



Exploring Trends of Web-Based Vocabulary Learning Apps in Indonesian Research : A Systematic Literature Review

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Abstract

Research on web-based vocabulary learning applications has gained momentum in recent years, reflecting the growing interest in technology-enhanced education across Indonesia. However, a comprehensive understanding of how these studies have evolved and contributed to the field remains limited. This systematic review aims to analyze research trends on web-based applications for vocabulary acquisition in Indonesia from 2019 to 2024, focusing on the themes, methodologies, and outcomes reported in these studies. Following the PRISMA framework, 80 studies were identified from databases such as Semantic Scholar and Garuda. After duplicate removal and relevance screening, 42 full-text articles were reviewed, with 35 meeting the final inclusion criteria. The analysis reveals an increasing focus on platforms like Duolingo, Quipper, and Memrise, with many studies employing experimental methods to assess vocabulary improvement. Key trends include the integration of gamification and multimedia elements to enhance engagement and learner motivation. The review reveals an increasing focus on web-based vocabulary learning applications in Indonesian research from 2019 to 2024, with most studies adopting experimental designs to evaluate short-term learning outcomes. The findings highlight several applications such as Duolingo, Quipper,

and Memrise are frequently employed, with positive effects on vocabulary acquisition through gamification and multimedia features. However, the research predominantly focuses on small-scale implementations, with limited studies exploring long-term impacts or usage in diverse educational contexts.

Keywords: *Indonesian Vocabulary Research; Systematic Literature Review (SLR); Vocabulary Acquisition; Web-based Learning Applications*

Introduction

The demand for proficient language skills is more critical than ever, especially in Indonesia, where English serves as a vital tool for global communication and access to information. The ability to acquire a broad vocabulary is essential not only for academic success but also for professional opportunities, as fluency in English has become a key requirement in various industries (Hughes, 2019). However, traditional classroom settings often face limitations in providing personalized, interactive, and engaging methods for vocabulary acquisition. This has led to a growing reliance on technology-based learning platforms, which have transformed the way learners engage with new language content. In Indonesia, web-based learning applications are emerging as valuable tools for supplementing traditional language education, offering flexibility and tailored experiences for diverse learners.

The importance of vocabulary acquisition in language learning cannot be overstated. It forms the foundation for mastering reading, writing, speaking, and listening skills (Nation & Coxhead, 2022). Without an adequate vocabulary, learners struggle to comprehend texts, express ideas clearly, and engage in meaningful conversations (Schmitt, 2010). Web-based learning applications have become particularly crucial in the Indonesian context, where access to quality English language education is unevenly distributed across regions. These platforms provide learners with affordable, flexible, and personalized tools that can be accessed anytime and anywhere (Reynolds et al., 2022). This democratization of learning resources through technology addresses significant educational disparities, making language learning more inclusive and accessible across Indonesia.

Three key reasons support the need for a systematic investigation of this topic. First, there is a notable gap in the literature concerning how web-based applications specifically impact vocabulary acquisition among Indonesian learners (Kohnke et al., 2023). Second, the integration of technology in education has accelerated in response to the COVID-19 pandemic, making it necessary to evaluate the effectiveness of digital tools in language learning (Basilaia & Kvavadze, 2020). Third, understanding the trends and effectiveness of these applications will provide insights into how future language learning platforms can be developed to

address the unique needs of Indonesian students. By conducting a systematic literature review, this study aims to fill these gaps and contribute valuable insights into the future of vocabulary acquisition in Indonesia.

Previous research has extensively explored the role of technology in enhancing language learning, with a significant focus on Mobile-Assisted Language Learning (MALL) and Computer-Assisted Language Learning (CALL). Studies have demonstrated that these digital platforms improve learners' engagement, retention, and motivation, especially in vocabulary acquisition (Gromik et al., 2023). In global contexts, web-based learning applications such as Duolingo and Quizlet have been found to positively impact language learners by providing tailored feedback and interactive exercises (Lim & Toh, 2024). However, while international studies have shown promising results, there is a scarcity of research that specifically focuses on the Indonesian context. Much of the literature on web-based learning tools tends to generalize findings without addressing the unique educational challenges in Indonesia, such as the disparity in technological infrastructure and access to quality education.

