CHAPTER I

INTRODUCTION

A. Background

Many global companies and organizations use English as a medium of official communication, making English proficiency a highly valued skill (Marlina, 2018). This aligns with (Warschauer, 2000), who stated that English is essential and plays a role in many aspects of life, such as business, economics, politics, tourism, and especially education.

Even though the importance of English is known and accepted, many high school students still lack adequate ability to develop speaking skills due to various limitations and obstacles. These obstacles often include limited opportunities to practice speaking the language outside the classroom, fear of making mistakes in front of classmates, and ineffective methods of learning to speak (Phan & Dang, 2021). Additionally, classroom teaching methods tend to focus more on grammar and reading rather than listening and speaking (Arta, 2019). This issue is particularly evident among high school students who find it challenging to become confident English speakers, making it difficult for them to overcome perceived limitations and improve their speaking abilities. A similar situation is observed at SMAN 1 Aralle West Sulawesi province in Indonesia, where several English teachers reported that many students feel embarrassed or afraid of making mistakes when speaking in front of their classmates, ultimately slowing their progress in learning English. This situation calls for a creative

approach to learning English speaking strategies that go beyond traditional methods, which are typically used to promote language fluency (Tiu et al., 2023).

With the emergence of technology, the landscape of language learning has dramatically shifted, providing learners with new methods to practice and improve their skills. Online services and mobile applications have provided flexible and accessible options for learners to develop language skills, including speaking (Chen et al., 2020). Applications such as Duolingo have become increasingly popular among learners due to their interactivity and ability to deliver language systems anywhere and everywhere (Yana, 2021). These advances in technology not only increase engagement in language acquisition but also allow learners to take ownership of their learning, removing them from depending on language settings based on educator-prompted classroom contexts (Alzubi, 2021). This is in line with the concept of the Self-Directed Learning (SDL) approach.

Self-directed learning (SDL) suggests a process in which learners learn to manage their learning process by establishing their learning objectives, identifying and seeking out resources, and monitoring their learning progress (Bhandari et al., 2020). These skills development provide active learning and encourage independence, which is becoming increasingly important in the current educational landscape (Karatas & Arpaci, 2021). With the advances in educational technology, SDL has become more plausible than ever; learners can now access abundant resources and digital tools specific to their needs (Chau et al., 2021). In language learning, SDL can create

opportunities for learners to focus on gaining speaking skills through tailored practice specific to their language needs (Raeisi, 2023). One educational technology tool that supports self-directed learning is the Duolingo application.

Duolingo is one of the most popular foreign language-learning applications worldwide, providing users with an interactive site for learning new languages (Nushi & Eqbali, 2017). Duolingo has several features that focus on each language skill, such as speaking, listening, reading, and writing. Speaking is supported explicitly by Duolingo exercises that promote pronunciation and the production of complete sentences and conversations. Moreover, Duolingo's utilitarian gamified learning style, accessibility, and flexibility make it an effective app for high school students striving to improve their English-speaking ability (Yundayani et al., 2023). Duolingo is inexpensive and easy to use, making language learning more accessible (Chasanah & Halim, 2024).

Although many studies have examined Duolingo, most focus on its effectiveness in acquiring vocabulary and grammar (Savira, 2020; Cesarini et al., 2021; Irawan et al., 2020), its impact on speaking skills, particularly among high school students, has received less attention. Existing studies have focused more on other aspects of language learning while speaking skills are often overlooked. Additionally, although Self-Directed Learning (SDL) has been widely researched in the context of language learning, very few studies have explored the integration of SDL with technological applications like Duolingo to enhance students' speaking abilities.

This study aims to fill this gap by exploring the effectiveness of Duolingo in improving students' speaking skills, and assessing how students' perceptions of the app evolve across various dimensions of cognitive, affective, and conative and their level of engagement in self-directed learning. The novelty of this research lies in integrating Duolingo with the SDL approach, a combination that is rarely discussed in the existing literature. This approach offers a more comprehensive understanding of how technology can be integrated within a self-directed learning framework to more effectively develop speaking skills.

By addressing this gap, the study is expected to provide new insights into how Duolingo can be optimally used in English language learning, as well as offer practical recommendations for teachers and policymakers on how to leverage technology to enhance students' speaking abilities especially for those in remote areas, such as SMAN 1 Aralle. This research also aims to help students overcome barriers in learning English and build their confidence as more competent English speakers.

B. Problem Statement and Research Question

English speaking skills have become essential in various global professional fields. However, many high school students struggle to develop their speaking abilities due to limited practice opportunities, fear of making mistakes, and traditional teaching methods that are less effective for speaking skills. At SMAN 1 Aralle, many students feel embarrassed or afraid of making mistakes when speaking in front of their peers, ultimately hindering their progress in learning English. With the emergence of

technology, applications like Duolingo offer an interactive and flexible learning approach that can support self-directed learning in developing speaking skills (Yanfang, 2024; Pujiawati & Miftakh, 2024)

The Self-Directed Learning (SDL) approach allows students to set learning goals, identify resources, and monitor their own progress, fostering independence and active engagement. However, although Duolingo is recognized as effective in vocabulary and grammar acquisition, few studies have explored its role in developing speaking skills, particularly among high school students. Therefore, this research is essential to understand the extent to which Duolingo, through the SDL approach, can improve high school students' English-speaking skills as well as students' perceptions and engagement with Duolingo in self-directed learning approaches for learning to speak English.

Based on the problem statement, the research question presented in this study is as follows:

1. How effective is the use of Duolingo with a Self-Directed Learning (SDL) approach in improving English speaking skills?
2. How do high school students perceive the application of Duolingo with a self-directed learning approach in learning English speaking skills?
3. What is the level of student engagement in self-directed learning using Duolingo for English-speaking practice?

C. The Objective Of The Research

Based on the problem statement, the objectives of this research are as follows

1. To explore the effectiveness of using Duolingo with a Self-Directed Learning (SDL) approach in improving students' English speaking skills.
2. To analyze high school students' perceptions of using Duolingo with a self-directed learning approach to enhance their English-speaking skills.
3. To measure student engagement in self-directed learning using Duolingo for English-speaking practice.

D. Significance Of The Research

The significance of the research is divided into two parts. They are theoretical and practical significance.

1. Theoretical significance;

The results of this research are expected to be useful information for the English language study, especially the role of the Duolingo app and self-directing learning in teaching speaking.

2. Practical significance;

This research result is expected to be useful information for English teachers in varying their teaching, students gaining a good impact and motivation in learning English using Duolingo, and valuable and meaningful references for the next researcher.

E. Scope Of The Research

The scope of this research is limited by three things, namely discipline, content, and activities:

1. By discipline, this research is limited to students in Enhancing English Speaking Through Duolingo.
2. By content, this research focuses on learning to enhance students' speaking skills using the Duolingo application with a self-directed learning approach. The materials targeted for learning are aligned with the English learning outcomes for grade 11, Phase E, in the listening-speaking element, including interpersonal communication (dialogue and conversation exercises in everyday situations) and oral texts (discussions on various topics; descriptive text).
3. By activity, the researcher conducted pre- and post-tests, questionnaires, and observation checklists. The pre-test and post-test are used to identify whether there is a significant difference in English-speaking skills between students using Duolingo with a self-directed learning approach and those who are not. The questionnaire is used to analyze high school students' perceptions of using Duolingo to enhance their English-speaking skills. Meanwhile, the observation checklist is used to measure student engagement in self-directed learning using Duolingo for English-speaking practice. This research is conducted at UPTD SMAN 1 Aralle

CHAPTER II

REVIEW OF RELATED LITERATURE

A. Previous Research-Related Findings

Several studies have explored the effectiveness of digital tools and self-directed learning (SDL) in enhancing language skills, including speaking. Duolingo, one of the most popular language-learning applications, has been the subject of various research focusing on improving language acquisition.

1. Duolingo and Language Learning

Duolingo has been shown to enhance vocabulary retention among learners significantly. Studies suggest that the platform's engaging vocabulary games and activities simplify the learning process and make it relevant to everyday contexts, thus increasing learner motivation and enthusiasm (Erizara & Wijirahayu, 2024); (Anggraeni & Degeng, 2024). Additionally, Duolingo supports pronunciation skills through its conversation exercises, which expose learners to a wide range of vocabulary, making the learning process enjoyable and effective (Erizara & Wijirahayu, 2024).

Duolingo's gamified approach enhances user engagement, making language learning more engaging and motivating. Its interactive features and accessibility provide a positive learning experience, encouraging regular use among students(Chasanah & Halim, 2024); (Suci, 2022). Many learners view the app as a

valuable tool for acquiring language skills, offering a dynamic and enjoyable environment that facilitates vocabulary mastery (Suci, 2022)

Research further highlights the positive impact of Duolingo on students' overall linguistic abilities, particularly in reading and writing. The platform's interactive design fosters learning enthusiasm, which can be highly beneficial in classroom settings (Juniansyah et al., 2024). While Duolingo has been proven effective in improving vocabulary and basic grammar, further research is necessary to evaluate its role in enhancing speaking proficiency, especially within classroom environments (Juniansyah et al., 2024).

2. Self-Directed Learning in Language Acquisition

Self-regulation is crucial in language learning, as it involves setting personal learning goals, monitoring progress, and managing effort effectively (Yu, 2023). This approach fosters critical metacognitive and self-assessment skills, which are vital for academic success (Bonk et al., n.d.). However, challenges persist, such as students often not dedicating enough time to self-directed learning, making it necessary for teachers to accommodate a variety of learning styles (Bazurto Alcívar et al., 2024).

In adult second language acquisition, self-directed learning (SDL) proves particularly effective due to higher levels of intrinsic motivation, access to technology, and strategic learning practices. However, barriers like digital literacy gaps and economic inequalities can limit the success of SDL, requiring tailored educational support (Robles Arboleda et al., 2024). Successful autonomous language learning also

depends on several pedagogical elements, such as fostering positive motivation, providing teacher support to develop autonomy, and ensuring access to quality learning resources (Robinson & Persky, 2020).

Moreover, the SDL model has been shown to improve learners' writing skills, with marked improvements in structured language lessons such as Indonesian, highlighting SDL's impact on language acquisition (Simanungkalit et al., 2024). Digital technology plays a vital role in SDL by offering diverse resources like language learning apps and online platforms, which, when thoughtfully integrated into pedagogical practices, can significantly enhance pronunciation, writing, and other language skills (Indriani et al., 2024). Despite the many benefits of SDL in language learning, overcoming challenges like digital literacy and resource access remains essential. Educators must strategically integrate technology and provide robust support to ensure that learners can maximize the potential of SDL in mastering language skills.

3. The Role of Technology in Enhancing Speaking Skills

Remote speaking tasks facilitated by digital platforms have significantly improved English language learners' comprehension, speaking proficiency, and confidence (Zemlyanova et al., 2021). Activities like video creation and collaborative projects not only promote active learning but also help students adapt to real-life language use situations (Tauchid et al., 2024). Moreover, platforms like VoiceThread and TikTok are increasingly used to create engaging and interactive language

assignments, which also support the development of essential 21st-century skills, including communication and collaboration (Tauchid et al., 2024).

Innovative technology has also become integral to language education, especially in teaching speaking skills. In elementary education, tools like mobile applications and online platforms have been noted for their ability to increase student engagement and enhance skill development (Wei, 2023). Despite the advantages, challenges remain—such as limited access to technology and the need for teacher preparedness and curriculum adaptation. Addressing these issues is essential to maximize the benefits of such technology (Shadiev & Wang, 2022).

Smartphone applications are also valuable for improving oral proficiency among college students. However, their effectiveness varies, and improvements in design are needed to optimize their impact on learners (Gao, 2024). Additionally, using digital tools in second language (L2) acquisition has transformed the learning process, making it more flexible, engaging, and interactive. These tools, which provide real-time feedback, help reduce speaking anxiety and foster a stimulating learning environment (Mahdi, 2022). Multimedia resources and virtual classrooms have significantly improved both productive and receptive language skills, further highlighting the potential of digital technology in education (Liu, 2023).

Technological resources, when applied effectively, can address the limitations of traditional teaching methods, leading to higher student participation and achievement (Balalle, 2024). Introducing technology into the classroom allows

teachers to improve student participation and academic achievement (Balalle, 2024). However, for these resources to be used effectively, student-centred pedagogy and adequate teacher training are crucial (Dr Lohans Kumar Kalyani, 2024). Studies have also shown that modern teaching methods, enhanced with technology, are more effective in engaging students compared to traditional approaches (Falasi, 2024).

While educational technology offers promising benefits for improving speaking skills, challenges like access to technology and teacher preparedness must be addressed. Additionally, continuous improvements in designing and implementing these tools are essential to fully realize their potential in enhancing language education.

