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TEACHER'S PERCEPTION OF DUOLINGO FOR VOCABULARY LEARNING IN INCLUSIVE EFL CLASSROOM: A QUALITATIVE CASE STUDY

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ABSTRACT

The integration of digital learning applications has gained increasing attention in English language teaching, including in inclusive classrooms. While Duolingo has been widely used to support language learning, less attention has been given to how teachers perceive its use for vocabulary learning in inclusive classroom practice. Using a qualitative case study design, this study aimed to explore an English teacher's perception of using Duolingo for vocabulary learning in an inclusive classroom and to identify the challenges encountered during its implementation. The study involved one English teacher at a junior high school in North Sumatra. Data were collected through classroom observations, semi-structured interviews, and document analysis and were analyzed using the interactive model of Miles, Huberman, and Saldana (2014). The findings revealed that Duolingo was perceived as a beneficial learning medium that supported vocabulary learning, increased students' motivation, encouraged classroom participation, and facilitated the involvement of a slow learner student. However, differences in students' learning abilities, the need for continuous teacher assistance, and technical constraints remained challenges during implementation. The study concludes that Duolingo's effectiveness in inclusive classrooms depends on both the application and the instructional support provided throughout the learning process. These findings contribute to the growing discussion on technology integration in inclusive EFL classrooms by highlighting the importance of teacher scaffolding in maximizing the benefits of Mobile-Assisted Language Learning (MALL).

Keywords: Digital Learning, Duolingo, Inclusive Education, Student Engagement

INTRODUCTION

The rapid advancement of technology has significantly transformed educational practices across the globe, including how languages are taught and learned (Kukulska-hulme, 2009). Digital learning tools, particularly mobile-assisted language learning (MALL) applications, have become increasingly popular due to their accessibility, flexibility, and interactive features (Alisoy & Sadiqzade, 2024). In the field of English as a Foreign Language (EFL), technology is often viewed as a promising solution to enhance learners' engagement and support language skill development, especially vocabulary acquisition, which is a fundamental component of language proficiency (Zakian et al., 2022). Vocabulary learning

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plays a crucial role in enabling learners to communicate effectively in English, as it supports the development of their listening, speaking, reading, and writing skills (Mukhtorova & Ilxomov, 2024). However, many EFL learners still face difficulties mastering vocabulary due to limited exposure to authentic language use, lack of motivation, and monotonous teaching methods. These challenges are more complex in classroom settings, such as inclusive classrooms, where students demonstrate diverse learning abilities and needs (Asrial et al., 2019)

In the Indonesian educational context, inclusive education has been increasingly implemented to ensure equal learning opportunities for all students within the same learning environment, including those with special educational needs (Rogahang et al., 2024; UNESCO, 2017). Moreover, from a constructivist perspective, learners require appropriate scaffolding and support to progress their individual learning needs and abilities (Vygotsky, 1978). Nevertheless, teachers often encounter practical challenges in inclusive classroom practice, such as large class sizes, limited instructional support, and the absence of specialized assistance, such as shadow teachers (Woodcock et al., 2023). Consequently, English teachers are required to adapt their teaching strategies and learning media to accommodate students with varied cognitive abilities, learning styles, and learning paces, particularly in vocabulary learning (Ajisoko, 2020).

One potential solution to address these challenges is the integration of digital learning applications, such as Duolingo. Duolingo is a digital application that combines modern technology with entertainment elements through a functional and attractive interface (Munday, 2016). Duolingo was developed by Luis von Ahn and Severin Hacker in 2011 as a free language-learning platform that is accessible through mobile devices and web browsers and has now been downloaded millions of times worldwide. The application is easily recognizable by its green owl logo and features a user-friendly interface in which learning materials are organized into sequential units and short lessons (Kazu & Kuvvetli, 2024). Duolingo incorporates several pedagogical features that support vocabulary acquisition through interactive activities such as word matching, translation, listening recognition tasks, and sentence completion tasks, structured and repetitive practice, self-paced learning, and immediate feedback (Rouabhia & Kheder, 2024). This application help learners practice language in a more interactive and enjoyable way while fostering learner engagement and motivation through gamified elements such as points, levels, and streak systems (Gragera, 2024; Tuong & Dan, 2024). Moreover, Duolingo has several learning levels, ranging from basic to advanced, making it suitable for various groups, especially for beginners learning English (Pramesti et al., 2025)

To illustrate how Duolingo supports vocabulary learning, Figure 1 presents the unit progression system and sample vocabulary exercises provided by the application.