Moreover, while web-based platforms are becoming increasingly integrated into educational settings, there has been little systematic investigation into their effectiveness specifically for vocabulary acquisition in Indonesia. Most existing studies either focus on broader language skills or examine the use of mobile apps rather than web-based platforms (Katemba, 2021). Furthermore, the rapid acceleration of e-learning adoption due to the COVID-19 pandemic has not been fully explored in the context of vocabulary mastery (Basilaia & Kvavadze, 2020). As a result, there is a need for more localized research over last few years that examines how these platforms cater to the diverse needs of Indonesian learners, particularly in remote areas where access to traditional classroom settings is limited.

This study seeks to address these gaps by systematically reviewing the literature on web-based learning applications for vocabulary acquisition in Indonesia over the past five years (2019-2024). While previous research has provided valuable insights into the general effectiveness of digital tools in language learning, this study will focus specifically to identify key trends in the use of these platforms, including the types of applications employed, the methodological approaches taken, and the demographic focus of the research. Additionally, the study will assess the effectiveness of these applications in improving vocabulary acquisition by reviewing empirical studies that measure outcomes such as learning improvements, learner engagement, and satisfaction. By doing so, it aims to contribute to a more nuanced understanding of how these applications can be

optimized to support vocabulary acquisition in diverse learning environments.

Research Questions

- 1) What are the research trends regarding web-based applications toward vocabulary learning in Indonesia over the past five years?
- 2) To what extent are these applications effective in improving vocabulary learning?
- 3) What are the challenges encountered by these web-based applications toward vocabulary learning in Indonesian EFL context?

Method

This study follows the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework to conduct the systematic literature review. PRISMA provides a standardized and transparent process for selecting, screening, and reporting data for systematic reviews (Page et al., 2021). Below are the steps adapted for this research:

1. Database Selection

The literature search was conducted across several academic databases to ensure comprehensive coverage of relevant studies. The databases chosen for this review include Semantic Scholar and Garuda (Garba Rujukan Digital), as these sources are widely recognized and provide access to a broad range of scholarly articles. Semantic Scholar is particularly effective in retrieving high-quality academic publications, leveraging artificial intelligence to improve the relevance and accuracy of search results. This makes it a valuable tool for discovering cutting-edge research on global trends in language learning and technology. Meanwhile, Garuda is a digital reference platform focused on Indonesian academic publications, ensuring that studies specific to the Indonesian educational context, including locally conducted research, are included in the review. The inclusion of Garuda is critical for capturing publications that may not be indexed in international databases, thereby providing a more complete picture of the research landscape in Indonesia.

2. Inclusion and Exclusion Criteria

To ensure relevance and focus, specific inclusion and exclusion criteria were applied:

Inclusion Criteria:

- Studies published between 2019 and 2024.
- Research conducted in Indonesia or involving Indonesian learners.
- Focus on vocabulary acquisition using web-based learning applications.
- Peer-reviewed journal articles

Exclusion Criteria:

- 1) Studies unrelated to vocabulary acquisition (e.g., focusing on other language skills).
- 2) Articles not available in full text.
- 3) Studies conducted outside of Indonesia without direct relevance to the context.

3. Search strategy

The search for relevant studies will be conducted using specific keywords to capture a broad range of literature related to the research questions. The following keyword combinations will be used: "English learning application", "Vocabulary acquisition", "Vocabulary mastery", "E-learning web", "Indonesian EFL learners".