4. Challenges in Using Duolingo for Speaking Skills

While Duolingo is effective for vocabulary and basic grammar acquisition, its impact on speaking skills still needs to be explored. Some studies have noted that Duolingo's design focuses more on reading and writing exercises, with fewer tasks that target real-time speaking practice (Fitria et al., 2023b). This gap in research highlights the need for further investigation, particularly in how Duolingo, combined with SDL strategies, can enhance high school students' English-speaking skills (Kazu & Kuvvetli, 2024).

Based on the studies mentioned above, it can be concluded that Duolingo is effective in improving vocabulary retention and basic grammar among language learners. However, although Duolingo offers many benefits in vocabulary and grammar mastery, its role in developing speaking skills still needs to be explored

(Erizara & Wijirahayu, 2024; Juniansyah et al., 2024). This research aims to fill this gap by focusing on the use of Duolingo in enhancing speaking skills.

Furthermore, this study makes a new contribution by examining how self-directed learning (SDL) can be effectively applied to improve speaking skills at the high school level. Previously, SDL was more commonly explored in the context of higher education or adult learning, where learners tend to have higher intrinsic motivation and digital literacy ((Robles Arboleda et al., 2024). Therefore, different challenges may arise in applying SDL to high school students, such as limited access to technology or the need for teacher support.

Moreover, digital technology in language education, including platforms like Duolingo, has proven to positively impact the development of speaking skills (Zemlyanova et al., 2021). However, most of these studies have focused on the context of college students or adults. This study will explore the use of Duolingo and SDL within the high school context, particularly in enhancing speaking skills, making it a significant addition to the existing literature. Thus, this research can provide further guidance for developing more appropriate pedagogies for high school students to master speaking skills through educational technology.

B. Some Pertinent Ideas

1. Speaking Skills (Definition and Components).

Speaking is one of the most critical skills, especially in the context of English as a Foreign Language (EFL), because it is the tool from which students can express

their ideas, feelings, and thoughts in oral communication (Amran, 2024). Speaking is less structured than reading or writing, and students' planning time is limited due to the immediacy of the need for a response. As a result, speaking is one of the most challenging skills for language learners to develop, especially in traditional learning environments such as the ones found in high schools (Kamal et al., 2024).

The critical components of speaking skills include (1) Fluency: how freely someone speaks, with few pauses and little hesitation (2) Accuracy: using correct grammar, vocabulary, and correct pronunciation and (3) Pronunciation: clear articulation of consonants and vowels combined with stress, rhythm of speech (pauses), pitch, and intonation (Sarwari, 2024). In addition, speaking is also the domain of pragmatics, that is, our capacity as language users to do different things with our languages in particular social and cultural contexts (Permana & Rohmah, 2024). Therefore, speaking proficiency is not only about the ability to use language but also the ability to engage in communication.

1.1 The Necessity of Speaking Skills in English Language Acquisition

Speaking skills play a vital role in the success of language acquisition when it comes to learning English as a second language. This is because speaking is an active use of the language compared to listening to lectures. It entails more reflection in a student's everyday life and is not academically-based only. It is not just about linking one word or phrase with another, but it goes beyond it to express the message in a way that can be understood by the listener. Thus, to speak well, students must have

communicative competence abilities, including linguistic knowledge, social context awareness, and communication strategies (Lian, 2024).

One of the problems in high school is that, as this type of speech is rare compared to daily communication, students have few chances to use English. The way English is taught in schools here places a lot more emphasis on receptive skills (reading and listening) than on productive skills (speaking and writing). This deficit deprives the students of chances to use oral language and may prevent their speaking from growing. As highlighted in studies on communicative competence, a balanced focus on both receptive and productive skills is essential to develop well-rounded language proficiency (Lian, 2024). Without sufficient practice in speaking and writing, students risk lacking the fluency and confidence needed for real-world communication.

Creating a communicative environment to encourage speaking and boost student confidence, allowing them to express themselves without fear of failure, is among the most challenging tasks for educators. A productive environment allows learners to experiment with various forms of communication, practice grammar, and gradually develop comfortable use of their knowledge to achieve appropriate enunciation. Successful speaking activities include a variety of tasks such as group discussions, role-playing, games, and other interactive exercises that ensure all students actively participate in speaking contexts. Furthermore, integrating formal presentations helps students familiarize themselves with different types of real-world verbal

interactions, which are essential for building fluency and developing communicative competence (Lian, 2024).

1.2 Factors that Influence Speaking Skills

Here are some factors that affect the development of English language learners' speaking skills. The most important part is the motivation and attitude of the students towards English. Students who are highly motivated to learn and who recognize the practical, real-world value of speaking English are more likely to actively engage in language practice within and beyond the classroom (Lian, 2024). Motivation origins can vary according to academic requirements, the desire to communicate with native speakers or aspirations for future career opportunities (Ritonga et al., 2020).

In addition, the environment in which learning occurs is vital. A supportive classroom, where students feel secure expressing themselves without the threat of being criticized or ridiculed, significantly enhances their willingness to participate in oral practice (Kolbe et al., 2020). In such environments, students are more likely to engage actively and raise their hands during speaking activities (Zhang, 2022). Conversely, a regimented and intimidating classroom atmosphere can discourage students from speaking and hinder their efforts to practice English effectively (Weiner et al., 2021). Research highlights that creating psychologically safe spaces in language classrooms is essential for fostering both participation and language development (Derakhshan et al., 2024a).

Thirdly, the speaking development of students in class is strongly affected by the teaching methods applied by a teacher. Teachers who actively encourage student participation, e.g., language games, group discussions, and everyday conversation simulations, succeed in improving the speaking skills of their students (Rajendran & Yunus, 2021). Interactive Method: This way, students get an actual practice of speaking a language in a dynamic and realistic environment, leading to improved fluency and confidence (Nazarov, 2023). Research shows that creating communicative activities like role-playing and group interactions allows students to experiment with language freely and significantly boosts their speaking abilities. Interactive environments not only help with developing students' speaking proficiency but also foster collaboration and engagement within the classroom (L. Agustina & Setiawan, 2020).

2. Self-Directed Learning (SDL)_Definition and its characteristics

Self-Directed Learning (SDL) is an education method in which the student takes all his life on teaching at least or at most control of learning. SDL is a framework where students plan, manage, and assess their own progress of learning with a view to learning their areas of interest. This method of learning facilitates student independence, self-reliance, and engagement in deciding what they will learn, how they will learn it, and both the process of assessment and evaluation (Leong et al., n.d.).

SDL helps students develop competencies for independent learning, enhancing their ability to take responsibility for their own academic and personal progress (Clausen, 2023). It also aligns closely with lifelong learning, empowering learners to

continue their education beyond formal classroom settings (Al-Wossabi, 2024). This framework is essential in modern education, especially in contexts requiring self-regulation and motivation to achieve learning goals (Siswanto, 2024).

SDL is the process in which individuals take the initiative, with or without help from others, in diagnosing their learning needs, formulating learning goals, identifying resources for learning, choosing and implementing learning strategies, and evaluating learning outcomes (Clausen, 2023; Ajani, n.d.). From this perspective, SDL is not about learning independently without outside assistance; instead, it refers to self-directedness in the process of learning, focusing on how learners take responsibility for guiding their learning journey with or without external support (Al-Wossabi, 2024).

Here are the key features of Self-Directed Learning (SDL):

1. Students choose: They decide what to learn, how, with what, and where to study (Ajani, n.d.).
2. Self-regulation: Students can manage their own learning process, including planning, time management, and evaluation (Clausen, 2023).
3. Reflective practice: Students reflect on their progress (what I am getting) and identify areas for improvement to adapt their learning strategies (Siswanto, 2024).
4. Incentive: The motivator (in regulation) comes from an inherent desire to succeed in pursuing task-relevant performance goals, drawing on more self-determined forms of SDL (Pacheco-Velazquez et al., 2024).

SDL has also been closely linked to the idea of lifelong learning, encouraging learners to continuously develop their skills throughout their lives, often during their own time while working and outside formal classrooms (Al-Wossabi, 2024). From this perspective, self-directed learning competencies become essential in managing the rapidly changing conditions and challenges present in start-up or entrepreneurial environments (Thuy & Trung, 2024). Additionally, Social-Emotional Learning (SEL) fosters a mindset of continuous progress, allowing learners to adapt and succeed in various personal and professional contexts (Dang et al., 2023).

2.1 The Role of Self-Directed Learning in Language Education

Self-directed learning (SDL) gives students the autonomy to access a range of resources and strategies that can help improve language skills, including English. SDL is highly beneficial for language learning because students can study based on their level and at their own pace (LIU, n.d.). Based on their weaknesses and personal or professional goals, they can choose to concentrate on certain areas of the language, such as vocabulary, grammar, or speaking abilities.

Students who focus on SDL also integrate technology and online resources, such as language-learning apps, video platforms, podcasts, and social media, into their learning process. Apps enable students to learn at their own pace and on their schedule. For example, an app like Duolingo offers personalized learning experiences with flexible timetables (Wang et al., 2024). When learning English, taking responsibility for their

own learning helps students sound more natural when speaking and applying the language more broadly (Li et al., 2024).

Language is a skill that can only be acquired through repetition and constant practice by the students themselves. Independent learning allows students to progress at their own pace, considering personal preferences, such as watching videos in English (in the original) or listening to music and podcasts, as well as participating in online conversations with native speakers for language practice (S. D. Agustina & Fatmawati, 2024)

2.2 Factors Influencing Self-Directed Learning

Several factors influence the efficiency of Self-Directed Learning (SDL), particularly in the development of language competence:

1. Motivation: Both intrinsic and extrinsic motivation play a crucial role in determining how well students engage in independent learning. Strong motivation helps initiate and sustain the learning process. The more motivated students are to learn English—whether to improve speaking skills or fluency—the better they can drive their learning efforts (Kharroubi & ElMediouni, 2024)
2. Metacognitive Skills and Planning: Students must plan their learning activities effectively. Developing metacognitive skills, such as self-reflection, progress monitoring, and evaluating strategies, is essential for successful SDL (Clausen, 2023); (Sadeghi et al., 2024).

3. Resources: The success of SDL depends on the easy availability and accessibility of learning resources. Technology plays a vital role in providing access to digital learning tools and online lessons (Wu et al., 2024) (Doo & Zhu, 2024).
4. Support from the Learning Environment: Although SDL focuses on student autonomy, teachers, peers, and technological tools are still essential. Teachers act as facilitators, helping students develop self-learning skills, while feedback from peers and teachers motivates students to stay on track (Kacha et al., 2024).

2.3 Advantages and Difficulties in SDL

SDL is highly advantageous in language learning as it allows students to learn at their own pace, using materials of interest and adjusting their methods to fit personal needs. It also encourages students to think critically and independently, as seen at Brandenburg University of Applied Sciences, where students are responsible for setting their learning goals and evaluating their progress (Al-Wossabi, 2024).

However, the challenges of SDL lie in students' ability to stay motivated and organize their time effectively. With adequate guidance and strong organizational skills, students may feel safe and confident in their learning journey (Khodaei et al., 2022). Therefore, strategies to enhance motivation and time management skills are essential for the success of SDL.

3. The Language Learning through Technology

Thanks to the development of technology, education has become more high-tech, and language learning has evolved significantly. The potential of technology to

enhance language acquisition is vast, offering more interactive and personalized experiences for learners. Students can now practice speaking with apps like Duolingo, which adapt exercises to individual needs, and engage with classmates through video platforms like Zoom for virtual lessons (Razali et al., 2024).

3.1 Pros of Technology in Language Learning

Personalized Learning: One key advantage of technology in language learning is that it provides personalized learning experiences. These technologies assess students' strengths, weaknesses, and learning preferences, delivering content suited to individual learning paths. Apps like Duolingo and Babbel use algorithms to track user performance and offer exercises targeting areas that need improvement (Gargesh, 2024).

Moreover, technology enhances access to authentic language materials through videos, podcasts, and articles that reflect native contexts. This exposure improves students' listening and reading comprehension by introducing them to diverse accents and dialects (Urbaite, 2024). Platforms like Lingua Exchange connect language learners with native speakers, fostering practical skills through real-time interaction and enhancing both speaking and listening proficiency.

3.2 Problems with Technology Use in Language Learning

While technology offers many benefits, it also presents challenges. One significant issue is that language learning through technology often lacks face-to-face interaction, which is crucial for mastering conversational skills. Although platforms

like Duolingo offer some speaking exercises, they remain primarily text-based and lack in-depth conversation practice.

Another major challenge is the digital divide: limited access to technology, particularly in areas with poor infrastructure. Stable internet access and adequate devices are essential for effective technology-based learning. This barrier can hinder the success of online learning for students in rural or low-income areas (Bang, 2024). Furthermore, not all technologies suit every learner. For example, kinesthetic learners may struggle with technology-based education requiring extended screen interaction. Teachers must, therefore, ensure that digital tools align with students' learning preferences and complement traditional methods.

