likely to be used. By following this guidance, the page I designed includes enough information to be useful without overcomplicating or overwhelming the user. It also decreases the amount of time a user spends finding the resource they need, which is important for those who are searching for one specific item.

Podcast

Podcasting has become an increasingly popular method of media consumption. They can be accessed through websites or through multiple streaming platforms available as smartphone apps. This means that listeners can choose when, where, and how to listen to whichever podcasts or specific episodes they're interested in. Podcast length was an important consideration for this project as the intended audience will be accessing this in their free time. As Krug (2014) states, "if it's short, it's more likely to actually be used" (p. 6). Due to that, each episode was limited to one interview, with a time limit goal of no more than 30 minutes, however that was flexible depending on the content of the interview. Editing was done for the purpose of cutting out any pauses or asides that did not impact the content of the interview. The majority of the interviewees were known to me as friends or were introduced to me by mutual friends. Additionally, I joined the Duolingo Educator's Network group on Facebook and asked for volunteers from that group, which was met with enthusiasm and resulted in a number of interviews.

Content

The podcast was not limited to a teacher's perspective only. Most of the podcast episodes were interviews with language learners who use Duolingo in the context of a non-immersion environment. The purpose of this was to provide educators with real feedback from students who will be in a similar situation as their learners in order to better understand what works and doesn't work with Duolingo in an EFL setting.

The website consists of multiple pages. The name of the website and podcast is "The Owl Truth" in reference to Duolingo's mascot, an owl named Duo, and a play on the phrase "the whole truth." The *Home* page includes the research question asked along with an easy to navigate menu to the other pages. This menu remains static at the top of all of the pages for ease of navigation throughout. An *About* page includes my biographical information and a brief overview of the project, including defining what MALL is. The *Why use MALL?* page is a summary of the research showing benefits and drawbacks of learning via MALL and specific information on why Duolingo was the app chosen for this project. These are all broken down into sections of Drawbacks, Benefits, and Why Duolingo, with each section having brief, bulleted summaries of the research. The format and brevity of the information follows the principles in Krug's book about website usability and was chosen as readers would be more likely to read the information in that format than in longer, more in depth paragraphs. There is a resource section at the bottom of the page that cites the sources used. The *Podcast* page includes all of the recorded podcast episodes with a short summary of each. The *Using Duolingo* page includes sections for teachers on how to get started using Duolingo and ideas on how to continue growing in their Duolingo use. This area includes links to Duolingo's various

websites that already have videos and step-by-step instructions on setting up a Duolingo classroom. As this information has already been created by the company, there was no need to duplicate the work, and linking directly is more likely to keep the information up-to-date as the company updates their product. There is a subpage in this section titled *Classroom Use Idea* which includes example ideas of how it can be used broken down into different sections, such as "Competition" and "Rewards." The *Feedback* page includes a form where teachers can ask questions or provide feedback on their own experiences with Duolingo. The *Contact* page is a simple form that viewers of the site can use to contact me directly in an email form.

Intended Outcomes

The goal of this website is to give adult EFL teachers an understanding of how MALL, with Duolingo in particular, can help their students learn. With the examples and ideas provided on the website, as well as with the authentic experiences of users recorded on the podcast, they should be able to identify ways to fit Duolingo into their curriculum. By not providing a set, strict curriculum for them to adhere to, teachers are allowed to be flexible with their use of the app and creative with coming up with other ways not covered on the website to use it. Ultimately, teachers who listen to the podcasts and visit the website will at least be introduced to the idea and benefits of integrating MALL into their teaching.

Assessment

As a resource for teachers, and as MALL and Duolingo are constantly evolving, this website will need to be updated in the future. As teachers try the methods, or come up with their own ideas, it would be beneficial for others to know how the methods did or

didn't work. To this end, I created a feedback page that feeds information to me directly via email. If a teacher tries any methods and wishes to share their experiences, they can do so. This feedback can then be included on the website either via edits to examples or ideas of how to use Duolingo, or via the *Feedback* form, all of which is controlled by myself. This way, there is an opportunity for feedback and sharing, without the liability of having an open comment section or discussion board.

