

Innovative Pathways to Fluency: Exploring Duolingo with Self-Directed Learning

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ABSTRACT

This study explores the effectiveness of the Duolingo application combined with a self-directed learning (SDL) approach in improving English-speaking skills among high school students. Using a quantitative research design, the study was conducted with 57 eleventh-grade students from UPTD SMAN 1 Aralle during the 2024-2025 academic year. Pre-test and post-test assessments measured students' speaking abilities before and after using Duolingo over a designated period. The results revealed a statistically significant improvement, with an average difference of -17.22 between pre-test and post-test scores, supported by a t-value of -8.92 and a significance level of 0.000. This indicates the significant positive impact of Duolingo's interactive features, gamification elements, and self-paced learning model in enhancing students' confidence and competence in speaking English. This research fills a gap in existing studies by focusing on speaking skills and provides practical recommendations for integrating technology into educational practices. It emphasizes the role of teacher guidance, consistent student engagement, and curriculum design to maximize the benefits of technology-driven learning.

Keywords: *Duolingo, Self-Directed Learning, Speaking Skills, Technology-Based Learning, Language Education, High School Students..*

INTRODUCTION

English speaking skills have become an essential competency in the era of globalization, particularly in international communication. The ability to speak English is a crucial determinant of success in social interactions, education, and professional settings (Masuram & Sripada, 2020). Research shows that approximately 1.5 billion people worldwide speak English, making it the second most spoken language after Mandarin. Speaking skills go beyond mastering vocabulary and grammar; they encompass the ability to interact effectively across



diverse contexts (Nur, 2021). Good speaking abilities have been shown to boost confidence, facilitate active participation in discussions, and open up broader career opportunities (Latifa & Ammade, 2024).

In recent years, the use of technology in language learning has garnered increasing attention. Among various applications, Duolingo stands out as a popular platform for developing language skills, including English (Kamil, 2021). Studies over the past five years have explored its effectiveness, particularly when combined with a self-directed learning (SDL) approach. Research by Vesselinov and Grego (2019) indicated that Duolingo users experienced significant improvements in their English skills after six months of usage. Additionally, Chen and Kuo (2021) demonstrated that SDL allows students to learn according to their needs, positively influencing their speaking skills.

Despite these findings, challenges remain in developing speaking skills among students. A significant issue is the lack of opportunities for students to practice speaking actively in supportive environments (Nur et al., 2021). Statistics indicate that over 70% of students feel insecure speaking English due to fear of making mistakes or receiving criticism (Muhammad et al., 2023). Conventional teaching methods, prioritizing listening and reading over speaking, further exacerbate this issue. This gap in practice can hinder students' communication development and their ability to compete in the global job market (Mridha & Muniruzzaman, 2020).



Although research on Duolingo has demonstrated its efficacy in improving various language skills, its impact on speaking abilities through an SDL approach remains underexplored. Previous studies, such as those by Vesselinov and Grego (2019) and Chen and Kuo (2021), focused primarily on reading and listening skills, often neglecting to speak. This indicates a need for deeper investigation into how SDL strategies can be effectively integrated into Duolingo to enhance students' speaking skills.

Several studies provide foundational insights into the potential of Duolingo and SDL in language learning. Chen (2016) found that independent use of Duolingo increases student motivation and engagement. Godwin-Jones (2019) highlighted the role of technology in supporting SDL through interactive and instant feedback, which fosters learner autonomy. Furthermore, Reinders and White (2011) emphasized the role of digital resources like Duolingo in supporting language acquisition, while Li and Wang (2020) demonstrated its efficacy in higher education for promoting SDL.

However, these studies do not specifically address whether Duolingo can enhance speaking skills with an SDL approach. This gap highlights the novelty of the current study, which focuses on developing speaking abilities through the integration of SDL theory and Duolingo's technological features. By examining how interactive elements within Duolingo can effectively train speaking skills, this research aims to fill a critical gap in the literature.



This study aims to investigate how the Duolingo application, when used with an SDL approach, can improve students' English speaking skills. This study seeks to contribute to developing innovative and effective language learning methods by analyzing the learning outcomes of students who use Duolingo. Additionally, it aims to provide actionable recommendations for educators in integrating technology into language teaching practices.

The research question driving this study is: "How effective is the use of Duolingo with a Self-Directed Learning (SDL) approach in improving English speaking skills?" The study hypothesizes that using Duolingo with an SDL approach significantly enhances students' English-speaking skills compared to traditional learning methods.

With a strong foundation in existing research and a focus on addressing a critical gap, this study aspires to deepen understanding of Duolingo's potential as an innovative tool for enhancing English speaking skills. The findings are expected to provide theoretical insights and practical applications for educators, curriculum developers, and policymakers in language education.