3.3 Teachers' Role in the Integration of Technology

While technology offers invaluable tools and resources, the role of teachers in language learning has yet to be fully replaced. Teachers are essential to guide the learning process by supporting students with complex materials, maintaining motivation, and facilitating effective technology integration. They provide individualized assessments and feedback to address students' specific needs, something that automated programs or applications cannot fully achieve (Bang, 2024).

Teachers must also possess strong digital literacy skills to maximize the benefits of technology in the classroom. Understanding how to effectively use e-learning platforms and language apps is crucial, and teachers need to strategically integrate these tools into lesson plans that foster all aspects of language learning—

listening, speaking, reading, and writing (Sarnovska et al., 2024). Educators play a key role in balancing traditional methods with technological tools to create a well-rounded learning environment that meets students' diverse needs.

4. Duolingo as a Language Learning Tool

Duolingo is an internationally recognized language-learning app launched in 2011 by Luis von Ahn and Severin Hacker. The app combines gamification with learning, making the process both enjoyable and effective. With over 40 languages available, Duolingo boasts tens of millions of users worldwide, many of whom are high school students. As a highly praised tool for language learning, Duolingo serves as a free resource that supports self-directed learning among students (Lahji, 2024).

4.1. Key Features of Duolingo in Language Learning

Duolingo is designed to foster various language skills: reading, writing, listening, and speaking through short, engaging lessons. Some of the features that contribute to its effectiveness include:

1. Points System: Duolingo introduced a gamified point-and-level system that motivates learners by offering experience points (XP) for completed lessons. Daily streaks and other competitive elements help students stay committed to their learning goals (Smith et al., 2024).
2. Adaptive Learning: The app customizes lessons based on user performance, providing more targeted exercises where students struggle. This adaptive approach supports personalized and self-directed learning (Gargesh, 2024).

3. Multi-Sensory Learning: Duolingo engages learners through listening, speaking, and reading activities. Students hear phrases from native speakers and practice pronunciation by repeating them, promoting deeper comprehension and practical language use (Sarnovska et al., 2024).
4. Instant Feedback: Students receive immediate feedback on their responses, allowing them to self-correct in real time. This feature is especially beneficial in self-directed learning environments, where continuous guidance from teachers may not be available (Derakhshan et al., 2024b).
5. Cultural Context: Beyond grammar and vocabulary, Duolingo integrates cultural notes that give learners insight into the language's real-world use, helping them understand subtle nuances essential for effective communication (Vaishnav, 2024).
6. Progress Tracking: Duolingo tracks users' progress through XP, skill levels, and streak achievements, motivating learners to stay engaged and visualize their improvement (Hasif & Darmi, 2024).

4.2. The Role of Duolingo in Improving English-Speaking Skills

Although Duolingo initially prioritized reading, writing, and listening, it now offers speaking exercises to enhance verbal communication. Learners engage in speaking tasks such as repeating phrases, translating spoken sentences, and providing voice input responses. These features help students improve their pronunciation and fluency over time. Duolingo's spaced repetition algorithm reinforces critical

vocabulary, enabling students to retain and apply their knowledge more effectively (Kazu & Kuvvetli, 2024).

Through continuous practice using the app's gamified elements and speaking drills, students develop both language proficiency and confidence in real-life communication (Gargesh, 2024).

4.3. Benefits of Duolingo on Learning Language

1. Accessibility and Flexibility: Duolingo is available on multiple platforms, such as mobile phones and computers, offering students high accessibility. Learners can engage with lessons anytime and anywhere, allowing them to progress at their own pace, an ideal feature for self-learners (Holozsai & József, 2024).
2. Free Learning Resource: One of Duolingo's main advantages is that it is free, making it accessible to students who cannot afford formal courses or one-to-one tutoring. By providing free resources, Duolingo democratizes language learning and ensures equitable access for all learners (Károly & Gloger, 2024).
3. Structured, Self-Paced Learning: Duolingo provides a platform for self-directed learners to work at their own pace. Students can skip topics they already understand and focus on challenging areas, such as pronunciation or grammar patterns, aligning with their personal goals and learning needs (Derakhshan et al., 2024b).
4. Gamified Learning: Duolingo's gamified elements, such as experience points and streak achievements, engage learners in an interactive and fun way. This

approach offers an alternative to traditional methods, particularly benefiting high school students who might find conventional learning methods too rigid or disengaging (Smith et al., 2024).

4.4. Student Perception and Engagement in Using Duolingo for Self-Directed Learning

Perception, as defined by Rosenberg and Hovland (1960), is a mental process through which individuals interpret and assign meaning to stimuli from their environment. This process is not solely based on direct observation but also involves cognitive processes such as attention, memory, and information processing. In this context, perception refers to how individuals view and assess objects or situations based on their personal experiences, beliefs, and values. Rosenberg and Hovland emphasized that perception is influenced by the social and cultural context as well as individual psychological factors. As a subjective process, perception is often not objective, as it is strongly shaped by personal interpretations of the stimuli received.

Rosenberg and Hovland identified three key dimensions of perception: cognitive, affective, and conative. These dimensions represent various aspects that influence how individuals form their views on specific objects or situations. The cognitive dimension is related to how individuals process and organize information. The affective dimension refers to the emotions and feelings that arise in response to an object or situation. Meanwhile, the conative dimension pertains to the attitudes and behaviors resulting from the perception process.

Next, Information Processing Theory, proposed by Broadbent (1958), suggests that perception is not a passive process but involves selection, processing, and interpretation of information from the external world. In the context of perception, this theory posits that individuals actively process information to generate meaning, rather than merely recording it automatically. The process of perception thus involves dimensions such as selection, attention, and interpretation, all of which play a role in how a person understands the world around them.

In the context of learning using the Duolingo app with a self-directed learning approach, students' perceptions of the app will include cognitive, affective, and conative dimensions. The cognitive dimension relates to how students understand the app and the information provided by Duolingo. The affective dimension describes how students feel about using the app—whether they find it engaging or emotionally involved. The conative dimension involves students' motivation to continue using the app and strive to improve their English speaking skills. By understanding how information processing works, we can gain deeper insight into how students' perceptions of Duolingo influence their engagement in learning.

According to Fredricks, Blumenfeld, and Paris (2004), student engagement in learning is a crucial factor influencing learning outcomes and academic success. They provide a comprehensive definition of engagement, emphasizing its multidimensional nature, which encompasses several dimensions and influences that enrich students' learning experiences. Fredricks, Blumenfeld, and Paris explain that engagement is not

a singular concept but rather a multidimensional one. They identify three main dimensions of student engagement: behavioral engagement, emotional engagement, and cognitive engagement. Behavioral engagement refers to students' active participation in tasks and learning activities, while emotional engagement concerns students' feelings toward learning, such as interest and satisfaction. Cognitive engagement involves students' effort to understand and deeply process learning materials.

Fredricks, Blumenfeld, and Paris also note that high levels of student engagement are strongly correlated with better academic outcomes. Students who are engaged emotionally, behaviorally, and cognitively are more likely to achieve higher academic performance, exhibit greater motivation, and maintain long-term learning. Therefore, in the context of self-directed learning using Duolingo, it is important to assess how the app can enhance all three types of student engagement, which in turn will affect their success in learning English speaking skills.

C. Conceptual Framework

Every language serves the same purpose as English within a member of society. The goals of teaching English are actually already covered in the existing mathematics curriculum. Learning media is one of an effort to arrive at the goal of TEFL, that implement in use the application Duolingo as a learning medium. Students practicing English speaking can gain more knowledge and improve their communication skills if

they use the Duolingo app which is easily used by the intensity of using Duolingo, number of times students practice learning English using the application.

Continuing the provision of self-directed learning support for English language skills is also necessary to help undergird academic success. Students with self-directed learning, High will learn effectively. Then, they will be able to gain knowledge well and improve their English communication skills. The characteristics of a self-directed learner are discipline, initiative, responsibility, and motivation. Therefore, extended research work is anticipated to investigate the direct correlation between the use of Duolingo and self-directed learning, likewise, improving students' communication skills in English. This reasoning gave rise to the framework developed.

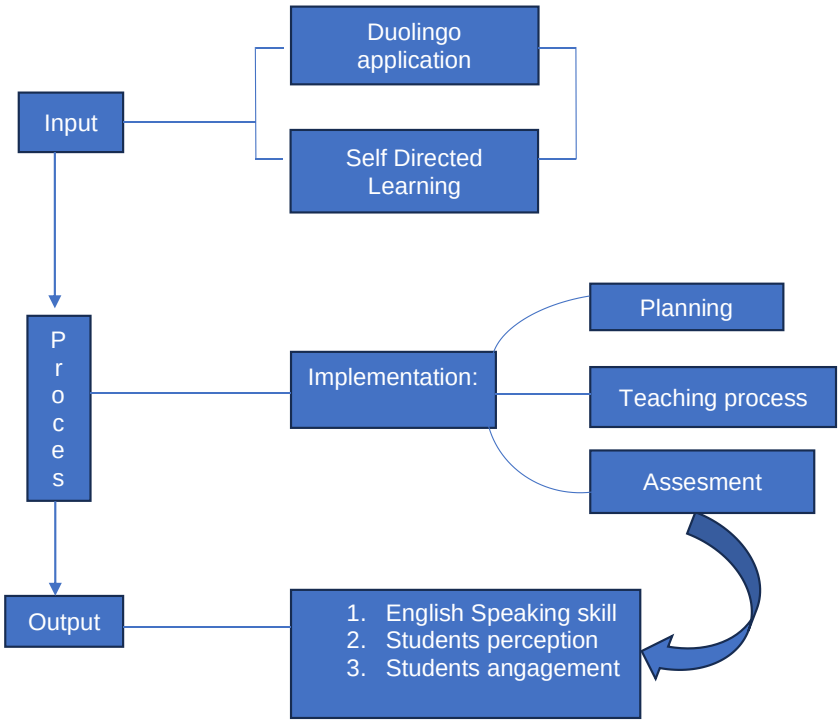

Figure II-1.
Conceptual Framework

D. Hypothesis

The following are the formulated hypotheses based on the research questions posed:

- Null Hypothesis (H0): There is no significant difference in English speaking skills between students who are taught using Duolingo with a self-directed learning approach and those who are not.
- Alternative Hypothesis (H1): There is a significant difference in English speaking skills between students who are taught using Duolingo with a self-directed learning approach and those who are not.

CHAPTER III

RESEARCH METHODOLOGY

A. Research Design

This study employs a quantitative approach with an experimental method to evaluate the effect of the Duolingo application on enhancing English speaking skills among high school students through a Self-Directed Learning (SDL) approach. The research design used is the Equivalent Control Group Design, an experimental method involving two groups (Krishnan, 2024). The first group is the experimental group, which used Duolingo as a self-directed learning tool. In contrast, the second group is the control group, which did not use the application and instead participate in English learning through conventional methods.

The Equivalent Control Group Design is chosen due to its suitability for comparative evaluation. In this design, each group receives the same treatment regarding time and settings, with the primary difference being the use of Duolingo in the experimental group. This design ensures that any observed differences in English speaking skills are genuinely due to the SDL approach via Duolingo. The study aims to identify differences in English speaking skills between the two groups while exploring student perceptions and engagement in using the application.

B. Setting and Subjects of the Research

The study was conducted at SMAN 1 Aralle during the even semester of the 2024/2025 academic year. The research population consisted of 57 eleventh-grade

students divided into classes: Class 11A-Kreativ and Class 11B-Mandiri. The researcher employed a cluster random sampling technique for sample selection. This technique is used when the researcher cannot easily identify the entire population (Creswell, 2012). As research samples, Class 11A-Kreativ serves as the experimental class (using Duolingo with a self-directed learning approach to teach speaking), while Class 11B-Berkarakter serves as the control class (using conventional media for speaking instruction). The study lasts for four weeks/four sessions, during which each student in the experimental group is required to use Duolingo for a minimum of 30 minutes per day to practice speaking.

C. Research Variables and Their Operational Definitions

This study involves two types of variables: (1) Independent Variable, The use of Duolingo with a self-directed learning approach, and (2) Dependent Variable, Students' English speaking skills, measured through pre-test and post-test assessments, as well as students' perceptions and engagement with Duolingo.

In addition to these variables, some variables were studied without examining the influence of the independent variable, namely: (1) the variable of students' perception of the use of Duolingo with the SDL (Self-Directed Learning) approach to improve students' English-speaking skills and (2) the variable of engagement regarding students' perception of the use of Duolingo with the SDL approach to improve students' English-speaking skills. The operational definitions used in the study include :

1. Use of Duolingo with SDL: This refers to students' self-directed use of the Duolingo application to practice English speaking skills, where students have control over the time, frequency, and duration of study. Self-directed learning in this study means students select their materials independently, although material options are pre-defined by the teacher.
2. Students' English Speaking Skills: This refers to the level of students' skill in effectively using spoken English for communication. Speaking skills are assessed through pre-test and post-test evaluations covering aspects such as fluency, grammatical accuracy, pronunciation, and vocabulary.
3. Students' Perceptions of Using Duolingo: This refers to students' views, attitudes, and evaluations regarding Duolingo as a tool to support learning English speaking skills. Perception is measured based on cognitive, affective, and conative (behavioral) dimensions, selection, attention, and interpretation, through several indicators, including material, method, media, and assessment aspects.
4. Student Engagement in Independent Learning Using Duolingo: This is the level of students' active participation and engagement in using Duolingo for independent learning, measured through an observation checklist covering behavioral, cognitive, and emotional engagement dimensions.