Timeline

The podcast episodes were recorded and edited in March, 2023, with the website being created in March and April of the same year. Each interview for the podcast was done via an online video conferencing application, allowing for participants to be interviewed remotely from various locations throughout the world.

Given the ever-changing landscape of MALL, and as more adult EFL teachers use Duolingo, the website will be updated and modified as feedback is received. Additional interviews for the podcast will also be able to be added in the future. Duolingo does also do some overhauls to how it presents learning to its users. The most recent of these was released in November, 2022, so it will remain the current version for the foreseeable future. However, as it is known that they do make these changes from time to time, updates when those go into place will be required. These will be done in the future on an ongoing basis.

Summary

In this chapter, the scope and content of the project were laid out to show how this project will answer the question of how adult EFL teachers can effectively incorporate Duolingo into their curriculum. It also discussed the intended audience and the rationale

behind developing a podcast and website for this purpose. The framework of using

technology with education, as well as the philosophy of usability in website design, were

discussed. Finally, the timeline, content, and assessment of this project were explained.

Chapter Four will discuss the limitations of this project, what was learned while

developing it, and potential future research or projects that could expand this area of

focus in an adult EFL setting.

CHAPTER FOUR

Reflection

This project set out to answer the question *How can teachers in an adult English as a Foreign Language setting incorporate Duolingo effectively into their curriculum?* The goal of answering this question was to provide a solid resource for teachers around the world who are interested in using MALL technology, in a variety of learning environments, to reference as they need it. The podcast included conversations with learners and teachers who use Duolingo,which are included on the website with ideas for teachers to try in their own classrooms, as well as a place for feedback where they can contribute their own ideas or share their experiences.

In Chapter One, I reflected on how I came to be interested in this topic. My own personal experience as a language learner who uses Duolingo, as well as that of my friends and family, was laid out. This background, combined with my pursuit of a degree in teaching English as a second language, had me thinking about how teachers could harness the benefits of MALL, especially in situations where students might not have the ability to practice outside of the classroom. This thinking assumed that there were benefits to language learning via MALL in the first place.

Chapter Two analyzed the research currently available regarding the efficacy of MALL. I reviewed literature that compared improvements, usually via test scores, in multiple second languages after students used various MALL programs. Receptive and expressive language skills were evaluated, as well as factors such as student motivation and student and teacher perceptions of using technology to supplement learning. This

analysis set the foundation for this project by showing that there are benefits to supplementing traditional language instruction with MALL applications.

These first two chapters lead to Chapter Three, where I laid out the plan for the podcast and website. In addition to the basics of setting out the layout, I discussed the need for usable website design and that the technology used needs to have a solid pedagogical purpose, and not just be used for technology's sake. The strategy for the podcast was canvassed, including why students as well as teachers were interviewed, and why the length of each episode was kept within certain limits.

In this final chapter, I reflect on what I learned throughout the process of researching and creating this project. I discuss key takeaways from the literature, including new perspectives I have on the reviewed literature as a result of working through this process. Finally, I look at the limitations of this project, implications for future research, how this project and future research can be beneficial to adult ESL teachers, and explore how I can share my findings and project with adult ESL teachers and, hopefully, with teacher educators in the field.

What I Learned

Every step of this journey was eye opening. I stumbled upon this topic because friends and family used Duolingo to learn a language from the beginning. I came to MALL late in the game and still use it to keep my skills fresh instead of learning from scratch. I always assumed that MALL apps were good for practice, but, as someone who has only ever learned languages in a traditional classroom setting, never assumed it was possible to learn a language via MALL apps alone. It turns out that I was mostly correct. Certainly, some people can learn a new language on their own with an app like Duolingo,

but those individuals are few and far between. Instead, MALL apps provide valuable supplemental support that can boost a language learner's performance. As an adult language learner, I learned that MALL provides a valuable service, but the claims of the companies that produce them are often far-fetched.