MATERIALS AND METHOD

A. Materials

a.1 Duolingo as a Language Learning Platform

Duolingo is one of the most popular language-learning platforms in the world, with over 500 million registered users by 2023 (Loewen et al., 2020). The platform offers a variety of features designed to improve users' language skills



through interactive and fun methods. One of the main advantages of Duolingo is the gamification approach that is applied in the learning process. By using game elements, such as points, levels, and rewards, users can feel more motivated to learn (Padilha et al., 2020). Another prominent feature is artificial intelligence technology, which allows the customization of learning materials according to the user's ability and progress (Godwin-Jones, 2018).

Various studies have shown the effectiveness of Duolingo in improving language skills. A study by Vesselinov and Grego (2019) found that Duolingo users could achieve a level of language proficiency equivalent to one semester of college within 34 hours of app use. This study shows that Duolingo is effective in teaching vocabulary and grammar and helping users understand the context of language use. In addition, Chen (2016) noted that users who actively engaged in speaking practice through Duolingo showed significant improvement in their speaking ability compared to those who did not use the app.

In language learning, Duolingo also provides interactive features such as "Duolingo Stories" and "Duolingo Podcasts" that allow users to listen and read in their target language. This allows users to engage with the language in a more accurate and practical context (Loewen et al., 2019). Thus, Duolingo serves not only as a learning tool but also as a bridge to a more immersive language experience (Boudadi et al., 2020)

a.2 Self-Directed Learning (SDL) in Language Learning

Self-Directed Learning (SDL) is a learning approach in which individuals take the initiative to determine their learning goals, select resources, and evaluate them. SDL is important in modern education, especially in the increasingly diverse language-learning context. In SDL, learners are empowered to control their learning process, which can increase their motivation and engagement in learning (Wong et al., 2021).



The basic principles of SDL include developing the ability to plan, implement, and evaluate learning independently. In the context of language learning, SDL allows learners to choose materials relevant to their needs and interests and organize learning time according to their availability (Roberson et al., 2021). Research shows that learners who apply SDL in their learning process are more successful in achieving their language goals. Control over the learning process can increase a sense of responsibility and commitment to learning.

The role of SDL in improving language skills is significant, especially in the aspect of speaking. When learners have the freedom to choose their learning means and materials, they are more likely to engage in relevant and meaningful speaking practices (Nurhayati et al., 2023). Moreover, SDL also encourages learners to seek feedback from various sources, including friends, tutors, and online learning communities, which can accelerate their learning process (Wong et al., 2021)

a.3. Relationship between SDL and Speaking Skills Improvement

Several factors influence the success of SDL in learning speaking skills. One of the main factors is learners' intrinsic motivation. Research shows that learners who have high motivation to learn a language tend to be more active in seeking opportunities to practice speaking, both orally and in writing (Deci & Ryan, 2000). This motivation can arise from the desire to communicate with native speakers, understand other cultures, or achieve specific career goals.

Learning strategies also play an important role in the success of SDL. Learners who actively plan and implement effective learning strategies, such as practicing speaking with native speakers through platforms like Duolingo, will be better able to improve their speaking skills. For example, Duolingo users who use the “Speaking Exercises” feature to practice pronunciation and intonation often report increased confidence in speaking (Vesselinov & Grego, 2019).



Social interaction is also a key factor in SDL. Learners who interact with fellow learners or native speakers can gain valuable feedback and improve their speaking skills (Abdullaeva & Avezova, 2020). Research shows that social interaction in language learning contexts can significantly improve speaking, as learners can learn from mistakes and gain new insights into language use in real contexts (Godwin-Jones, 2018).

a.4. Previous Research

Several studies have explored the relationship between Duolingo usage and improved language skills, focusing on speaking skills. Chen (2016) found that Duolingo users who were active in speaking practice showed significant progress in speaking ability compared to a control group who did not use the app. Vesselinov and Grego (2016, 2019) also reported that Duolingo users could achieve proficiency levels equivalent to formal learning in a relatively short period.

However, while many studies demonstrate the effectiveness of Duolingo, there is a gap in the literature that takes an in-depth look at speaking skills in the context of SDL. Many existing studies focus more on other aspects of language learning, such as vocabulary and grammar, without paying enough attention to how SDL can affect speaking skills. In addition, existing research often does not consider factors such as motivation, learning strategies, and social interactions that can contribute to the success of SDL in language learning.

Thus, further research is needed to explore the relationship between SDL and speaking skills, mainly using learning apps such as Duolingo. This research can provide deeper insights into how learners can utilize SDL to improve their speaking skills and what factors can influence their success in the process.