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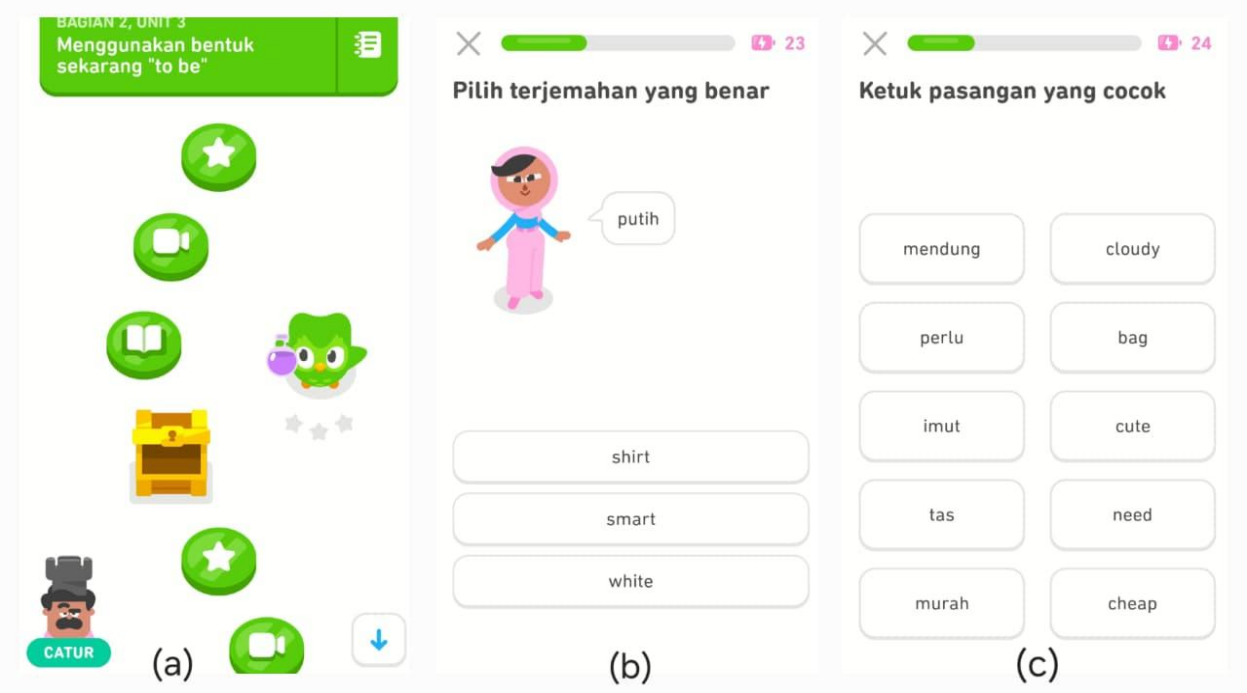


Figure 1. Duolingo learning units and sample vocabulary exercises: (a) unit progression system; (b) translation exercise; (c) vocabulary matching task.

Note. Source: Researcher's screenshots.

As shown in Figure 1, Duolingo integrates a structured learning progression with interactive vocabulary exercises, including translation and matching tasks, to facilitate vocabulary acquisition through incremental practice and immediate feedback.

Previous research has widely explored the use of Duolingo as a language learning tool, particularly in relation to vocabulary acquisition and other language skills. Several studies have reported that Duolingo positively influences learners' vocabulary mastery, motivation, and engagement due to its gamified, interactive features. For instance, Febrianti et al. (2024) found that Duolingo significantly enhanced Indonesian higher education students' vocabulary learning and engagement due to its flexible practice and gamified design. Similarly, Fitria et al. (2023) reported that 90 % of junior high students perceived Duolingo as helpful for speaking development, with vocabulary identified as the most improved area. Another study in Indonesia by Apoko et al. (2023) reported that Duolingo was effective in enriching vocabulary and pronunciation. Humairoh & Martriwati (2025) also noted that students viewed Duolingo as motivating and useful for speaking, while Zeng & Fisher (2024) found that its use beyond the classroom supported autonomous learning habits and long-term motivation. Furthermore, Ahmad et al. (2025) compared several learning applications, such as Duolingo, ELSA Speak, and Hello English, and found that all three contributed positively to students' speaking skills, especially in terms of pronunciation and confidence.

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These findings align with Nguyen & Nguyen (2023) who observed that Duolingo supported learners' listening comprehension through engaging listening practice.