Key Takeaways from the Literature

As a commercial venture, Duolingo has a vested interest in proving that its methods work. The studies that they funded, such as Jiang et al (2020), and Vesselinov & Grego (2012) focus entirely on learning language as a whole, without breaking down skills. I found that these corporate-funded studies provided a valuable jumping off point for digging deeper into the realities of the efficacy of Duolingo as a way to learn a new language.

Considering that Duolingo's claim was that you can learn a language online with no other input, identifying non-corporate sponsored studies to verify this was important. To this point, I found the 2019 test by Loewen et al. to be one of the most valuable pieces of literature as it put the corporate sponsored studies to the test and found them lacking. It didn't show that MALL, with Duolingo in particular, was ineffective, but did show that it's not as effective as it purports to be, in isolation from other teaching methods. Ultimately, with MALL being a relatively new field of language learning, the best research evaluated specific learning outcomes instead of focusing on teaching language as a whole. Munday's article about using MALL as a teaching tool stood out because it highlighted limitations with using Duolingo as homework, while also showcasing the benefits to students of using MALL.

Looking Forward

Limitations

Setting out to record a podcast about using an app to teach a language when you are not a teacher yourself turned out to be a challenge. I personally don't have many connections to the adult ESL world. I did reach out to everyone I could think of, but even that ran into a particular roadblock- a decided lack of educators using Duolingo in their curriculum. It forced me to shift my focus away from "here is how others have done this and succeeded" and more to "how could it be done successfully from the standpoint of the learner and the student." Due to this, most of the podcast episodes are with learners and not teachers. Much of the discussion is hypothetical and hasn't been tested in a concrete manner. By doing this, I hope that, in addition to providing some specific ideas on how to integrate Duolingo, these podcasts can spark an idea that a teacher can build on and share with others. The ideas provided and, in some cases already implemented, have not been tested for efficacy, and are primarily assumed to be effective based on similar research and anecdotal evidence.

Implications for Future Research

MALL research is newer as the technology itself is relatively new, therefore there are many avenues to explore in relation to it. One area that was lacking in research that pertained to my question in particular were studies of adult learners in non-immersion, non-compulsory learning settings. This is an area that could benefit from more research on a wide range of topics, including student motivation to use MALL technology as well as research including control and test groups, with measurements of learning gains tested.

Specifically to Duolingo, the adult educators field has been largely ignored. Their own program, Duolingo for Schools, isn't explicitly for primary and secondary levels only, however most of the material they offer is heavily skewed towards those groups. Further academic research on how Duolingo can aid in language learning could result in the company itself improving the support they give teachers, as well as improvements to the app itself to make it better suited as a supplement for language learning. It needs to be prefaced that this is a hope, as Duolingo and other MALL apps do market themselves as standalone and might be hesitant to view themselves as supplemental instead of primary when it comes to language education.

Benefits to the Field

The entire basis of this project has been predicated on the belief that practice outside of the classroom is beneficial. Throughout my graduate program experience, this has been emphasized while also being put into a perspective of a need to respect the time of adult students and to make sure any additional practice, or homework, is relevant to the needs of the learner. Given the feedback from the learners I interviewed in the podcast, what Duolingo teaches is relevant. It might not be exactly what a teacher is focusing on in class, but it does focus on quotidian uses of the language in a low risk environment. This resource is free, as long as students have access to it, but also appears to be underutilized by teachers.

This project is designed to not only help teachers use Duolingo effectively, but also to introduce them to the ways that it and other MALL apps can benefit their students. Language instructors rarely receive explicit guidance on how to leverage technology for language learning. As an example, an assigned textbook in one of the classes I took

during this program, Loewen's *Introduction to instructed Second language acquisition* published in 2020, included a chapter about technology and language learning. It was one of the only such references I came across during the program, other than online resources for authentic materials to use in learning. There is a clear benefit to working with MALL and other resources available with helping our students to learn. This project provides just one way for teachers to expand their use of technology in order to engage their students outside of the classroom in a fun and beneficial manner.