D. Instrument of the Research

The instruments used in this study are as follows:

1. English Speaking Test: This test is conducted to measure students' improvement in speaking skills. The test includes two conversation topics: offering food and drink and asking and giving opinions. In this test, students will engage in a dialogue, and their performance will be evaluated based on five key competencies: 1) Grammar competence, 2) Vocabulary competence, 3) Pronunciation competence, 4) Discourse competence, and 5) Strategic competence.
2. Questionnaire: It is aimed to assess students' perceptions of using Duolingo with a self-directed learning approach. The questionnaire consists of 40 statements measured on a Likert scale with the options of Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree. This questionnaire is based on the theories proposed by Rosenberg and Hovland (1960), as well as Broadbent (1958), and evaluates five main dimensions: cognitive, affective, conative, selection and attention, and interpretation. The aspects assessed include material, method, media, and assessment, aimed at providing a comprehensive understanding of students' perceptions of using Duolingo in a self-directed learning context.
3. Observation Sheet: It is aimed to assess the level of student engagement in using Duolingo with a self-directed learning approach. The observation sheet is in the form of a checklist with Yes or No options. This instrument is based on the theory proposed by Fredricks, Blumenfeld, & Paris (2004), which includes three main dimensions of student engagement: behavioral engagement, cognitive engagement,

and emotional engagement. The observation sheet consists of 15 statements designed to measure the level of student engagement in each of these dimensions.

E. Technique of Collecting Data

The data collection techniques consist of:

1. Test

Pre-tests and post-tests are conducted to measure students' improvement in speaking skills. The pre-test is administered before the intervention, and the post-test is conducted after the learning sessions.

2. Questionnaire

A questionnaire is provided to students to assess their perceptions of using Duolingo and their experiences with self-directed learning. The questionnaire contains 40 items on a 5-point Likert scale. Instructions for completing the scale are as follows: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree. This questionnaire is administered after the learning process.

3. Observation

Observations are conducted during the learning process to monitor student engagement in Duolingo learning activities and overall learning progress. The observation checklist will be conducted with the assistance of one of the English teachers, who will observe student engagement during the learning process using Duolingo with a self-directed learning approach. This observation will take place during the learning sessions, and the data collected will be recorded in a checklist consisting of 15 statements.

F. Learning Procedure in Class

The learning procedure is carried out as follows:

a. Experimental group

1. Preparation

The teacher provides instructions to the experimental group on how to use Duolingo for speaking practice and sets a daily target (e.g., at least 20 minutes per day).

2. Implementation Stage

1) Teachers provide material that will be studied in various media choices in the form of videos, audio and texts. Students can choose media according to their interests
2) Students use Duolingo as a tool to enrich their understanding of the material being studied. Students use Duolingo independently in and out of class, following the daily target set.
3) Students report their learning activities using screenshots of topics/materials or achievement scores during their practice, which are shared in a WhatsApp group.
4) The teacher monitors and holds brief discussions to evaluate students' progress.

3. Evaluation

1) After a few weeks, students participate in a post-test to measure improvements in their speaking skills.

2) The teacher also collects questionnaire data and observation sheets with students to explore their perceptions and engagement throughout the learning period.

b. Control Group

1. Preparation

The teacher provides material that is going to teach in the form of a video downloaded from YouTube

2. Implementation Stage

Teachers teach using conventional methods. It is not carried out using the Duolingo application with the SDL approach.

3. Evaluation

After a few weeks, students participate in a post-test to measure improvements in their speaking skills.

G. Technique of Data Analysis

This study applies quantitative data analysis to evaluate the effectiveness of Duolingo in enhancing students' English-speaking skills and to gain insights into their perceptions of the application. Several instruments were used in this research, including speaking tests, questionnaires, and observation sheets. The data collected from these instruments will be analyzed using SPSS 22 software, which provides detailed and precise statistical analysis. The following are the specific data analysis methods that will be applied to each of these instruments:

1. Speaking Test

The speaking test administered to the students will be analyzed using a rating scale that covers five key competencies in speaking skills: Grammar Competence, Vocabulary Competence, Pronunciation Competence, Discourse Competence, and Strategic Competence. Scores for each competency will be calculated using the assessment rubric from Latifa et al. (2015).

Table III-1
A Practical Rating Rubric of Speaking Test
(P2RST)
Scales and Descriptors of Grammar Competence

SCALES/SCORES	DESCRIPTORS
0	The speaker is not able to use the rule of grammar (articles, subject-verb agreement, use of verbs, nouns, adjectives and adverbs, prepositions, coordinators, subordinators) on his or her utterances at all.
1	The speaker is able to perform the rule of grammar (articles, subject-verb agreement, use of verbs, nouns, adjectives and adverbs, prepositions, coordinators, subordinators) he or she still makes many ungrammatical productions (approximately 57% to 75 % ungrammatical production in the utterances).
2	The speaker is able to perform the rule of grammar (articles, subject-verb agreement, use of verbs, nouns, adjectives and adverbs, prepositions, coordinators, subordinators), even he or she still makes some ungrammatical production (approximately 33% % to 56% ungrammatical production in the utterances).
3	The speaker is able to perform the rule of grammar (articles, subject-verb agreement, use of verbs, nouns, adjectives and adverbs, prepositions, coordinators, subordinators), he or she still makes few ungrammatical productions (approximately 14 % to 32% ungrammatical production in the utterances).
4	The speaker is able to perform the rule of grammar (articles, subject-verb agreement, use of verbs, nouns, adjectives and adverbs, prepositions, coordinators, subordinators) very well in various circumstances which seems there is no mistake.

Scales and Descriptors of vocabulary Competence

SCALES	DESCRIPTORS
0	The speaker is not able to produce the relevant vocabulary in the topic of speaking at all.
1	The speaker is only able to produce approximately 25% to 49% of the relevant words of the topic of speaking in a set meaningful of communication.
2	The speaker is able to produce approximately 50% to 82% of the relevant words of the topic of speaking in a set meaningful of communication, but the speaker still seems to employ a number of times to recall the words.
3	The speaker is able to produce approximately 83% to 86% of the relevant words of the topic of speaking in a set meaningful of communication even, but she, or he seems to employ a few times to recall the words. a set meaningful communication in conversation
4	The speaker can produce the relevant words to the topic of speaking in one meaning of communication very fluently which seems there is no difficulty in producing the words.

Scales and Descriptors pronunciation competence

SCALES	DESCRIPTORS
0	The speaker is not able to pronounce the utterances in the case of words, phrases, or sentences on expected pronunciation at all.
1	The speaker can pronounce the spoken words but he/she still makes many mispronunciations (approximately 66 - 86 % mispronunciation of the production of the utterance)
2	The speaker is able to pronounce the utterances in case of words, phrases or sentences correctly and independently but there are still some mistakes (approximately 50 % to 65% mispronunciation of the utterances production)
3	The speaker is able to pronounce the utterances in case of words, phrases or sentences even he or she still makes a few mispronunciations (approximately 25 % to 49% of the production of the utterance)
4	The speaker is able to utter the utterances in case of words, phrases or sentences very well which seems close to the native speaker's pronunciation and the speaker seems to have no mispronunciation

Scales and Descriptors of Discourse Competence

SCALES	DESCRIPTORS
0	The speaker is not able to connect his/her communication meaning to the previous utterance in one exchange of interactive discourse.
1	The speaker is able to connect his/her communication meaning to the previous utterance by using cohesive devices (back channels, conjunction, discourse marker) but there are still many disconnected meaning utterances (approximately 67 to 83.3% disconnected utterances meaning in exchanges)
2	The speaker is able to connect his/her utterance meaning to the previous utterance by using cohesive devices (back channels, conjunction, yes, no, discourse marker) but there are still some disconnected meanings of utterances (approximately 50% to 66% disconnected meaning of utterances in exchanges)
3	The speaker is able to connect his/her utterance's meaning to the previous utterance by using cohesive devices (back channels, conjunction, yes, no, it, discourse marker. The speaker still makes few disconnected meanings of the utterance (approximately 33% to 49% unconnected meanings of utterances in exchanges).
4	The speaker is able to connect utterances by using cohesive devices such as "according to, based on, in my mind, etc., in various circumstances. He or she seems to elaborate the cohesion very well, and there is no problem.

Scales and Descriptors of Strategic Competence

SCALES	DESCRIPTORS
0	The speaker is not able to communicate his/her meaning of communication when he/ she gets a problem communicating his meaning.
1	The speaker is able to maintain his or her communication interaction by using verbal strategies such as code-switching, paraphrasing, and avoidance) and non-verbal strategies such as eye contact, gesture, posture, and mime but he or she is still having many communication problems such as hesitations, or repetitions (approximately 51 to 66%) to communicate his/her communication meaning.
2	The speaker is able to maintain his/her communication interaction by using verbal strategy (code-switching, paraphrasing, avoidance) and

	non-verbal strategy (eye contact, gesture, posture, mime) but he/she still has some problems communicating his/her meaning (approximately 17% to 50%).
3	The speaker is able to maintain his/her communication interaction to employ verbal strategies such as code-switching, paraphrasing, and avoidance and non-verbal strategy such as eye contact, posture, and mime). He/she still has a few problems communicating his/her meaning. (approximately 1% to 16,7%) .
4	The speaker seems very fluent in manipulating the language by using communication strategies, for example, ; verbal strategies such as code-switching, paraphrasing, and avoidance) and non-verbal strategy such as eye contact, posture, and mime when he or she gets problems communicating his or her proposition in various situations.

Next, the researcher applied the following formula to find the impact of using Duolingo with a self-directed learning approach on students' speaking:

$$\textbf{Score} = \frac{\textbf{students' correct answer Score}}{\textbf{Maximum Score}} \times 100$$

After getting the score the researcher classified data into classifications by referring to the scoring system as in table III-2

Table III-2
Students' score classification scale 0-100

Scale 0-100	Score	Result of inversion
86-100	Very Good	A
71-85	Good	B
56-76	Fair	C
< 55	Poor	D

(Dirjen Pendidikan Dasar dan Menengah, 2017)

To illustrate the development of students' speaking skills, test data will be analyzed using descriptive statistics such as mean, standard deviation, and frequency

distribution. This will allow the researcher to observe an overall picture of student performance before and after using Duolingo.

A paired t-test will be conducted to test whether there is a significant change between the scores before and after using Duolingo. This test compares the mean scores under two different conditions (before and after) to determine whether there is a significant improvement in students' speaking skills.

The study will use a two-tailed test for the t-test, which allows for testing changes in both directions: whether there is an increase or decrease in scores after using Duolingo. In other words, this test will examine whether there is a significant difference in either direction (positive or negative) between the scores before and after.

2. Questionnaire

The data collected from the questionnaire, which uses a Likert scale (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree), will be analyzed using descriptive statistics to describe students' perceptions of using Duolingo with a self-directed learning approach**.** For each measured dimension knowledge, affective, conative, selection and attention, and interpretation, as well as aspects of content, methods, media, and assessment the mean scores and frequency distribution will be calculated to determine how students respond to each statement in the questionnaire.

3. Observation Sheet

The observation sheet, which is in a checklist format (Yes/No), will be analyzed using frequency and percentage to measure the level of student engagement during the

learning sessions using Duolingo. Based on three dimensions of engagement (behavioral, cognitive, and emotional) observed by the teacher, the percentage of "Yes" responses will be calculated for each statement in the observation sheet. Descriptive statistics will be used to describe the level of student engagement based on the results from the observation sheet, including the frequency of students' behavioral, cognitive, and emotional engagement. After the data from the three instruments have been analyzed separately, the results will be combined to provide a comprehensive overview of the effectiveness of using Duolingo in improving students' speaking skills through a self-directed learning approach. The quantitative analysis will offer insights into how factors such as student engagement, students' perceptions of the application, and improvement in speaking skills are interrelated in the context of English language learning.

Furthermore, the research hypotheses are formulated to answer the research questions, with testing criteria established. The testing will be conducted using relevant statistical tests (e.g., independent samples t-test) with a significance level of α set at 0.05. The decision criteria are as follows:

- If the significance value (p-value) < 0.05, the null hypothesis is rejected and the alternative hypothesis is accepted, indicating a significant difference in English speaking skills between students taught using Duolingo with a self-directed learning approach and those not.
- If the significance value (p-value) ≥ 0.05, the null hypothesis is accepted and

the alternative hypothesis is rejected, indicating no significant difference in English speaking skills between students taught using Duolingo with a self-directed learning approach and those not.