In addition to student outcomes, several studies have examined teachers' and students' perceptions of Duolingo as a classroom tool. Harahap & Daulay (2023) found that EFL teachers in Medan perceived Duolingo as effective and motivating in English instruction, while Alya & Kembaren (2025) reported that Indonesian teachers saw Duolingo as engaging but emphasized the need to integrate it with structured classroom teaching due to curriculum alignment and resource limitations. Raahayu et al. (2024) likewise reported overwhelmingly positive student perceptions of Duolingo's ease of use and motivational features in the context of a hospitality college. Dearestiani et al. (2023) demonstrated improved speaking performance in classroom action research when Duolingo was integrated, highlighting its practical value in active learning. Syafrizal et al. (2022) similarly noted increases in student engagement and speaking confidence, although some students struggled with spelling and listening tasks.

Although previous studies have consistently reported the effectiveness of Duolingo in improving vocabulary acquisition, speaking skills, motivation, and learner engagement, most of these studies (Dearestiani et al., 2023; Fitria et al., 2023; Syafrizal et al., 2022) have primarily emphasized students' learning outcomes and perceptions. Studies exploring teachers' perceptions have also generally examined Duolingo in EFL classrooms without considering the complexity of inclusive classroom practices. Consequently, limited attention has been given to how teachers perceive the implementation of Duolingo for vocabulary learning in classrooms where students demonstrate diverse learning needs and abilities. In contrast, in an inclusive approach, teachers have different pedagogical views regarding the effectiveness of technology for the individual needs of students (Florian & Black-hawkins, 2011). This indicates a gap in the literature regarding the pedagogical role of teachers in integrating Mobile-Assisted Language Learning (MALL) applications within inclusive EFL settings.

Teachers play a crucial role in determining the effectiveness of instructional tools, as their perceptions influence how technology is implemented in the classroom (Akram et al., 2022) Teachers' trust and perceptions of technology determine the extent to which it can be effectively integrated into the teaching and learning process (Ertmer, 2005). Borg (2003) also adds that teachers' perceptions are shaped by their experiences, values, and the social context in which they teach. Understanding teachers' perceptions of Duolingo in vocabulary learning within inclusive classrooms is therefore essential for evaluating its practicality, benefits, and limitations in real teaching contexts. Despite its growing use, empirical studies exploring teachers' perceptions of Duolingo for vocabulary learning in inclusive classroom practices remain scarce, particularly in the Indonesian EFL context.

Based on these considerations, this study aims to explore teacher's perception of Duolingo for vocabulary learning in inclusive classroom practice at SMP Nurul Hadina Patumbak through a case study approach. The research questions are formulated as follows: (1) How does the teacher perceive the use of Duolingo for vocabulary learning in inclusive classroom practice? (2) What challenges does the teacher face in implementing Duolingo for vocabulary learning in an inclusive classroom? The novelty of this study lies in its focus on

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teachers' perceptions of using Duolingo specifically for vocabulary learning within inclusive classroom practices in the Indonesian EFL context, which remains underexplored in previous studies. Unlike previous research that has largely emphasized students' perspectives or learning outcomes, this study highlights teachers' pedagogical perspectives in adapting digital learning applications to accommodate diverse learner needs. Theoretically, this study contributes to the growing literature on Mobile-Assisted Language Learning (MALL) and technology integration in inclusive EFL learning by emphasizing the role of teacher mediation in technology-supported instruction. Practically, the findings provide pedagogical insights for English teachers regarding the potential and limitations of implementing Duolingo in inclusive vocabulary learning practices.

METHODS

This study employed a case study design to explore teacher's perception of using Duolingo for vocabulary learning in inclusive classroom practice. Qualitative research is appropriate for exploring participants' perceptions, experiences, and meanings within a natural context (Creswell, 2009). A case study approach was chosen because this study focused on one bounded case, namely an English teacher's perception of using Duolingo for vocabulary learning in an inclusive classroom. This design was considered appropriate because the study focused on a single inclusive classroom within a real-life educational context, enabling the researcher to gain an in-depth understanding of the teacher's perception and challenges related to the implementation of Duolingo through multiple data sources, including interviews, classroom observations, and document analysis, which are key characteristics of case study research (Yin, 2018). In addition, qualitative case study research emphasizes a holistic understanding of participants' experiences and the meanings constructed through social interactions (Creswell, 2012). Therefore, this approach was suitable for exploring teacher's perspective regarding the use of Duolingo rather than statistically measuring learning outcomes.