Plans to share findings

I plan on making my website easier to find by providing key search words behind the scenes. There is a lot of information available on search engine optimization that was not germane to the original process of creating the website that I will look into going forward. By making the podcast and site easier to find, the information they contain will be more readily accessible to educators who are interested in this topic. While working on this project, I found and joined a social media group, moderated by Duolingo, called the Duolingo Educators Network. It's hosted on Facebook and members can post ideas and issues on the board. I intend to share the link to the website there and encourage those teachers to share it with their colleagues. I will also be sharing this with my own professors at Hamline University in the hopes that it proves to be a valuable resource for other future educators going through the same program.

Summary

Despite the much touted claims of MALL apps to be able to teach people a language, I found that they are, instead, best suited to help people as supplemental practice while learning. The literature indicates that there are benefits to using MALL.

What seems more limiting in the field of adult EFL teaching is a lack of knowledge about how they can be used effectively. I hope that this project reaches more teachers and allows them to experiment with their own methods and share those experiences with other educators.

References

Cesarini, A. N., Sulaeman, N., Mulyana, S. S., & Yolandri, V. (2021). Utilizing duolingo

    in learning vocabulary. *International Conference on Education of Suryakancana*

    2021 Proceedings, 109-117. https://jurnal.unsur.ac.id/cp/article/view/1325

Chai, C. S., Wong, L., & King, R. B. (2016). Surveying and modeling students'

    motivation and learning strategies for mobile-assisted seamless chinese language

    learning. *Educational Technology & Society, 19*(3), 170-180.

    https://scirp.org/journal/paperinformation.aspx?paperid=88236

Chen, X. (2016). Evaluating language-learning mobile apps for second-language learners.

    Journal of Educational Technology Development and Exchange, 9(2), 38-51.

    https://doi.org/10.18785/jetde.0902.03

Damyanov, I., & Tsankov, N. (2018). Mobile apps in daily learning activities.

    International Journal of Interactive Mobile Technologies, 12(6), 133-140.

    https://doi.org/10.3991/ijim.v12i6.9659

Dolzhich, E., Dmitrichenkova, S., & Ibrahim, M. K. (2021). Using M-learning

    technology in teaching foreign languages: A panacea during COVID-19 pandemic

    era. *International Journal of Interactive Mobile Technologies, 15*(15), 20-34.

    https://doi.org/10.3991/ijim.v15i15.22895

Dong, L., Jamal Mohammed, S., Ahmed Abdel-Al Ibrahim, K., & Rezai, A. (2022).

    Fostering EFL learners' motivation, anxiety, and self-efficacy through

    computer-assisted language learning- and mobile-assisted language

learning-based instructions. *Frontiers in Psychology, 13*, 1-15.

https://doi.org/10.3389/fpsyg.2022.899557

Duolingo (2022, October 12) *Duolingo- the world's best way to learn a language.*

https://www.duolingo.com/

Evans, M., & Tragant, E. (2020). Demotivation and dropout in adult EFL learners.

TESL-EJ , 23(4), 1-20. https://tesl-ej.org/wordpress/issues/volume23/ej92/ej92a8/

Falk, S., & Götz, S.(2016). Interactivity in language learning applications: A case study

based on duolingo. In T. Zeyer, S. Stuhlmann, & R. D. Jones (Eds.), *Interaktivität*

beim Fremdsprachenlehren und -lernen mit digitalen Medien (pp. 239-259).

Germany: Narr Francke Attempto.

García Botero, G., Nguyet, D. A., García Botero, J., Zhu, C., & Questier, F. (2022).