B. Method



This research design uses a quantitative approach to analyze the Duolingo application's effectiveness in improving students' English speaking skills through a self-directed learning approach. The study was designed to evaluate the difference in students' speaking ability before and after using the application. Using pre-test and post-test methods, the researcher can objectively measure the improvement of students' speaking ability. The data obtained will be analyzed using statistical tests to determine the significance of the differences that occur. This research is expected to contribute to the development of more innovative and effective English teaching methods, as well as a reference for further research in the field of language education (Creswell, 2014). Respondents in this study involved 11th-grade students of UPTD SMAN 1 Aralle in the academic year 2024-2025, with 57 people. The subjects were selected using a cluster random sampling method, in which students were divided into groups based on their grades. This approach is expected to provide a more representative picture of the Duolingo application's effectiveness in improving students' English speaking skills. By involving students from diverse backgrounds, the study's results are expected to reflect variations in students' learning abilities and motivations and provide insights into how this app can be used in different educational environments (Fraenkel & Wallen, 2012).

The research instrument was an English-speaking test to measure students' oral communication ability. The test consisted of two main topics: "offering food and drink" and "asking and giving opinions." Each student performs a dialog



according to their chosen topic, 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 (Latifa et al., 2015). Using this instrument, the researcher can measure the improvement of students' speaking ability comprehensively and provide constructive feedback for further development.

The data collection procedure in this study involved two main stages, namely pre-test and post-test. The pre-test was conducted before students started learning English using the Duolingo application with a self-directed learning approach. Students will be tested on their speaking ability to get the baseline data at this stage. After that, students will follow the learning program using the Duolingo application with a self-directed learning approach for a certain period. After completing the program, a post-test is conducted to measure students' speaking ability after using the application. This procedure is designed to ensure that the data obtained is accurate and reliable and provides a clear picture of the method's effectiveness (Cohen et al., 2011).

Data analysis in this study will be carried out quantitatively using the paired t-test statistical test. This test determines whether there is a significant difference between students' pre-test and post-test results. Using a paired t-test, the researcher can evaluate whether the improvement in students' speaking ability after using the Duolingo application is the result of the intervention. The results of the analysis will be presented in the form of tables and graphs for ease of



understanding. They will be complemented with an in-depth interpretation of the implications of the findings of this study. The analysis will provide valuable insights for developing more effective English language learning methods in schools (Field, 2013).

RESULTS

Based on the Paired Samples Test analysis listed in the table below, there is a significant difference in students' English speaking ability before and after being given treatment using the Duolingo application with a self-directed learning approach. The average difference between the pre-test and post-test scores is -17.22, indicating a significant increase in the post-test results compared to the pre-test. This high mean value is reinforced by the standard deviation of 10.03 and the standard error of the mean of 1.93, which indicates that the data tends to be consistent and representative in describing the population of students studied.

Table Paired sample test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference	95% Confidence Interval of the Difference			
					Lower	Upper			
Pair 1	Pre Test - Post Test	-17.22222	10.032	1.93066	-21.19075	-13.2537	-8.92	26	0

In addition, the t-value of -8.92 with degrees of freedom (df) 26 and the significance (Sig. 2-tailed) of 0.000 indicates that the mean difference found is statistically highly significant at the 95% confidence level. This indicates that using the Duolingo application with a self-directed learning approach has a



significant positive impact on students' English speaking ability. Thus, this result supports the hypothesis that technology-based and self-directed learning can effectively improve students' English speaking skills.