The main participant in this study was an English teacher at SMP Nurul Hadina, a regular junior high school in Patumbak, North Sumatra. The participant was selected using convenience sampling, which involves selecting participants based on their accessibility and availability to the researcher (Etikan et al., 2016). This sampling technique was considered appropriate because the teacher was readily available at the research site and taught a class that matched the research context. The class included a student with a slower learning pace who required additional learning support, as identified by the school and acknowledged by the student's parents. In addition, a homeroom teacher was involved as a supporting informant to provide supplementary information for data triangulation. The homeroom teacher was not treated as the main research participant but contributed contextual insights related to classroom conditions and student learning characteristics. Since this study employed a qualitative case study design, the selection of one primary participant was intentional rather than a limitation of the research design. The study sought to obtain an in-depth understanding of a bounded case, namely an English teacher's perception of using Duolingo for vocabulary learning in one inclusive classroom.

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Data were collected through classroom observation, semi-structured interviews, and document analysis. Non-participant classroom observation was conducted to examine the teaching and learning process during the implementation of Duolingo for vocabulary learning in an inclusive classroom, focusing on classroom interaction, teacher instructional practices, students' participation, and students' responses toward the use of Duolingo. The observation data were collected using an observation checklist and supported by field notes to systematically capture classroom activities, teacher-student interactions, students' participation, and other important contextual events during the teaching and learning process. Semi-structured interviews were used as the primary data collection method to explore the English teacher's perceptions, beliefs, experiences, and challenges related to the use of Duolingo for vocabulary learning in inclusive classroom practice, as this type of interview allows flexibility while maintaining focus on key research issues (Creswell, 2009). A supporting interview with the homeroom teacher was conducted to obtain contextual information regarding classroom conditions and student learning characteristics. The interviews were conducted face-to-face with the participants' consent. Document analysis was conducted using teacher reflection and lesson plan to gain further insight into instructional practices and reflective experiences. The use of multiple data collection methods supported data triangulation and strengthened the findings (Yin, 2018).

The data obtained from interviews, classroom observation, and document analysis were analyzed using the interactive model proposed by Miles, Huberman, and Saldana (2014). The analysis involved three main stages: data reduction, data display, and conclusion drawing and verification. The analysis involved data obtained from semi-structured interviews, classroom observation, and document analysis related to the implementation of Duolingo for vocabulary learning in an inclusive classroom. During the data reduction stage, the researcher selected, organized, and focused the raw data by identifying information relevant to the research objectives and research questions, particularly regarding the teacher's perceptions and challenges in using Duolingo. The interview transcripts, observation field notes, and supporting documents were then read repeatedly to gain familiarity with the data. Relevant data were identified and assigned initial codes based on the research questions. Similar codes were grouped into broader categories and subsequently refined into themes representing the teacher's perceptions and the challenges encountered during the implementation of Duolingo. The themes were continuously compared across the different data sources to ensure consistency before being presented descriptively in the findings. In the data display stage, the organized data were presented in the form of descriptive narratives to facilitate interpretation. Finally, conclusions were drawn by interpreting the recurring patterns and themes across the different data sources.

To enhance the trustworthiness of the findings, methodological triangulation was employed by comparing data obtained from semi-structured interviews, classroom observations, and document analysis, while source triangulation was also applied by comparing information obtained from the English teacher and the homeroom teacher. The consistency of the emerging themes across these different sources strengthened the credibility of the study (Creswell, 2009). Ethical considerations were taken into account throughout the research process. Prior to data collection, the participants were informed

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about the objectives of the study and the procedures involved. Their participation was entirely voluntary, and informed consent was obtained before conducting classroom observations and interviews. To protect participants' privacy, the identities of the participants are not disclosed in this study, and all data were used solely for academic purposes.

RESULTS

Based on the analysis of interviews, classroom observation, and document analysis (teacher reflection and lesson plan) data using the interactive model proposed by Miles, Huberman, and Saldana (2014) several themes emerged regarding the teacher's perception and the challenges encountered during the implementation of Duolingo for vocabulary learning in inclusive classroom.