CHAPTER IV

FINDING AND DISCUSSION

This chapter presents the results and discusses the findings regarding the improvement of students' speaking skills after using the Duolingo application with a self-directed learning approach. In the results section, the quantitative data obtained from the pre-test and post-test analysis will be described to measure the effectiveness of this approach on students' speaking skill development. Furthermore, the discussion section will examine the findings in depth by integrating theoretical perspectives and previous research results, thus providing a more comprehensive understanding of the contribution of technology-based applications in supporting independent learning of English. With this analytical approach, this chapter aims to provide a strong foundation in explaining the impact of technology-based learning on improving students' oral communication competence while offering practical insights for developing language learning methods in the future.

A. Finding

This section presents the research findings, divided into three main aspects. First, (1) The findings of students' English-speaking ability results from pre-test to post-test illustrate the significant improvement in students' speaking ability in the experimental group after using the Duolingo app with a self-directed learning approach. Secondly, (2) Research data findings on students' perceptions of the Duolingo app revealed their views on its effectiveness in helping them learn to speak

English independently. Third, (3). Observational findings on students' level of engagement explain students' level of participation in terms of behavior, cognition, and emotions during the learning process using the app. The explanation of these three aspects aims to provide a comprehensive picture of the effectiveness and acceptance of using the Duolingo app in supporting independent English-speaking learning.

1. Findings of students' English-speaking ability results from pre-test to post-test

This section will describe the findings related to the results of students' English-speaking ability measured through the pre-test and post-test in the experimental group. To provide a clearer picture of the data, Table 4.1 is presented below, summarizing the mean scores of students' speaking ability before and after the intervention.

Table IV-1
Paired sample test

		Paired Differences							
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	95% Confidence Interval of the Difference Upper	t	df	Sig. (2-tailed)
Pair 1	Pre Test - Post Test	-17.22	10.03	1.93	-21.190	-13.253	-8.92	26	0.00

Based on the analysis, it was found that there was a significant improvement in the English-speaking ability of the experimental class students after being given the treatment using the Duolingo application with a self-directed learning approach. The

average pre-test score for the experimental class was 60, while the average post-test increased sharply to 77. This average increase of 17 points indicates a significant positive impact of the treatment. This result is supported by the paired samples test, where the mean difference value is -17.22, accompanied by a p-value smaller than $\alpha = 0.05$. This indicates that the difference between the pre-test and post-test scores is significant.

In addition, the 95% confidence interval ranging from -21.19 to -13.25 provides evidence that the results are consistent and did not occur by chance. The curve graph created shows an evident upward trend in the experimental class scores, confirming the effectiveness of technology-based learning in improving students' speaking ability. These findings suggest that the Duolingo app successfully supports the development of students' speaking skills through an interactive and engaging self-directed learning approach.

The effectiveness of this intervention can be explained through the interactive features of the Duolingo app, such as live speaking and real-time feedback. As such, it provides a personalized and adaptive learning experience, allowing students to learn at their own pace and needs. Based on these results, using technology in English language learning significantly impacts students' learning outcomes.

From an academic perspective, using the Duolingo app can be explained through constructivist learning theory, which states that students build understanding through hands-on experience and active learning. The self-directed learning approach

also supports the development of student autonomy, an important element in second-order learning. The significant improvement in the experimental class students' post-test results corroborates previous literature highlighting the effectiveness of technology in language learning, primarily through mobile-based applications. With these results, a technology-based learning approach can be considered an innovative step towards the challenges of English language learning in the digital age.

The findings not only support existing theories but also provide relevant practical implications. The integration of technology with appropriate pedagogy can have a positive impact on learning outcomes, as seen in the experimental class. These results suggest that interactive app-based learning, such as Duolingo, can effectively improve students' speaking skills. Therefore, this approach is worth considering as a learning model that can be applied in formal and informal education contexts.

There is a significant difference in the development of students' speaking skills compared to the control class. In the control class, the average pre-test score was 60, and the average post-test score only increased to 65, showing an increase of 5 points. This improvement was much lower than that of the experimental class, which experienced an improvement of 17 points. The curve graph shows a marked difference between the two groups, where the experimental class had a much sharper improvement trend than the control class.

These results indicate that the traditional approach to the control class was less effective in improving students' English-speaking skills. In contrast, using the

Duolingo application in the experimental class proved more effective, as seen from the significant post-test results. The analysis also showed that the level of student engagement in the experimental class was much higher than in the control class, which was most likely due to the more engaging and interactive approach. The difference in results between the two classes reinforces the hypothesis that technology integration in English language learning provides more significant benefits than conventional methods.

Overall, these findings provide empirical evidence of the effectiveness of technology-based learning in improving students' speaking skills. Technology-based applications not only help students develop speaking skills but also increase their learning motivation. Thus, these findings can be a strong basis for recommending the use of similar approaches in English language learning, both at the school level and in self-directed learning contexts.

To support the empirical findings previously described, a visual representation through a graph is used to clarify the difference in results between the experimental and control groups.

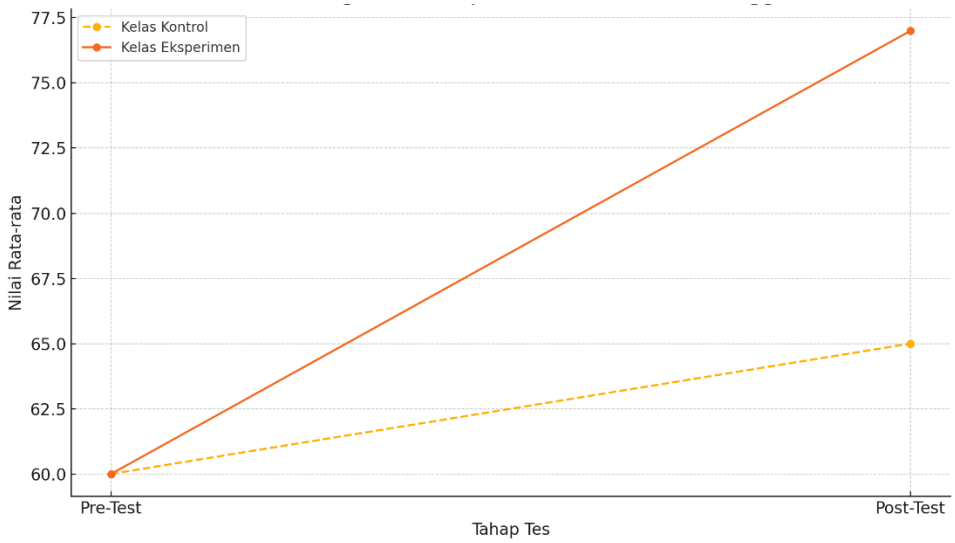

Figure IV-1
The development of English-speaking skills

Figure IV-1 represents the data from the statistical analysis conducted using SPSS software (see page 141), precisely to measure the development of student's English-speaking skills in the control and experimental classes. The data displayed in this graph adopts the findings as average pre-test and post-test scores from both classes. The experimental class received the intervention of using the Duolingo app with a self-paced learning approach, while the control class followed conventional learning. The graph shows a significant difference between the two groups regarding speaking ability improvement, which is the leading indicator of the success of the intervention.

Implementing the Duolingo app with a self-directed learning approach plays an important role in improving students' English-speaking ability. This approach allows students to learn independently according to their pace and needs, which cannot always be facilitated in conventional learning. Using interactive features such as

pronunciation, repetition, and automatic feedback, Duolingo creates a learning environment rich in practice and relevant for speaking skill development. As a result, students in the experimental class showed significant improvement in the post-test compared to the control class.

The effectiveness of this intervention can also be seen from the personalized nature offered by the Duolingo app. Each student can access the learning content flexibly and focus on areas that need improvement. This contributed to improved learning outcomes, as seen in the striking difference in post-test scores between the experimental and control classes. In addition, the gamification-based learning element in Duolingo motivates students to keep learning through engaging challenges, which in turn increases student engagement in the learning process.

In theory, these results support constructivist learning principles, which emphasize that students learn more effectively through hands-on experience. Using technology-based applications such as Duolingo allows students to build their knowledge through continuous speaking practice actively. The app's ability to provide real-time feedback helps students recognize and correct their mistakes immediately, which becomes one of the success factors in improving speaking skills.

In addition, the self-directed learning facilitated by the app strengthens students' ability to take responsibility for their learning process. This helps improve speaking skills and prepares them to become lifelong learners. This approach shows that integrating technology in education can be a very effective tool to address the

challenges of language learning in the digital age. Thus, the implementation of Duolingo provides concrete evidence of how technology can change the way English language learning is done, with better results than traditional learning methods.

In conclusion, the learning intervention using the Duolingo app with a self-directed learning approach not only significantly improved students' English-speaking ability but also provided a new paradigm in language learning that is more adaptive and effective. With these results, Duolingo proves its role as a tool that is not only relevant but also transformative in the context of English language education, particularly for speaking skills.

2. Research findings on students' perceptions of Duolingo application with self-directed learning approach in learning English speaking

This section outlines the research findings regarding students' perceptions of using the Duolingo application with an independent learning approach to improve English speaking skills. The findings are analyzed based on several main dimensions: a). The cognitive dimension evaluates how students understand and process learning information; b). The affective dimension focuses on students' emotional responses to the app; c). The conative dimension describes students' motivations and actions in achieving their learning goals; d). The selection and attention dimension measures students' ability to focus on their learning goals. The selection and attention dimension measures students' ability to focus on relevant learning content; and e). The interpretation dimension evaluates students' ability to interpret and apply learning

information. In addition, the findings of the five dimensions are summarized in f). An overall analysis of the dimensions provides a holistic picture of students' perceptions of the app's effectiveness. This explanation aims to provide a more comprehensive insight into students' experience using app-based learning technology.

2.1 Cognitive dimension

Findings related to the cognitive dimension that evaluates how students understand and process learning information through the Duolingo application are visualized in Figure IV-2. This visualization represents data that illustrates the level of student perceptions of various indicators in this dimension. It aims to provide a clearer picture of the application's effectiveness in improving students' cognitive abilities.

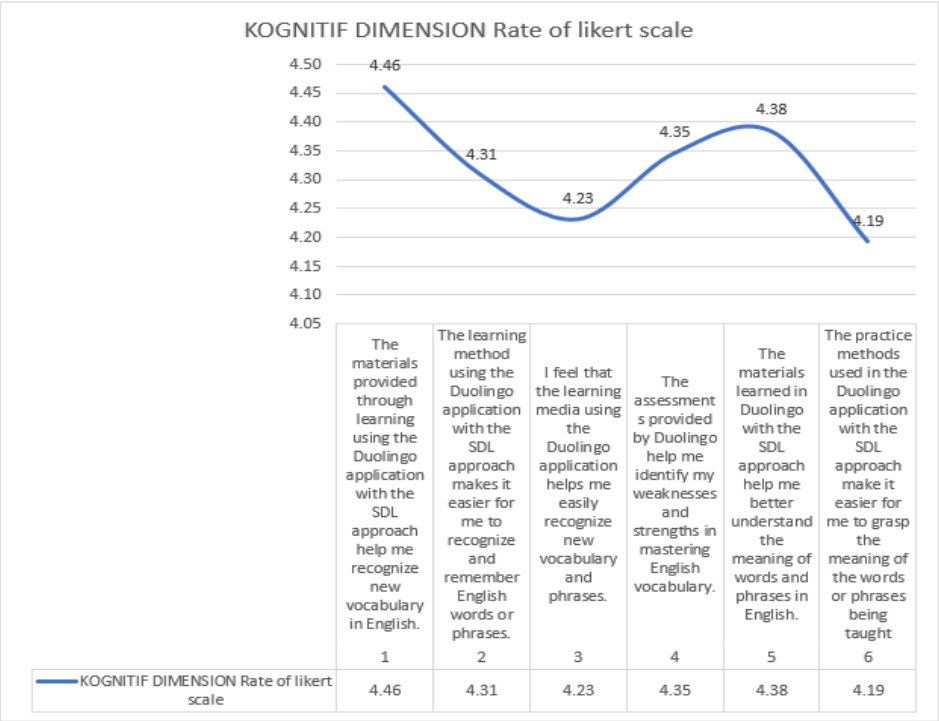

Figure IV-2
Cognitif Dimension

Based on the data presented in Figure IV-2, the cognitive dimension of learning using the Duolingo application with a self-directed learning approach shows variation in the level of perception on various indicators. The indicator relating to the materials provided recorded the highest score of 4.46, indicating that the learning materials were perceived as very helpful in supporting the introduction of new vocabulary and mastery of learning content. This suggests that the quality and relevance of the materials presented by the app are in line with users' learning needs in improving English speaking skills.