4. PRISMA Workflow

The PRISMA workflow was followed to screen and select studies:

- 1) Identification: All relevant articles were identified through the selected databases. Titles and abstracts were reviewed, and duplicates were removed.
- 2) Screening: In the second stage, the remaining articles were reviewed based on the inclusion and exclusion criteria. Any irrelevant studies were excluded at this stage.
- 3) Eligibility: Full-text articles of the screened studies were obtained and reviewed thoroughly to determine their eligibility based on the established criteria.
- 4) Included Studies: Studies that met all inclusion criteria were included in the final review for data extraction and synthesis. The full PRISMA flow diagram (Figure 1) illustrates the process of identification, screening, and inclusion of studies.

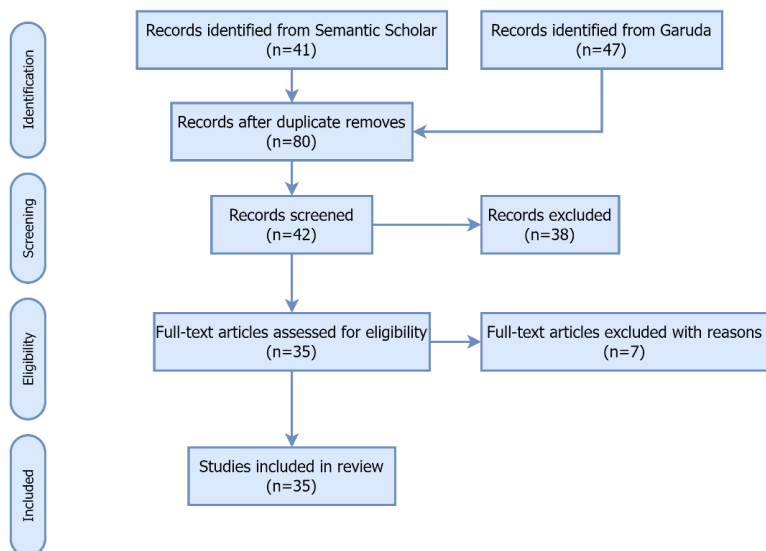


Figure 1. Prisma Flow Chart for Systematic Literature Review

Result

A total of 88 articles were identified through the literature search conducted using the Semantic Scholar and Garuda. These databases provided a broad selection of scholarly articles relevant to web-based learning applications and vocabulary acquisition in Indonesia. After the initial search, duplicate articles were removed to avoid redundancy across the databases. This process resulted in the exclusion of 8 duplicate articles, leaving 80 unique articles for further consideration.

Following the removal of duplicates, the title and abstract screening was applied to the 80 remaining articles. This stage was essential to ensure that only articles directly related to the research questions were taken to the full-text review. The articles were screened based on inclusion criteria, such as focusing on web-based applications for vocabulary acquisition, being set within an English language learning context, and being published between 2019 and 2024. As a result of this screening, 38 articles were excluded and leaving 42 articles for full-text analysis.

After the initial screening by title and abstract, a total of 42 articles were selected for full-text review. This stage involved a thorough examination of each article to assess its relevance to the research questions and its methodological quality. The studies needed to provide clear, empirical findings related to the effectiveness of these applications.

During the full-text review, 7 articles were excluded due to various reasons. Some articles did not meet the inclusion criteria, particularly those that focused on broader aspects of language learning, such as grammar, pronunciation, or listening skills, rather than vocabulary acquisition. Other studies were excluded because