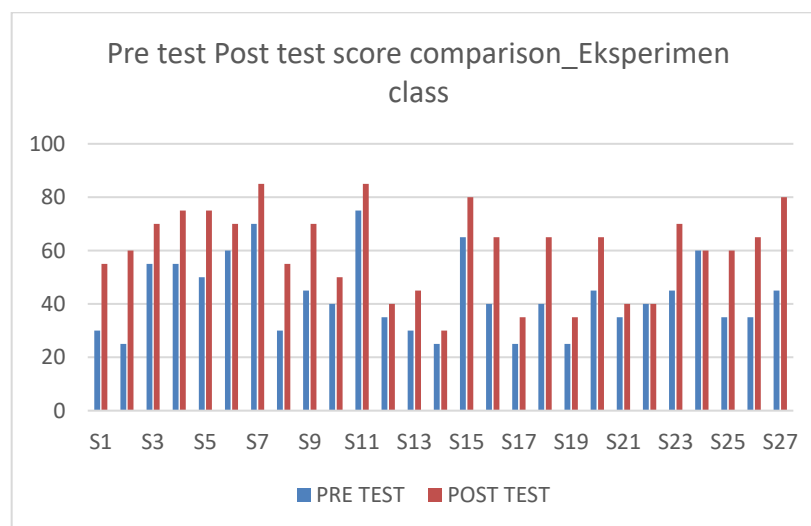


Chart 1. Score comparison of pre-test and post-test of experiment class

Based on the graph data presented above, there is an increase in students' average scores in the post-test compared to the pre-test after using the Duolingo application with a self-directed learning approach. This increase was seen almost evenly across all participants, which shows the effectiveness of this technology-based learning method in improving students' English speaking skills. In the pre-test, most students scored below average, whereas in the post-test, their scores increased significantly, some even showing a sharp spike to reach the highest score among the participants.

This reflects that the Duolingo app, with a self-paced learning approach, can help students develop their English speaking skills more effectively. The app allows students to learn independently, practice interactively, and get assessments



encouraging a deeper understanding of the material (Loewen et al., 2020). Quantitatively, the increase in scores from pre-test to post-test indicates that this app-based learning supports vocabulary and grammar comprehension and can also increase students' confidence in using English orally. Thus, this app can be recommended as an effective supplementary learning tool to improve students' English speaking ability.

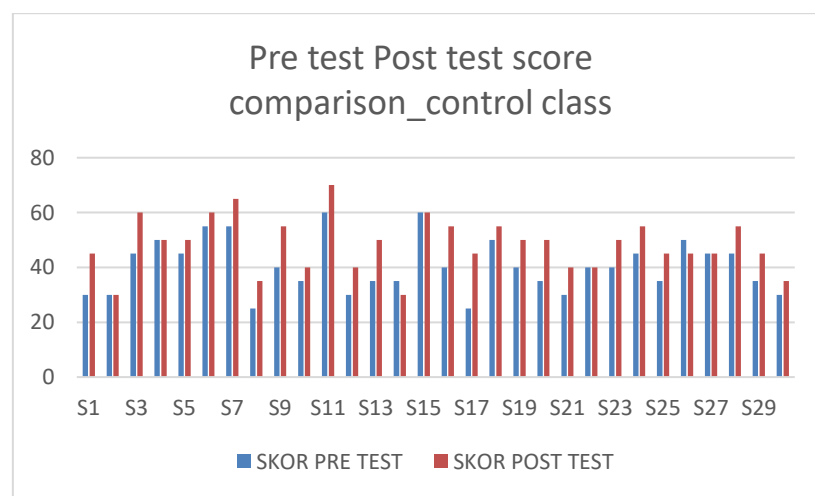


Chart 2. Score comparison of pre-test and post-test of control class

Based on the graph shown for the control class, scores are relatively lower from pre-test to post-test compared to the graph of the experimental class using the Duolingo app. Although there was some increase in scores, the average increase was not significant or consistent across students. This shows that the learning method applied to the control class was less able to optimally encourage the improvement of students' English speaking skills.

Quantitatively, the data on this graph indicates that the traditional learning approach applied to the control class produced stagnant results or little



development in students' speaking ability. In contrast to the experimental class, students in the control class did not gain substantial additional benefits in supporting vocabulary development, grammar, and confidence in speaking English. Thus, this graph emphasizes the effectiveness of technology-based learning approaches such as Duolingo compared to the traditional approach in the control class.

DISCUSSION

The results showed a significant improvement in students' English speaking ability after using the Duolingo application with a self-directed learning approach. Data analysis through the *Paired Samples Test* revealed the mean value of the pre-test and post-test difference of -17.22, with a t-value of -8.92 and a significance of 0.000, indicating a highly significant statistical difference. This improvement can be explained by the flexibility of the self-paced learning approach that allows students to manage their time and learning materials as needed, interactive features such as instant feedback and speaking practice that boost confidence, and gamification elements that make the learning process more engaging. In contrast, in the control class that used the traditional method, the score change was insignificant and tended to stagnate. Therefore, teachers need to support integrating technology such as Duolingo into learning by providing guidance in selecting relevant materials and evaluating results regularly. Students must also utilize the app consistently, integrate speaking practice into daily activities, and engage in social interactions to support the active use of English.



The synergy between technology, teachers, and students can create more effective and meaningful learning.

The findings of this study provide significant practical implications for teachers, students, educational actors, and curriculum developers in improving the effectiveness of English language learning through technology integration. For teachers, using the Duolingo application with an independent learning approach can support a more interactive and adaptive teaching process. Teachers can utilize this application to complement classroom learning by providing directed and relevant assignments and regularly monitoring students' progress through the results obtained from the application. In addition, it is important for teachers to provide guidance and motivation so that students can use this app consistently and maximally to improve their speaking skills.