However, the assessment of learning media and learning methods showed lower scores, 4.23 and 4.31, respectively. This score indicates that the media and methods used still have limitations in helping users understand the material more effectively. Meanwhile, the assessment aspect scored 4.35, which is good and indicates that the evaluation feature in the app has helped users identify their weaknesses and strengths in learning. However, although the assessment is considered helpful, there are indications that the role of the assessment can still be strengthened, for example by providing more detailed and personalized feedback.

The lowest score was on the practical method aspect, with 4.19, reflecting the need to improve users' practical learning experience. This limitation may be due to the lack of innovation in the practice methods offered by the app. Overall, the Duolingo app has had a positive impact on users' cognitive dimension, especially in the aspect of material recognition. However, to achieve more optimal results, further development

on practice methods, learning media, and assessment enhancements are needed so that users can be more effective in improving their English-speaking skills.

2.1 Affective dimension

Figure IV-3 visualizes the data on students' perceptions related to the affective dimension, which focuses on students' emotional responses to using the Duolingo app. It provides a more detailed picture of the findings on this aspect, which focuses on students' happiness, enthusiasm, and motivation while using the app for English self-learning.

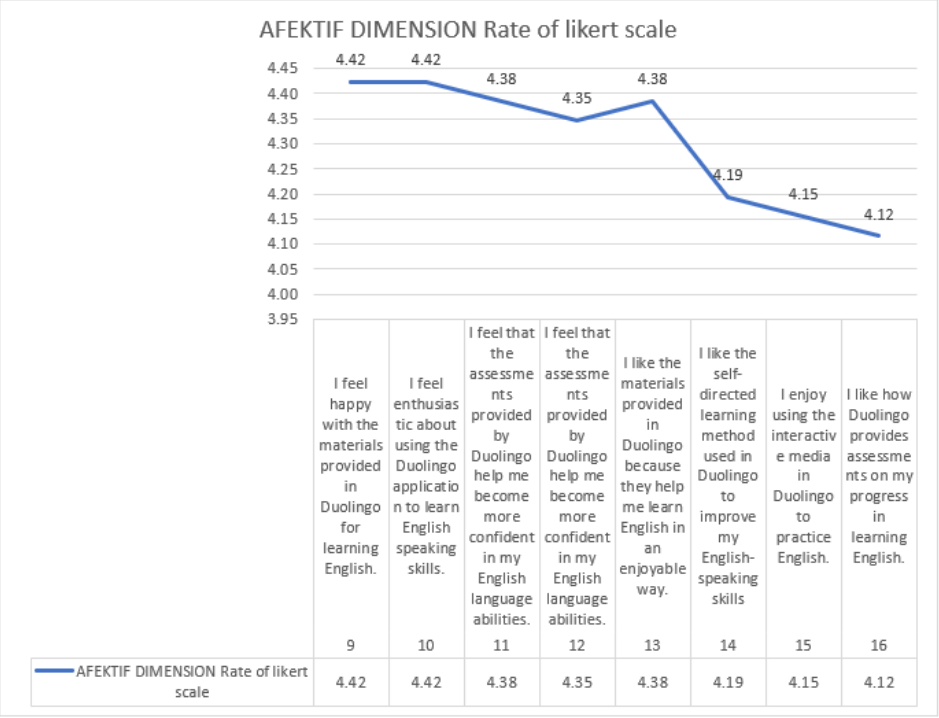

Figure IV-3
Afektif dimension

Based on the graphical data presented, the affective dimension in learning using the Duolingo application with a self-directed learning approach shows varied results on various aspects measured. The highest score of 4.42 is found in the aspects of happiness towards the learning materials and enthusiasm in using the app. This shows that the Duolingo app has successfully created a positive and enjoyable learning experience, which is important in maintaining students' motivation to continue learning. The combination of relevant materials and innovative learning approaches meets the emotional needs of users.

The assessment scores were relatively high at 4.38 and 4.35, reflecting that the feedback from the app's assessment system increased users' confidence in speaking English. However, the declining scores on the interactive media aspect (4.19) and self-directed learning method (4.15) indicate that while the app's approach is helpful, there is room for improvement, especially in terms of the design and interactivity of the media to better engage users emotionally in the learning process.

The lowest score of 4.12 is seen in how assessments support users to monitor their learning progress. Although the score remains positive, it indicates that users feel the assessment support is inadequate to encourage self-reflection and self-monitoring of progress. Overall, the Duolingo app positively impacts the affective dimension of learning, particularly in creating happiness and enthusiasm. However, optimization of the interactive media and assessment features is needed to support sustained emotional engagement in learning further.

2.3 Conative Dimension

To support the analysis on the conative dimension, which focuses on students' motivation and actions in using the Duolingo app to achieve learning objectives, Figure IV-4 is presented as a representation of data illustrating students' level of engagement in this aspect. The graph shows the extent to which students are motivated to learn more material, the frequency of practice they do, as well as their level of initiative in independent learning. This visualization provides a clearer picture of the app's role in encouraging students to actively engage in the learning process while also highlighting elements that support or require further development to maximize conative engagement.

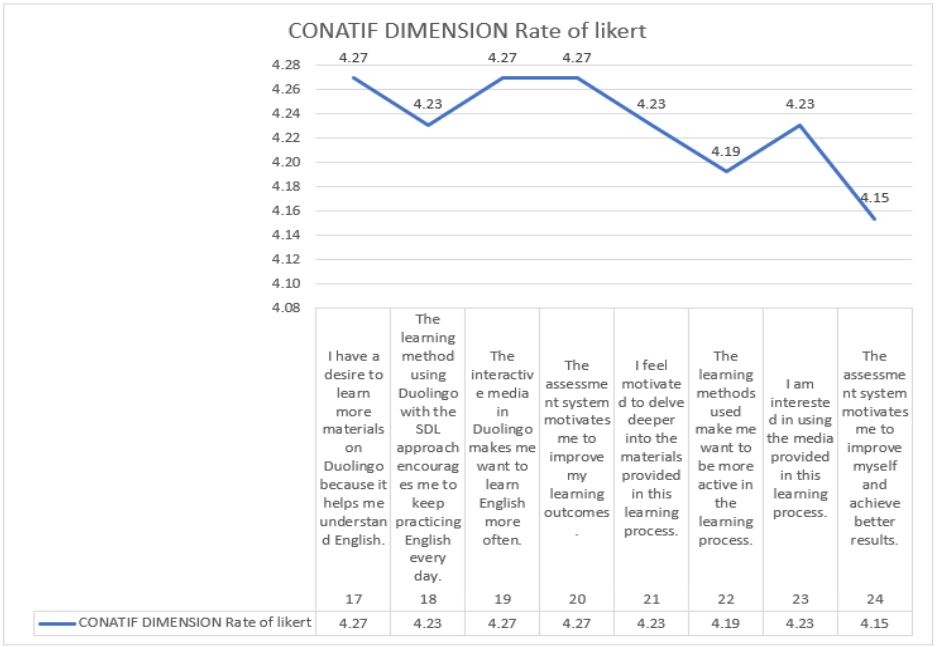

Figure IV-4
Conative dimension

Based on the graph presented, the conative dimension in learning using the Duolingo app with a self-directed learning approach shows a relatively high level in most indicators. The highest score of 4.27 is in the aspect of desire to learn more material and assessment of interactive media in the application. This shows that the Duolingo app can motivate users to keep learning independently, primarily through the provision of relevant materials and media that support users' active involvement in learning.

However, there was a decrease in the aspects of learning methods used (4.19) and assessments provided by the app (4.15). This assessment indicates that although assessments and learning methods have a role in increasing learning motivation, some users still feel these features are less than optimal. Further development on the assessment aspect, such as providing more personalized feedback and innovations in learning methods that are more engaging, could improve users' overall conative engagement.

Nonetheless, pretty stable scores on various indicators, such as motivation to understand the material deeply (4.23) and interest in the learning process (4.23), indicate that the app successfully maintains users' motivation to continue learning. Overall, the Duolingo app positively influences the conative dimension of self-directed learning, primarily through the provision of interactive media and relevant materials. However, to further support long-term learning success, improvements to the assessment method and system must be prioritized in further development.

2.4 Selection and Attention Dimension

To provide further explanation of the selection and attention dimension, which assesses students' ability to focus on relevant learning content while using the Duolingo app, Figure IV-5 is presented to visualize the data illustrating the analysis results of this dimension. The graph illustrates the extent to which students can maintain attention, select appropriate learning materials, and overcome distractions during the self-study process. This visualization aims to provide a clearer understanding of the app's effectiveness in supporting student focus while identifying aspects that still require development to create a more immersive and purposeful learning experience.

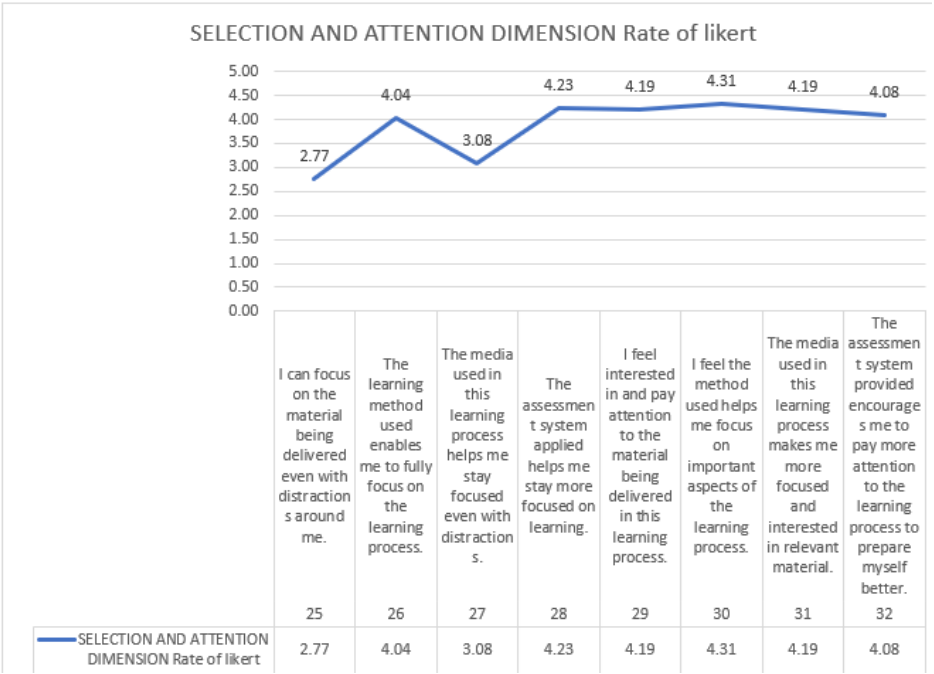

Figure IV-5
Selection and attention dimension

Based on figure IV-5, the selection and attention dimension in learning using the Duolingo app with a self-directed learning approach shows significant variation in results across indicators. The lowest score of 2.77 is on the ability to focus on the material despite distractions. This indicates that the app may not be able to fully overcome external distractions which are often a challenge in self-directed learning. Thus, further development is needed to create a more immersive learning experience so users can more easily maintain focus.

In contrast, a relatively high score of 4.23 was found on the aspect of the assessment system that helps users stay focused during the learning process. This shows that the assessments provide a clear direction and support users to stay engaged in learning. In addition, the learning method used also scored reasonably well at 4.04, which reflects that the approach applied has supported user focus. However, there is still room for improvement, especially on the integration of more effective learning media, considering the score on media-only reached 3.08.

Overall, although the Duolingo app has positively influenced the selection and attention dimensions, some areas still require attention, especially in terms of addressing external distractions and improving the quality of learning media. The high score on the aspect of interest in the material (4.31) shows this app's great potential to continue attracting users' attention if combined with media innovation and more interactive learning methods. Thus, improvement efforts in these areas can increase users' overall focus and attention during the English learning process.

2.5 Interpretation dimension

To support the discussion on the interpretation dimension, which assesses students' ability to interpret, analyze, and apply information obtained through the Duolingo app, Figure IV-6 is presented to visualize the related data. This graph shows the results of the analysis of indicators such as students' ability to summarize the material, connect new concepts with prior knowledge, and draw conclusions from their learning. This visualization provides a more concrete picture of the app's effectiveness in helping students deeply understand and internalize the material while identifying areas that can be improved to support a more comprehensive interpretation.