Table 1. Summary of themes and supporting evidence

Theme	Supporting Evidence	Main Finding
Supporting Vocabulary Development	Interview, Observation, Documents	Duolingo helped students learn new vocabulary through interactive activities.
Enhancing Students' Motivation	Interview, Observation	Students showed greater enthusiasm during learning activities.
Encouraging Classroom Engagement	Interview, Observation	Students actively participated individually and collaboratively.
Facilitating Slow Learner Participation	Interview, Observation, Documents	Teacher scaffolding enabled the slow learner to participate.
Diverse Student Learning Needs	Interview, Observation	Different learning abilities required differentiated support.
Teacher Assistance	Interview, Observation, Documents	Continuous teacher guidance remained essential.
Technical Constraints	Interview, Observation, Documents	Limited devices and unstable internet affected implementation.

Teacher's Perception of Using Duolingo for Vocabulary Learning in Inclusive Classroom

The analysis showed that the teacher held a generally positive perception of Duolingo as a learning medium for vocabulary learning in the inclusive classroom. This perception was reflected in several themes identified from the data.

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Supporting Vocabulary Development

The findings demonstrated that Duolingo supported students' vocabulary learning through repetitive exercises, direct practice, and interactive learning activities. Based on the interview, the English teacher (ET) explained that the application helped students understand vocabulary more easily because students were exposed to repeated practice and direct exercises during the learning process. As stated by ET:

> *"In my opinion, Duolingo is quite effective for vocabulary learning because students can learn through repetition and direct practice, plus there are gamification features and a points system that keep them motivated. However, for a deeper understanding, additional explanations from a teacher are still needed." (ET Interview)*

However, the teacher also emphasized that although Duolingo helped students practice vocabulary through repetition and interactive activities, the application could not function independently without additional explanation and guidance from the teacher during classroom instruction:

> *"Duolingo still can't stand alone, it needs to be used alongside and combined with explanations from a teacher." (ET Interview)*

ET further explained that Duolingo was particularly helpful in assisting students, including a slow learner student, to understand vocabulary and answer exercises more confidently after receiving guidance during classroom activities.

These interview findings were supported by the observation data, which showed that students actively practiced vocabulary while using the application during classroom activities. Several students were observed repeating vocabulary items, trying to answer exercises independently, and correcting their answers during the activity. The teacher reflection also supported these findings, where the teacher noted that Duolingo was easy to understand and helped students learn vocabulary in a more enjoyable way because the application provided simple vocabulary levels and interactive activities. In addition, the lesson plan showed that the teacher had designed vocabulary-focused learning activities through guided practice, memorization, demonstration, and direct classroom interaction. The learning procedures emphasized active participation and repeated vocabulary practice, which aligned with the implementation observed during classroom activities.

Enhancing Students' Motivation

The findings revealed that Duolingo increased students' motivation during vocabulary learning activities in the inclusive classroom. ET explained that the gamified features integrated into the application, such as points, levels, and rewards, encouraged students to participate more enthusiastically during the lesson:

> *"In my opinion, what makes it the most exciting is that it's structured like a game with points and levels, which makes them more interested in learning English and understanding it, so it's more like playing a game while learning." (ET Interview)*

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According to ET, students perceived the learning activities as more enjoyable because the application resembled games rather than conventional classroom exercises. This statement was also reflected in the teacher reflection, in which the teacher described Duolingo as an interesting application that encouraged students to learn vocabulary more enthusiastically because of its game-like features and level system, and they felt as if they were playing while learning. This finding was also supported by the homeroom teacher (HT), who stated that students generally showed greater enthusiasm when learning activities involved media and direct practice:

> *"If I just teach the theory, they might get bored. But when it comes to actually using the tools, they'll be more active, more enthusiastic, and more interested." (HT Interview)*

Similarly, the observation findings showed that students participated enthusiastically during classroom activities using Duolingo. Students appeared focused while completing vocabulary exercises, actively interacted with peers, and showed excitement when answering questions during the activity. The classroom atmosphere also became more dynamic as students responded positively to the learning activities.

Encouraging Classroom Engagement

Another finding of this study showed that Duolingo promoted greater classroom engagement during vocabulary learning activities. Based on the interview, ET explained that students became more active and willing to participate during the lesson because the learning activities were delivered through interactive media and game-based learning experiences. As stated by ET:

> *"As for student engagement, it has increased. They're more active and interested, maybe because it's like a game." (ET Interview)*

This statement was supported by HT, who stated that students generally became more engaged when learning activities involved media and practical interaction rather than relying solely on theoretical instruction:

> *"If they learn using media, they'll definitely be very interested." (HT Interview)*

These findings were supported by the observation data, which showed that students were actively involved throughout the classroom activities. During the lesson, students appeared more willing to participate, respond to questions, and interact with peers while completing vocabulary exercises through the application. Several students were also observed discussing answers collaboratively, helping classmates, and focusing on completing the assigned tasks.