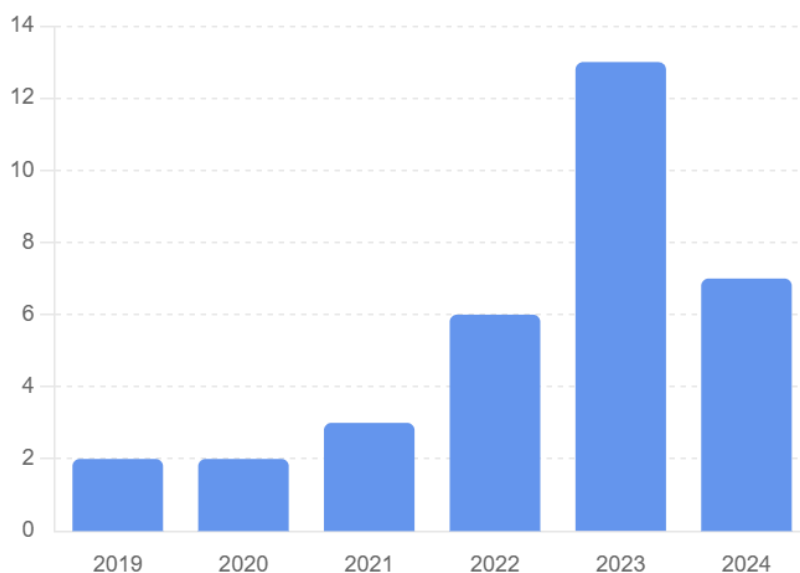
they focused on teacher or educator rather than EFL learner or student, which is the specific focus of this research. Additionally, a few articles were removed due to methodological weaknesses, such as insufficient data or unclear research designs, which affected the validity of their findings.

After this rigorous assessment, 35 articles were deemed relevant and of sufficient quality to be included in the final analysis. These studies provided significant insights into how web-based learning applications are being implemented for vocabulary acquisition, especially in the Indonesian context. The selected studies offer a balanced view of the potential benefits, challenges, and effectiveness of using digital platforms for vocabulary learning, contributing valuable data to address the research questions of this systematic review.

1. Publication Trends

a. Publication Year

The chart above presents the distribution of publications over the years related to web-based learning applications for vocabulary acquisition among Indonesian EFL learners.

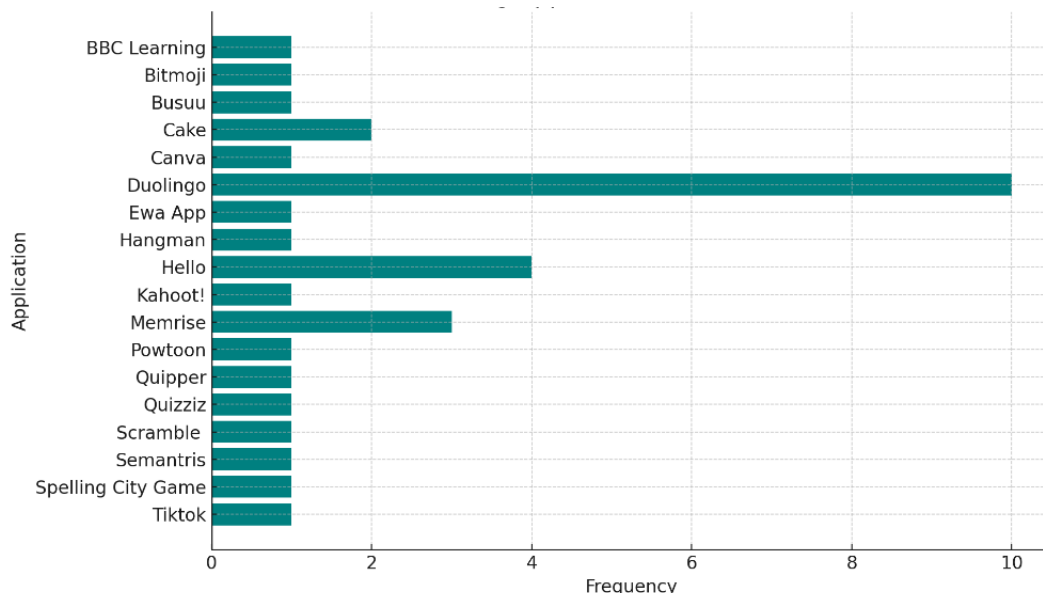


The data reveals a noticeable upward trend, with a peak in 2023, indicating a growing scholarly interest in this area. This increase aligns with the rapid adoption of technology-driven learning solutions in educational settings, particularly in response to the shift toward digital platforms in recent years. The steady output in prior years reflects consistent exploration of innovative tools to enhance vocabulary acquisition. This trend highlights the evolving landscape of web-based

learning applications, underscoring their potential to support EFL learners in Indonesia as educators and researchers continue to investigate new methods to improve language learning outcomes.