Acceptance and use of mobile-assisted language learning by higher education

language teachers. *Lenguaje, 50*(1), 66-92.

https://doi.org/10.25100/lenguaje.v50i1.11006

García Botero, G., Questier, F., & Zhu, C. (2019). Self-directed language learning in a

mobile-assisted, out-of-class context: Do students walk the talk? *Computer*

Assisted Language Learning, 32(1-2), 71-97.

https://doi.org/10.1080/09588221.2018.1485707

Ghorbani, N., & Ebadi, S. (2020). Exploring learners' grammatical development in

mobile assisted language learning. *Cogent Education, 7*(1), 1-13.

https://doi.org/10.1080/2331186X.2019.1704599

Habib, S., Haider, A., Samar Sufyan, M. S., Akmal, S., & Mohammed, A. K. (2022). Mobile assisted language learning: Evaluation of accessibility, adoption, and perceived outcome among students of higher education. *Electronics (Basel), 11*(7), 1-20. https://doi.org/10.3390/electronics11071113

Habibie, A. (2020). Duolingo as an educational language tool to enhance efl students' motivation in writing. *British (Jurnal Bahasa Dan Sastra Inggris), 9*(1), 13. https://doi.org/10.31314/british.9.1.13-26.2020

Hidayati, T., & Diana, S. (2022). Students' motivation to learn english using mobile applications: The case of duolingo and hello english. *JEELS (Journal of English Education and Linguistics Studies), 6*(2), 189-213. https://doi.org/10.30762/jeels.v6i2.1233

Hoi, V. N., & Mu, G. M. (2021). Perceived teacher support and students' acceptance of mobile‑assisted language learning: Evidence from vietnamese higher education context. *British Journal of Educational Technology, 52*(2), 879-898. https://eprints.qut.edu.au/206262/1/72420217.pdf

Jafari, S., Talebinejad, M., & Ketabi, S. (2021). Comparative effects of technology-, motivational-, and metacognitive-based scaffolding on male and female iranian adult advanced EFL learners' speaking. *Research in English Language Pedagogy, 9*(2), 259-282. https://doi.org/10.30486/relp.2021.1912273.1229

Jiang, X., Rollinson, J., Plonsky, L., & Pajak, B. (2020). Duolingo efficacy study: Beginning-level courses equivalent to four university semesters.

https://duolingo-papers.s3.amazonaws.com/reports/duolingo-efficacy-whitepaper.
pdf

Jones, A., Kukulska-Hulme, A., Norris, L., Gaved, M., Scalon, E., Jones, J., & Brasher,
A. (2017). Supporting immigrant language learning on smartphones: A field trial.
Studies in the Education of Adults, 49(2), 228-252.
https://www.tandfonline.com/doi/pdf/10.1080/02660830.2018.1463655?casa_tok
en=-HEDne-HzGYAAAAA:QfPyZBEOMyA_Jn_RCBFTJxx6fYFpY9pFKDFpa
dw_1FqVPqdswRW9Qq3N2Q5dp3yVPAWJa_AODT3lrQ

Kacetl, J., & Klímová, B. (2019). Use of smartphone applications in english language
Learning—A challenge for foreign language education. *Education Sciences, 9*(3),
179-187. https://doi.org/10.3390/educsci9030179

Krug, Steve (2014). *Don't make me think, revisited: A common sense approach to web
usability. Amazon (3rd ed.).* New Riders.

Kukulska‑Hulme, A., & Viberg, O. (2018). Mobile collaborative language learning: State
of the art. *British Journal of Educational Technology, 49*(2), 207-218.
https://doi.org/10.1111/bjet.12580

Lei, X., Fathi, J., Noorbakhsh, S., & Rahimi, M. (2022). The impact of mobile-assisted
language learning on english as a foreign language learners' vocabulary learning
attitudes and self-regulatory capacity. *Frontiers in Psychology, 13*, 1-14.
https://doi.org/10.3389/fpsyg.2022.872922

Li, R. (2022). Effects of mobile-assisted language learning on EFL/ESL reading
comprehension. *Educational Technology & Society, 25*(3), 15-29.

http://english.hnu.edu.cn/__local/0/33/3D/3C26CC98DBC7A2C0F997CDBE7BC
_59DA1E80_753EB.pdf

Loewen, S. (2020). *Introduction to instructed Second language acquisition* (2nd ed.).
Routledge, Taylor & Francis Group.