Facilitating Slow Learner Participation

Another significant finding revealed that Duolingo supported a slow learner student in participating in vocabulary learning activities within the inclusive classroom setting. ET explained that although the slow learner student initially experienced difficulties in understanding the instructions and operating the application, the student gradually became

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able to participate and answer the exercises correctly after receiving teacher guidance and repeated explanations:

> *"At first, he was a little confused, but after some guidance, he was able to participate and even answer the questions correctly." (ET Interview)*

ET further stated that the visual support and gradual levels of difficulty provided within the application assisted the student in understanding vocabulary more easily:

> *"I think it's because the exercises are arranged in order of difficulty, from easy to harder, so he can follow along at his own pace. Also, the visual aids make it easier to understand, which is probably what makes him feel more confident to try and answer the questions correctly." (ET Interview)*

Based on the observation, it was also noted that the slow learner student was able to participate during classroom activities. During the lesson, the student appeared engaged in the activities, followed the instructions, and was able to answer several vocabulary exercises correctly after practicing with the application. The teacher reflection additionally noted that the student responded positively during the activities because of the activities were designed similarly to games. The student was able to participate better when learning was conducted interactively and collaboratively.

Challenges in Implementing Duolingo for Vocabulary Learning in an Inclusive Classroom

Despite the positive perceptions of Duolingo, several challenges were identified during its implementation in the inclusive classroom.

Diverse Student Learning Needs

The findings revealed that differences in students' learning abilities and levels of independence became one of the primary challenges during the implementation of Duolingo in the inclusive classroom. Based on the interview, ET explained that not all students were capable of understanding instructions and following the learning activities immediately and independently:

> *"One of the biggest challenges is the variation in students' abilities, not all students have the same level of ability. However, all students can participate according to their own abilities. But to implement this, it is necessary to adjust to the class conditions, and guidance is still needed because not all students can immediately understand and participate." (ET Interview)*

Similarly, HT explained that most students in the classroom required different levels of attention and guidance during the learning process:

> *"In terms of learning, their abilities do vary, and when learning, they must be paid close attention to, one by one." (HT Interview)*

The observation findings also indicated that several students experienced difficulties in understanding instructions and operating the application independently during the

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lesson. Some students required repeated explanations before they were able to complete the assigned exercises properly. These conditions showed that differences in students' learning abilities and levels of independence became challenges during the implementation of Duolingo in the classroom.

The Necessity of Teacher Assistance

Another challenge identified during the implementation of Duolingo was the high level of teacher assistance required throughout the learning process, particularly for students with learning difficulties. Although the application provided interactive learning activities, ET explained that students still depended on teacher guidance, clarification, and classroom monitoring throughout the learning activities. As stated by ET:

> *"Not all students immediately understand how to use it, so they need some guidance, and for a slow learner, he can actually follow along and answer the questions but still needs guidance and direction, especially when it comes to understanding instructions, like how to use the app." (ET Interview)*

ET further explained she provided initial instructions and continuously monitored students throughout the lesson, particularly those who required additional assistance. These findings were supported by the observation data, which showed that the teacher frequently moved around the classroom to assist students who experienced difficulties while using the application. The teacher was observed repeating instructions, clarifying vocabulary meanings, and directly helping students complete vocabulary exercises. Furthermore, the field notes revealed that the slow learner student required repeated explanations and direct assistance from the teacher during the activities. This finding was reinforced by HT, who explained that the slow learner student required continuous assistance throughout the learning process. HT further stated that the slow learner student actually possessed learning potential when receiving sufficient attention and individualized guidance from the teacher:

> *"If we really pay attention to him, he's actually capable. But if we don't pay attention to him, especially when he's studying, he won't finish the assignments we give him. And his work will definitely be full of mistakes. That's why we really need to focus on him and pay close attention." (HT Interview)*

The lesson plan analysis additionally demonstrated that guided instruction, demonstration activities, and teacher assistance had been integrated into the learning procedures from the beginning of the lesson planning stage.

Technical and Facility Constraints

The findings also revealed several technical and facility-related challenges during the implementation of Duolingo. Based on the interview, ET explained that not all students possessed personal smartphones or stable internet access during classroom activities.

> *"Another challenge lies in the disparity in access to technology, not all students have compatible devices like smartphones, not all students have smartphones." (ET Interview)*

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ET further explained that internet connectivity frequently became an obstacle during the learning process.