For students, the self-directed learning approach through Duolingo offers flexibility in learning according to their needs and time (Padilha et al., 2020). With interactive features and instant feedback, students can practice independently, develop confidence, and improve their speaking skills significantly. Meanwhile, educational actors, including curriculum developers, must consider integrating technology such as Duolingo into the curriculum structure, especially in language learning. A curriculum that supports self-directed learning can provide space for students to develop practical skills relevant to global needs. With the synergy between technology utilization, teacher assistance, and adaptive education policies, English learning outcomes are expected to be



more optimal and have a long-term impact on students' competence in the globalization era (Shaji & Nagaraj, 2020).

The results of this study provide a significant theoretical contribution to the field of education, especially in teaching English at the senior high school level. By using the Duolingo application in a self-directed learning approach, this study corroborates the theory that technology-based learning can effectively overcome the limitations of conventional methods in improving students' speaking skills. The results support the view that personalized and flexible learning can increase student participation while providing a deeper understanding of the relationship between intrinsic motivation, interactivity, and learning outcomes in the context of language teaching. Theoretically, this study also reinforces the *self-directed learning* approach as a relevant method to accommodate students' individual needs in mastering English speaking skills.

More broadly, this research contributes to developing English language science by offering a new framework integrating technology-based self-directed learning in the high school curriculum. An app like Duolingo is not only a medium of learning but also an evaluation tool that allows students to identify their strengths and weaknesses in speaking. These results serve as a foundation for developing language teaching theories that are more adaptive to the needs of modern learners, especially in the context of language learning as a *life skill*. Thus, the findings enrich practical approaches in English language teaching and offer new perspectives in technology-based language education theory that can be applied at different levels of education.



This study has similarities with several previous studies, especially in confirming the effectiveness of technology-based learning, such as Duolingo, in improving students' English language skills. For example, research by Vesselinov and Grego (2016) and Chen (2016) showed that Duolingo can significantly improve English language skills, focusing on its learning flexibility and interactive features. This study supports these findings, especially in terms of increasing student motivation and interactivity as the main supporting factors for successful learning. However, this study differs from previous studies in that it explores explicitly speaking skills with a self-paced learning approach. In contrast, most previous studies have focused more on reading or listening skills. This difference arises because previous studies tend to use general quantitative parameters without delving deeper into aspects of speaking that require contextual evaluation and intensive practice.

Support for the findings of this study can also be explained through alignment with the theory of *self-directed learning*, as proposed by Reinders and White (2011). The research shows that technology-based self-directed learning allows students to take more responsibility for their learning process, which is relevant to the results of this study. This support occurs because both studies share a focus on student autonomy in learning, which is key to improving speaking skills. In addition, using gamification elements and instant feedback on Duolingo creates a more engaging and personalized learning environment, strengthening students' intrinsic motivation to practice speaking independently. Therefore, the differences in the focus of these studies provide new contributions that enrich the



literature, while the similarities demonstrate the validity and relevance of the methods used.

CONCLUSION

This study shows that using the Duolingo application with a *self-directed learning (SDL)* approach effectively improves students' English speaking ability. The results of data analysis showed a significant increase in post-test scores compared to pre-test, with an average increase of -17.22 and a significance level of 0.000. This proves that the combination of interactive features, instant feedback, and time flexibility offered by Duolingo can support the development of independent speaking skills. The study also confirms that this technology-based method can help students overcome barriers such as lack of confidence and opportunity to practice speaking in a conventional learning context.

Nevertheless, this study has some limitations. First, the scope of the study was limited to one school with a relatively small number of respondents, so the results cannot be generalized to a broader population. Secondly, the limited duration of the study may not be sufficient to evaluate the long-term impact of this learning approach. Thirdly, this study has not fully explored external factors that may affect learning outcomes, such as individual motivation or social interactions outside the app. For future research, it is recommended to involve more participants from various backgrounds, extend the duration of the study, and consider additional variables such as students' learning styles and learning environment support.



For future study development, it is recommended that research focuses more on integrating learning technologies such as Duolingo into the formal curriculum, particularly in the context of English language learning. Further research could also explore combining the SDL approach with collaborative learning methods, where students can interact directly with peers or native speakers to enrich their learning experience. In addition, further evaluation of the effectiveness of specific features in the app, such as actual situation-based speaking exercises, could provide deeper insights to improve the efficiency of technology-based learning in the future. Thus, this research can be an important foothold in developing innovative English learning methods that are relevant to the needs of the 21st century.

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