Loewen, S., Crowther, D., Isbell, D. R., Kim, K. M., Maloney, J., Miller, Z. F., & Rawal,
H. (2019). Mobile-assisted language learning: A duolingo case study. *ReCALL
(Cambridge, England); ReCALL, 31*(3), 293-311.
https://www.tandfonline.com/doi/full/10.1080/09588221.2021.1933540

Loewen, S., Isbell, D. R., & Sporn, Z. (2020). The effectiveness of app‑based language
instruction for developing receptive linguistic knowledge and oral communicative
ability. *Foreign Language Annals, 53*(2), 209-233.
https://doi.org/10.1111/flan.12454

Mendes de Oliveira, M., Sporn, Z., Kliemann, L., Borschke, A., & Meyering, M. (2021).
Online language learning and workplace communication: A study on babbel's
virtual-classroom solution. *Computer Assisted Language Learning,
ahead-of-print*(-), 1-27. https://doi.org/10.1080/09588221.2021.2002364

Moayeri, M., & Khodareza, M. R. (2019). The effect of mobile-assisted language
learning on speaking accuracy of EFL learners. *Technology in Language Teaching
and Learning, 2*(1), 22-35. https://doi.org/10.29140/tltl.v2n1.140

Munday, P. (2015). The case for using duolingo as part of the language classroom
experience. *Revista Iberoamericana De Educación a Distancia, 19*(1), 83-101.
https://doi.org/10.5944/ried.19.1.14581

Puebla, C., Fievet, T., Tsopanidi, M., & Clahsen, H. (2022). Mobile-assisted language learning in older adults: Chances and challenges. *ReCALL (Cambridge, England); ReCALL, 34*(2), 169-184. https://doi.org/10.1017/S0958344021000276

Pulker, H., & Kukulska-Hulme, A. (2020). Openness reexamined: Teachers' practices with open educational resources in online language teaching. *Distance Education, 41*(2), 216-229. https://www.tandfonline.com/doi/full/10.1080/01587919.2020.1757412?scroll=top&needAccess=true&role=tab

Ritonga, K. F. (2020). Technology integration in EFL teaching and learning in Indonesia: the use of Duolingo application as an interesting media in EFL teaching and learning. https://www.academia.edu/41535458/Technology_Integration_in_EFL_Teaching_and_Learning_in_Indonesia_The_Use_of_Duolingo_Application_as_an_Interesting_Media_in_EFL_Teaching_and_Learning_in_Indonesia_Khairuna_Fajrin_Ritonga_0304162110

Sabboor Hussain, M., Salam, A., & Farid, A. (2020). Students' motivation in english language learning (ELL): An exploratory study of motivation-al factors for EFL and ESL adult learners. *International Journal of Applied Linguistics & English Literature, 9*(4), 15-28. https://doi.org/10.7575/aiac.ijalel.v.9n.4p.15

Sherine, A., Mallampalli, M. S., & Anumula, V. S. S. (2020). Improving second language speaking and pronunciation through smartphones. *International Journal of*

Interactive Mobile Technologies, 14(11), 280-287.

https://doi.org/10.3991/ijim.v14i11.13891

University of Toronto. (2022, May 9). *Digital pedagogy - A guide for librarians, faculty,*

and students. https://guides.library.utoronto.ca/digitalpedagogy

Vesselinov, R., & Grego, J. (2012). Duolingo effectiveness study.

http://static.duolingo.com/s3/DuolingoReport_Final.pdf

Yadav, M. S. (2021). Role of social media in english language learning to the adult

learners. *International Journal of Linguistics, Literature and Translation, 4*(1),

238-247. https://doi.org/10.32996/ijllt.2021.4.1.25

Yeşilçınar, S. (2019). Using the flipped classroom to enhance adult EFL learners'

speaking skills. *PASAA: Journal of Language Teaching and Learning in Thailand,*

58(July-Dec 2019), 206-234.

https://www.researchgate.net/publication/336287505_Using_the_Flipped_Classro

om_to_Enhance_Adult_EFL_Learners'_Speaking_Skills