> *"Technically, the network is often a problem, and not all students have a cell phone or internet data." (ET Interview)*

These findings were supported by the observation data, which showed that several students experienced internet connection problems during the lesson, while some students had to share smartphones with classmates in order to participate in the activities. The teacher reflection also confirmed that limited smartphone access and internet connection became major obstacles during the learning process. To address this issue, students were instructed to work collaboratively and take turns using available devices, while the teacher provided additional internet access through a personal hotspot. As stated by ET:

> *"To address the issue of students not having mobile phones, I asked those who do have phones to share them with those who don't, kind of like a sharing arrangement, and I solved the data allowance problem by providing a hotspot." (ET Interview)*

Nevertheless, the teacher continued implementing Duolingo during classroom activities by adjusting the learning process according to students' available facilities and classroom conditions.

DISCUSSION

The implementation of Duolingo in the inclusive classroom showed that the application supported students' vocabulary learning through repeated exposure and interactive practice during classroom activities. Students continuously encountered vocabulary items while completing quizzes, matching exercises, and translation tasks, which appeared to help them become more familiar with English vocabulary and more confident in answering vocabulary-related questions. Similar findings were reported by Pramesti et al. (2025), who found that students became more active in practicing vocabulary because the application provided direct and interactive vocabulary exercises. However, the findings of this study also suggest that vocabulary learning through Duolingo became more effective when combined with classroom explanation and teacher guidance. Rather than replacing classroom instruction, Duolingo functions as a pedagogical support tool that becomes more meaningful when integrated with teacher explanations and classroom interaction. This indicates that the application functioned better as a supportive learning medium rather than as an independent instructional tool, which is in line with Alya & Kembaren (2025), who emphasized that Duolingo still requires teacher support during the learning process.

The classroom atmosphere also became more lively and participatory during the implementation of Duolingo. Students appeared more enthusiastic during vocabulary activities because the learning process felt more enjoyable and less monotonous. Features such as points, levels, and rewards seemed to encourage students to participate more actively and maintain their interest throughout the lesson. In the inclusive classroom setting, where students demonstrated different levels of confidence and learning ability, these gamified activities appeared to reduce students' hesitation to participate during classroom

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instruction. This situation suggests that enjoyable learning experiences can positively influence students' motivation and classroom participation. Gragera (2024), similarly explained that gamification features in Duolingo increase students' motivation and engagement during language learning activities. Likewise, Zeng & Fisher (2024) found that enjoyable digital learning environments encourage students to become more intrinsically motivated in learning English. In an inclusive classroom, this finding is particularly important because enjoyable and interactive learning activities may reduce students' anxiety and encourage participation regardless of differences in learning abilities. Therefore, motivation in this context should be viewed not merely as students' interest in using technology but also as a factor that supports equitable participation in classroom learning.

Besides increasing students' motivation, the implementation of Duolingo also encouraged more active classroom interaction. During the learning activities, students became more willing to discuss answers with classmates, respond to questions, and participate during classroom instruction. The use of interactive learning media appeared to reduce students' passivity because students were not only focusing on completing tasks individually, but were also interacting with peers throughout the lesson. In this context, vocabulary learning developed through participation and collaboration during classroom activities. This condition reflects Lev Vygotsky's sociocultural perspective, which emphasizes that learning develops through social interaction and collaborative participation. Similar findings were reported by Syafrizal et al. (2022) and Febrianti et al. (2024) who found that Duolingo contributes positively to students' participation and engagement during English learning activities. This finding extends previous studies by showing that classroom engagement supported by Duolingo is not limited to individual interaction with technology. Instead, meaningful engagement also emerged through collaboration among students and teacher facilitation, indicating that social interaction remained central even when digital applications were integrated into classroom instruction.

Another important finding in this study was related to the participation of the slow learner student during vocabulary learning activities. The student initially experienced difficulties in understanding instructions and operating the application, but gradual improvement became visible after repeated guidance and assistance were provided during the lesson. The visual exercises, simple activities, and gradual levels of difficulty in Duolingo appeared to help the student participate more comfortably during classroom activities. This finding is consistent with the principles of Mobile-Assisted Language Learning (MALL), which promote flexible and self-paced learning opportunities for learners with diverse abilities and learning needs (Alisoy & Sadiqzade, 2024). Nevertheless, the learning process still depended heavily on teacher assistance and classroom support throughout the lesson. This situation reflects Vygotsky's concept of scaffolding and the Zone of Proximal Development (ZPD), where students can achieve better learning progress through support from more knowledgeable individuals. In this study, teacher assistance functioned as scaffolding that helped the slow learner student participate more successfully in vocabulary learning activities. Rogahang et al. (2024) similarly emphasized that inclusive classroom practices require adaptive instructional support to accommodate students with diverse learning needs and characteristics.