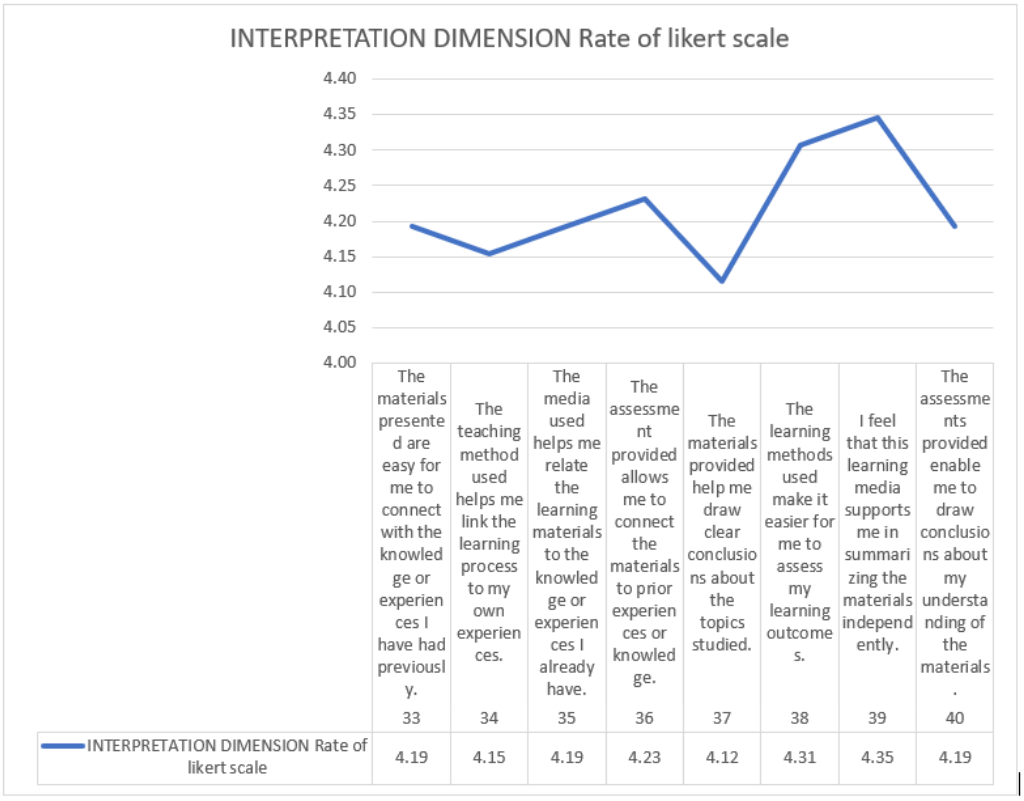

Figure IV-6
Interpretation dimension

Based on the data shown in the graph, the interpretation dimension of learning using the Duolingo app with a self-directed learning approach shows positive results in most of the essays. The highest score of 4.35 is seen in learning media support to help users summarize the material independently. This reflects that the media provided by the app has a significant role in supporting an in-depth understanding of the material. In addition, the learning method that makes it easy for users to assess their learning outcomes also obtained a high score of 4.31, indicating that the self-learning approach implemented is reasonably practical.

However, the score of the aspect of learning media that helps connect the material with previous experience or knowledge decreased to 4.19. This score is lower than the other essays, indicating that the media can less support knowledge transfer or connection optimally. This highlights the need for further development in the assessment feature to provide more in-depth and relevant feedback to improve users' ability to conclude independently.

Overall, the Duolingo app positively impacts the interpretation dimension, particularly in supporting users in summarizing and assessing their learning outcomes independently. Nonetheless, there is room for improvement, especially in learning media and assessments that support linking material with prior experience or knowledge. Developments in these two aspects can increase the app's effectiveness as a self-learning tool to support English speaking skills more comprehensively.

2.6 Analysis of the whole dimension

To provide a more holistic understanding of students' perceptions of using the Duolingo app with a self-directed learning approach, Figure IV-7 is presented as a visual representation of the overall dimension analysis. This graph includes a comprehensive overview of the five dimensions: cognitive, affective, conative, selection and attention, and interpretation, showing how each dimension contributes to creating a practical learning experience. This visualization provides an overall view of the app's strengths in supporting English language learning while identifying dimensions that require improvement to optimize student learning outcomes further.

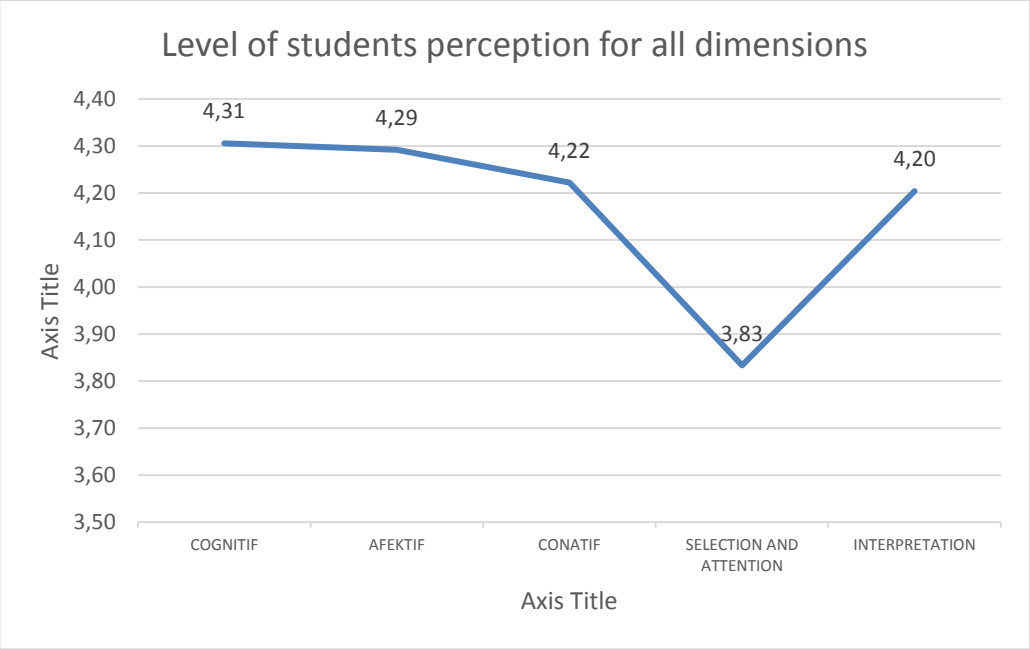

Figure IV-7
Level of Students' perception of all dimensions

Based on the graph of the level perception of all dimensions (cognitive, affective, conative, selection and attention, and participation) in learning using the Duolingo app with the self-directed learning approach, it can be seen that the average scores of all dimensions are in a reasonably high range. The dimension with the highest score at the beginning of the measurement is the cognitive dimension (4.31), which shows that this application successfully helps students understand and internalize the learning material well. This indicates that the app can provide learning materials and methods relevant to students' cognitive needs.

Furthermore, the affective and conative dimensions show relatively consistent scores, although there is a slight decrease in the following measurement stages, namely 4.29 and 4.22. This decrease indicates a challenge in maintaining students' emotional motivation and desire to continue learning independently. Factors such as the interactivity of the media, the assessment method, or the material's difficulty level may account for the drop in affective and conative engagement. However, scores remain in the high category, indicating that, in general, the app is still effective in supporting students' emotional development and learning motivation.

The dimensions of selection, attention, and participation showed lower scores than the other dimensions, at 3.83 for certain stages. This indicates that students may have difficulty maintaining focus and attention during learning or lack features that support active participation in the learning process. Overall, the Duolingo app has positively impacted the development of various dimensions of learning. However,

improvements to the features that support student focus, attention, and engagement would provide more optimal results in improving English speaking skills.

3. Research findings on students' level of engagement with the Duolingo app with self-directed learning approach in learning English-speaking

This section discusses the findings of the observational data related to the level of student engagement in learning English using the Duolingo application with a self-directed learning approach. To support this analysis, Figure IV-8 presents a visual representation depicting students' engagement from three main dimensions: behavioral, cognitive, and emotional. The graph shows students' active participation in learning activities, understanding of the material, and emotional responses while using the app. This visualization provides a clearer picture of the effectiveness of this approach in improving student engagement while identifying areas that can be strengthened to support the success of learning more thoroughly.

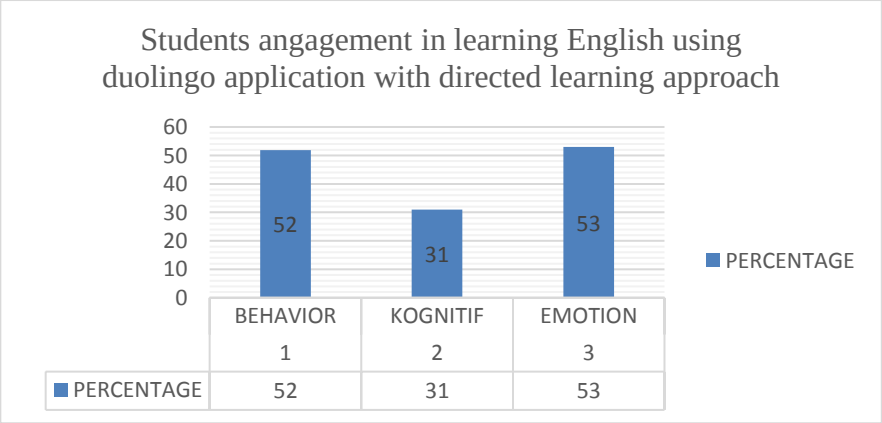

Figure IV-8
Student engagement in learning English using Duolingo with a self-directed learning approach

Based on the graph presented, students' engagement in learning English using the Duolingo application with a self-directed learning approach shows different levels of participation in behavioral, cognitive, and emotional dimensions. The emotional dimension recorded the highest percentage (53%), which indicates that the Duolingo app successfully created a fun and motivating learning experience. This high level of emotional engagement shows that students feel emotionally connected to the learning process, an important factor in increasing learning motivation and continued app use.

The behavioral dimension has a percentage close to that of the emotional, which stands at 52%. This means that students are engaging with the app's learning activities, such as exercises, challenges, and assessments. Such high behavioral engagement is an indicator that the app's self-directed approach creates room for students to actively partake in learning. Structured and interactively designed activities are crucial to fostering such engagement.

In contrast, the cognitive dimension has a much lower percentage of 31%. This low cognitive engagement indicates that there are obstacles in processing the material presented, both in terms of depth of understanding and application of concepts in real situations. This is a concern, considering that cognitive engagement is an important indicator of mastering English-speaking skills. Therefore, the Duolingo app must improve learning elements that encourage students to think critically, such as presenting more complex content or interactive simulations. Overall, the app is

successful enough in engaging students emotionally and behaviorally but needs improvement on the cognitive dimension to support overall learning success.

This research seeks to test two main hypotheses regarding the impact of using Duolingo with a self-directed learning approach on students' English-speaking ability. The alternative hypothesis (H_1), which states that students who use Duolingo with a self-directed learning approach have significantly higher English-speaking ability than students who do not use the method, is accepted. This is indicated by the significant improvement in students' speaking ability in the experimental group compared to the control group, based on the post-test data covering the aspects of fluency, accuracy, pronunciation, and vocabulary. Meanwhile, the null hypothesis (H_0), which stated that there was no significant difference in speaking ability between the two groups, was rejected. These findings are consistent with previous research supporting the effectiveness of technology-based learning and self-directed approaches in improving students' English language skills. Therefore, this study strengthens the evidence that integrating Duolingo with a self-directed learning approach effectively enhances student's English-speaking skills.

B. Discussion

This section comprehensively examines the research results covering three main aspects: improving students' English-speaking ability, students' perception of the Duolingo app, and student's level of engagement in technology-based learning with a self-directed approach. The discussion begins with an analysis of the effectiveness of

the Duolingo application in improving students' speaking ability, which is shown by comparing pre-test and post-test results in the experimental group. Next, students' perceptions of the app are described based on five main dimensions: cognitive, affective, conative, selection and attention, and interpretation, which provide insights into their experiences using the app. This section also discusses the level of student engagement in the learning process, which includes behavioral, cognitive, and emotional dimensions, as important indicators of the success of technology-based learning approaches. Thus, this discussion not only integrates quantitative and qualitative findings but also provides an in-depth analysis of the effectiveness of using technology applications with self-directed learning approaches in supporting the development of independent and systematic speaking skills.

1. Students’ English-speaking skills

Based on the findings of students speaking skills in the control class that used the conventional method, the pre-test results showed that students' speaking ability tended to be low, with average scores indicating limitations in fluency, vocabulary, and pronunciation. After learning, there was an improvement, but still to a limited extent. This shows that the conventional method still contributes less significantly due to the lack of intensity of speaking practice and limited time for interactive practice in class. This finding is consistent with previous research, which states that conventional methods are often not effective enough in training students' speaking skills due to a

greater focus on receptive skills such as reading and listening than productive skills (Iswari et al., 2017 and Ajisoko, 2022)

In contrast, in the experimental class that used the Duolingo application with a self-directed learning approach, there was a significant improvement from the pre-test to the post-test. This improvement included fluency, vocabulary, pronunciation, and communication strategies. Duolingo provides an interactive and flexible learning environment, allowing students to practice independently and repeatedly. This approach aligns with the theory of self-directed learning, which emphasizes student autonomy in managing time, selecting materials, and monitoring learning progress (Freeman et al., 2023). This reinforces findings from previous literature that app-based learning technologies can improve speaking skills through purposeful and repetitive practice (Pratiwi & Waluyo, 2023).