b. Most Frequent Applications

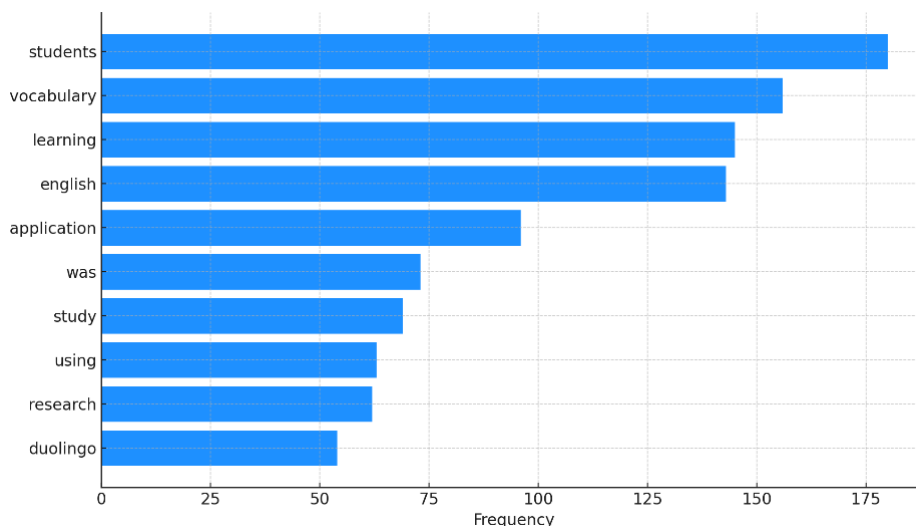
The chart illustrates the frequency of web-based learning applications used in studies focused on vocabulary acquisition for Indonesian EFL learners.



Duolingo stands out as the most frequently utilized application, reflecting its popularity and effectiveness in vocabulary learning. Other tools, such as Quipper and Spelling City Game, are also employed but to a lesser extent, indicating the diverse range of digital platforms explored in this field. The presence of multiple applications suggests that researchers are experimenting with various technologies to determine their impact on vocabulary mastery. This variety underscores the importance of identifying suitable tools that align with the needs of EFL learners in Indonesia, contributing to a deeper understanding of effective practices for web-based language learning.

c. Most Frequent Keywords

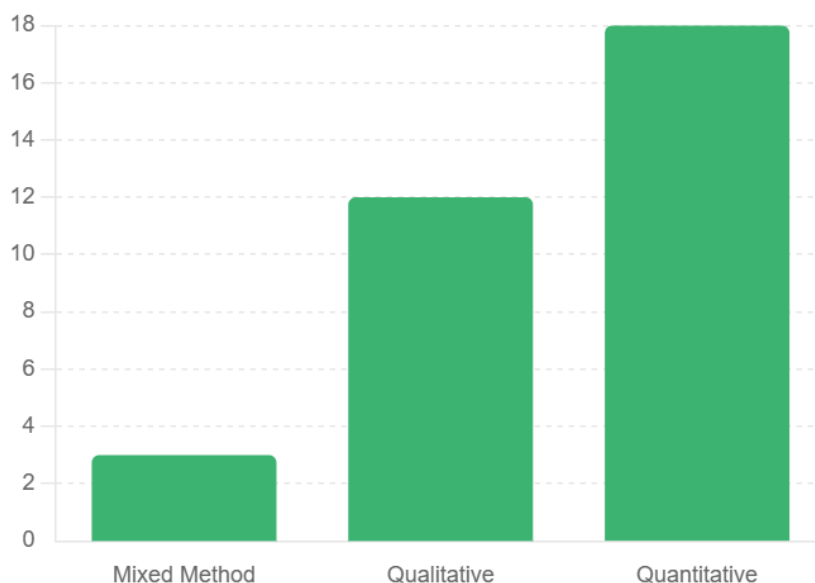
The chart highlights the most frequent keywords found in the titles and abstracts of studies on web-based learning applications for vocabulary acquisition among Indonesian EFL learners.