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Despite the positive contributions of Duolingo, several challenges emerged during its implementation in the inclusive classroom. Differences in students' learning abilities and levels of independence meant that some students could complete activities independently, whereas others required repeated explanations and continuous guidance. Consequently, teacher assistance remained essential throughout the learning process, particularly for students who experienced difficulties in understanding instructions and operating the application. This finding suggests that technology-assisted learning cannot fully replace the instructional role of teachers in inclusive classrooms because adaptive support and mediation are still necessary to accommodate diverse learner needs. This finding also highlights that successful technology integration in inclusive classrooms requires continuous teacher decision-making and instructional flexibility. Therefore, teachers remain central in determining how digital applications are adapted to accommodate learners with varying levels of readiness and independence. This is aligned with Woodcock et al. (2023), who explained that inclusive classrooms require flexible instructional practices to accommodate diverse learner needs. Moreover, Borg (2003) and Ertmer (2005) emphasized that the effectiveness of technology integration depends greatly on teachers' instructional decisions and their ability to adapt learning activities according to students' classroom needs.

In addition to instructional challenges, technical and facility-related limitations also influenced the implementation process. Limited smartphone ownership and unstable internet connectivity affected students' participation during classroom activities, causing several students to share devices with classmates during the lesson. Similar challenges were also reported by Alya & Kembaren (2025) who identified technological accessibility and limited classroom facilities as obstacles in implementing Duolingo in formal learning settings. Akram et al. (2022) likewise explained that limited technological resources frequently become barriers in technology-assisted language learning implementation. These constraints indicate that the successful implementation of MALL is influenced not only by pedagogical readiness but also by the availability of technological infrastructure. Schools need to provide adequate facilities to maximize the educational benefits of digital learning applications in inclusive settings. Even so, collaborative learning strategies and classroom adaptation helped the learning activities continue despite these limitations.

Generally, Duolingo has the potential to support vocabulary learning in inclusive EFL classrooms by creating more interactive, engaging, and participatory learning experiences. The application not only encouraged students to practice vocabulary more actively, but also supported classroom interaction and the participation of students with different learning abilities. However, the effectiveness of Duolingo in inclusive classrooms depends not only on the application itself, but also on teacher scaffolding, classroom interaction, and adaptive instructional support throughout the learning process. Therefore, Duolingo is more appropriately positioned as a supportive learning medium that complements classroom instruction rather than as an independent learning tool in inclusive classroom practice. These findings extend current discussions on MALL by demonstrating that technology integration in inclusive EFL classrooms should be understood as a collaborative process

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involving digital tools, teacher mediation, and adaptive instructional practices rather than relying solely on technological innovation.

CONCLUSION

The successful integration of Duolingo in an inclusive EFL classroom is shaped not only by the application itself but also by the instructional support provided throughout the learning process. The use of digital learning media alone was insufficient to accommodate the diverse characteristics and learning needs present in the classroom. Instead, its value emerged when technological tools were combined with teacher guidance, classroom interaction, and adaptive instructional practices. This study contributes to the growing body of research on Mobile-Assisted Language Learning (MALL) by providing insight into the role of teacher mediation in supporting the use of digital learning applications within inclusive educational contexts. Nevertheless, the findings were derived from a single teacher and one inclusive classroom setting and were primarily based on teacher perception. Consequently, the findings provide insights into a particular educational context and may differ from those found in other inclusive EFL classrooms.

Considering these findings, Duolingo is recommended to be implemented as a complementary learning tool alongside continuous teacher guidance and adaptive instructional support, particularly in classrooms with diverse learner needs. For English teachers, the findings highlight the importance of combining digital learning applications with appropriate scaffolding to ensure meaningful participation for all learners. School administrators are encouraged to provide adequate technological facilities and internet access to support technology-enhanced learning, while policymakers may consider strengthening professional development programs that prepare teachers to integrate digital applications effectively in inclusive classrooms. Future research may involve a wider range of participants, including students, and examine the implementation of Duolingo across different educational contexts to provide a broader understanding of its role in supporting inclusive English language learning.

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