From an academic perspective, these results show that integrating technology such as Duolingo with a self-directed learning approach improves speaking skills over conventional methods. The significant improvement in the experimental class indicates the importance of continuous practice that technology-based applications can provide. This study also supports previous findings on the effectiveness of technology in creating a motivating, adaptive, and interactive learning environment (Raposo et al., 2020). Thus, this approach can be a model for developing technology-based learning methods to improve students' speaking ability.

2. Students' perception of Duolingo application with the self-directed learning approach

Furthermore, the academic interpretation related to students' perceptions of Duolingo application with self-directed learning approach in improving English speaking skills which includes five dimensions of perception:

2.1 Cognitive dimension

The cognitive dimension includes how students understand and process information delivered through the Duolingo application. In this study, students perceived Duolingo as an effective tool to improve their understanding of vocabulary, grammar, and pronunciation. This is following Broadbent's (1958) theory that perception involves actively processing information to produce meaning. As an interactive application, Duolingo facilitates students in learning language patterns with a gamification approach that stimulates cognition. This result aligns with Alzubi's (2021) research, emphasising that self-learning-based technology increases students' cognitive engagement through adaptive and relevant learning experiences.

2.2 Affective Dimension

The affective dimension relates to students' emotions and attitudes toward using Duolingo. Findings show that students feel more motivated and confident using the app due to its engaging gamification elements, such as daily achievements and experience points. The app creates a fun learning atmosphere, reduces speaking anxiety, and encourages students to practice more often. Research by Fitria et al. (2023) supports

this by showing that Duolingo can increase students' intrinsic motivation through a fun and fulfilling learning experience.

2.3 Conative Dimension

The conative dimension refers to students' motivation and actions in using the app to achieve their learning goals. Students in this study showed a significant increase in the frequency of speaking practice, reflecting their active efforts to master English. This motivation is supported by the app's features that monitor individual progress and provide instant feedback, which aligns with Fredricks, Blumenfeld, and Paris' (2004) research on behavioral engagement as an indicator of learning success. Duolingo allows students to take initiative in their learning, consistent with the characteristics of self-directed learning outlined by Karatas and Arpaci (2021).

2.4 Selection and Attention Dimension

The selection and attention dimension refers to how students choose and focus on the learning features available in Duolingo. According to research findings, students are more likely to use features that provide immediate feedback, such as speech recognition and automatic correction exercises. This aligns with the *Information Processing Theory* proposed by Broadbent (1958), which states that individuals tend to select and focus on information perceived as most relevant to their needs. Research by Zemlyanova et al. (2021) also demonstrates that digital platforms offering instant feedback improve students' speaking skills more effectively. Therefore, Duolingo's interactive features that enable real-time speaking practice significantly enhance

students' attention and focus on learning materials, ultimately contributing to their speaking skill development.

2.5 Interpretation Dimension

The interpretation dimension represents how students interpret, analyze, and apply the information obtained through Duolingo while speaking English. Research data show that students exhibit strong abilities in summarizing the material they have learned but face challenges connecting new concepts with prior knowledge, as reflected in lower scores than other indicators. This suggests that while Duolingo effectively provides structured speaking exercises, it still has limitations in helping students apply language in broader communication contexts. This finding aligns with research by Robinson and Persky (2020), which highlights that reflective and contextual activities must complement technology-based learning to be more effective in supporting student comprehension. Chau et al. (2021) also emphasize that feedback features in language learning applications should be more in-depth and reflective to help students draw better conclusions from their learning experiences. Therefore, although Duolingo has proven effective in supporting students' comprehension and self-assessment, enhancing features that enable students to connect learning materials with real-life experiences and improving the quality of assessments can further optimize its effectiveness as a self-directed learning tool for enhancing English speaking skills.

Thus, this study demonstrates that using Duolingo in self-directed learning positively impacts the five perception dimensions, improving students' English-

speaking skills. Nevertheless, developing more contextual features and enhancing a more comprehensive assessment system could further increase the application's effectiveness in supporting a more holistic language learning experience.

3. Level of student engagement with the Duolingo app with a self-directed learning approach

Furthermore, the interpretation of students' level of engagement with the Duolingo application with a self-directed learning approach in improving English speaking skills covering three dimensions is as follows:

3.1 Behavioral Dimension

The behavioral dimension of student engagement shows their active participation in using the Duolingo app. Observations show that students routinely take the time to complete daily targets, such as pronunciation practice and interactive task completion. This engagement supports Fredricks, Blumenfeld, and Paris' (2004) view that behavioral engagement reflects students' physical and visual involvement with learning activities. In this context, Duolingo's gamification-based features, such as points and achievement levels, motivate students to practice more consistently, improving fluency and confidence in speaking English.

3.2 Cognitive Dimension

The cognitive dimension includes students' efforts to understand and internalize English materials through Duolingo. Observations show that cognitively engaged students utilize the app's adaptive features to strengthen their grammar, vocabulary, and pronunciation. Broadbent's (1958) information processing theory supports the idea

that effective learning involves selecting, organizing, and interpreting information. Studies by Alzubi (2021) also confirm that learning technologies, such as Duolingo, encourage cognitive engagement by providing instant feedback that helps students understand mistakes and improve their speaking.

3.3 Emotional Dimension

The emotional dimension is related to students' affective response to the learning process using Duolingo. Observations indicate that students feel more motivated and enthusiastic, thanks to the interactive elements and fun learning atmosphere. This factor reduces students' anxiety about speaking, often a significant obstacle in English learning. According to the theory of Fredricks et al. (2004), positive emotional engagement increases students' intrinsic motivation, directly affecting learning outcomes. Research by Fitria et al. (2023) supports this finding by mentioning that gamification in learning applications creates an engaging and emotionally motivating learning environment.

These three dimensions, namely behavioral, cognitive, and emotional, complement each other in improving students' speaking skills. Using Duolingo with a self-directed learning approach encourages students to practice actively and provides a meaningful, fun, and purposeful learning experience to improve their English-speaking skills.

This study shows similarities with previous studies. One of them is research conducted by Yundayani et al. (2023), which also examined the effectiveness of

Duolingo in English language learning. Both studies highlighted that application-based technology can increase students' motivation and engagement in language learning. In addition, this study's findings align with a study conducted by Chasanah and Halim (2024), which states that Duolingo is efficacious in improving language skills, especially in vocabulary and grammar. However, the striking difference is that this study specifically integrated the concept of SDL, which has not been widely discussed in previous studies. This study emphasizes students' independence in learning, in contrast to previous studies that mainly highlighted the effectiveness of the application in the context of classroom-based or instructional learning.

On the other hand, this study also shows differences from previous studies. The difference found in this study is the approach used in measuring learning outcomes. Some earlier studies, such as those by Erizara and Wijirahayu (2024) and Juniansyah et al. (2024), focused on vocabulary acquisition and grammar comprehension in app-based learning. Meanwhile, this study focuses more on the effect of using Duolingo on students' speaking skills and their perceptions of the learning process with SDL. This shows a shift in focus from previous studies examining apps' impact on passive skills (such as reading and writing) to productive skills (such as speaking). The similarities in the results show that technology, particularly Duolingo, has been proven to improve language skills. However, the differences suggest that innovations in methodological design, such as the integration of SDL, can provide new perspectives in the world of technology-based language learning.

The results of this study provide significant practical benefits for educators in integrating technology into English language teaching, mainly to improve students' speaking skills. The Duolingo app, with a self-paced learning approach, offers an interactive, adaptive, and flexible method, allowing students to learn according to their pace and needs. This provides an effective alternative to traditional approaches that tend to be less supportive of speaking skill development. Theoretically, this study strengthens the literature on self-directed learning and educational technology, particularly in supporting oral communication skills. The findings also provide a foundation for developing more inclusive and innovative technology-based learning models, which can be widely applied in various educational contexts. Thus, this study's results expand academic insights and provide practical guidelines for designing relevant teaching strategies in the digital age.

Although this study demonstrates the effectiveness of the Duolingo application in enhancing English-speaking skills through a self-directed learning approach, several limitations should be noted. First, this study focuses solely on a single high school in a specific region, making the findings less general to broader learning contexts. Additionally, the relatively short intervention duration may not be sufficient to measure the long-term impact of Duolingo usage on English-speaking proficiency. Another limitation is the lack of control over external variables, such as individual motivation levels, prior learning backgrounds, and varying access to technology among students. Furthermore, this study primarily employs a quantitative method, collecting data

through speaking tests and questionnaires, which, although providing strong quantitative insights, may not be adequate to fully capture students' subjective experiences in using the application.

Based on these limitations, future research should expand the scope of the study by involving schools from different regions to obtain more representative findings. Researchers can also extend this study by investigating the effectiveness of Duolingo and self-directed learning approaches in separate and combined conditions. A comparative study using three different groups, one group using Duolingo, another group applying the self-directed learning approach without Duolingo, and the third group integrating both approaches could provide a more comprehensive understanding of which factors contribute most to improving speaking skills. This design will allow researchers to analyze whether the improvement in speaking skills is due more to the technology-enhanced language practice through Duolingo or to the self-directed learning habits developed through self-directed learning. In addition, a longer-duration study could be conducted to explore the long-term impact of Duolingo on students' English proficiency. A mixed-methods approach, combining quantitative and qualitative methodologies, is also recommended to gain deeper insights into students' experiences, the challenges they face, and the factors that contribute to the effectiveness of technology-based learning. Lastly, future research can explore how integrating Duolingo with classroom-based learning methods, or more contextualized learning strategies can further improve student learning outcomes, especially in

English language skills. Thus, further research can provide a more comprehensive understanding of the role of technology in language learning at different levels of education.

CHAPTER V

CONCLUSIONS AND SUGGESTIONS

This chapter has two sections. The first portion is the conclusion based on the discussion and study results. The second section includes some recommendations based on the conclusion.

A. Conclusion

This study shows that students' English-speaking abilities are greatly improved when the Duolingo app is combined with the Self-Directed Learning (SDL) methodology. The key findings of this study are as follows:

First, the pre-test and post-test analysis indicate a notable improvement in fluency, accuracy, pronunciation, and vocabulary acquisition in the experimental group compared to the control group. Duolingo's flexibility and personalized nature allow students to learn at their own pace, while its interactive and gamified features foster an engaging learning environment, increasing both motivation and confidence.

Second, students expressed positive perceptions toward using Duolingo to learn English. They found the application user-friendly, engaging, and effective in supporting their comprehension and speaking abilities. Features promoting active learning, such as automated assessments, iterative practice, and real-time feedback, reinforce these perceptions, enhancing the learning experience.

Third, student engagement in learning was high across behavioral, cognitive, and emotional dimensions. Active participation in daily exercises, involvement in

learning challenges, and self-reported progress contributed to improved learning outcomes. This level of engagement underscores the effectiveness of technology-driven learning in fostering independent language acquisition.

In conclusion, this study shows that integrating technology in learning, particularly through the utilization of the Duolingo application with the SDL approach, has a significant positive impact on improving students' English-speaking skills. Thus, this app is not only relevant as a learning aid but also offers an innovative and adaptive approach to supporting learning needs in the digital era.

B. Suggestions

1. Suggestion for teachers

Teachers are advised to integrate technology-based learning applications, such as Duolingo, into teaching and learning activities to enhance students' speaking skills. Teachers can provide guidance and monitor the use of the application to ensure that students optimally utilize its relevant features. Additionally, students should use this application independently as an additional means to practice their speaking skills, especially outside the classroom. To maximize speaking skill improvement, teachers should consistently motivate students to apply the English they have learned, both in the classroom and in daily interactions. This is crucial because speaking skills can only develop through continuous practice and application in various communicative contexts. With consistent practice and the utilization of Duolingo's gamification features, students can effectively improve their speaking abilities while maintaining their motivation to learn.

2. Suggestions for curriculum developers

Curriculum developers are advised to incorporate technology-based learning, such as Duolingo, into English curriculum design as part of learning strategies that support self-directed learning. The curriculum can be designed to accommodate the formal use of technology by providing special time in the learning schedule and preparing systematic usage guidelines. In addition, curriculum developers also need to consider providing training for teachers to utilize technology effectively to support learning objectives.

3. Suggestions for future researchers

Future research should explore the effectiveness of Duolingo and self-directed learning approaches separately and in combination to determine which method best enhances students' speaking skills. A comparative study involving three groups: one using Duolingo, another applying self-directed learning without Duolingo, and a third integrating both can provide deeper insights into their respective contributions. Expanding the study to include diverse educational backgrounds and larger sample sizes will also improve the generalizability of findings, ensuring more comprehensive conclusions for language education.

Additionally, future research should investigate the long-term impact of these approaches on students' speaking proficiency by conducting longitudinal studies. This will help assess whether improvements in speaking skills persist over time and how students develop autonomous learning habits. Incorporating qualitative methods such

as interviews and classroom observations will also enrich understanding of student engagement and motivation, offering valuable insights for curriculum designers and educators on optimizing technology-driven language learning.

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