Key terms like students, vocabulary, learning, and English appear prominently, reflecting the primary focus of the research on enhancing language proficiency through digital tools. The frequent occurrence of applications and research indicates an ongoing investigation into the effectiveness of various platforms. This pattern underscores the importance of understanding how technology can support vocabulary acquisition and optimize learning outcomes in EFL contexts, aligning with the overarching goals of digital education in Indonesia.

d. Types of Research:

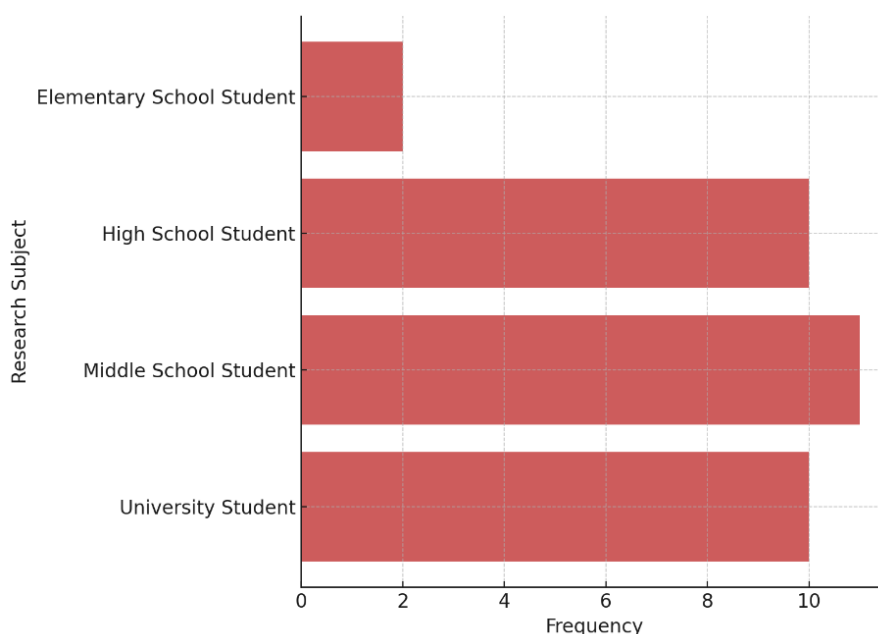
The chart presents the types of research approach employed in studies on web-based learning applications for vocabulary acquisition among Indonesian EFL learners.



The findings reveal a balanced use of qualitative, quantitative, and mixed-method approaches, with a slight preference for qualitative studies. This suggests that researchers are not only measuring learning outcomes quantitatively but are also focusing on understanding learner experiences and interactions with these applications. The use of mixed methods highlights the effort to combine the strengths of both qualitative and quantitative approaches, offering a comprehensive perspective on the effectiveness of these tools. This diversity in research methods underscores the complexity of studying vocabulary acquisition and reflects the growing interest in exploring both learner outcomes and the contextual factors that influence learning in digital environments.

e. Research Subjects:

The chart shows the research subjects employed in studies on web-based learning applications for vocabulary acquisition among Indonesian *EFL learners*.



University students are the most frequently targeted participants, indicating that higher education institutions are a primary context for exploring the effectiveness of these tools. This focus aligns with the growing need to enhance English proficiency at the tertiary level, where students are often required to engage with academic content in English. The consistent use of university students as subjects reflects the accessibility of this demographic for research and their familiarity with digital tools. However, the emphasis on this group suggests potential opportunities for future studies to explore other populations, such as

secondary school students or working professionals, to gain a more comprehensive understanding of the impact of web-based learning applications across diverse learner contexts.

Discussion

1. Trends of Web-Based Vocabulary Acquisition

The use of web-based applications for vocabulary acquisition has become increasingly prevalent worldwide, driven by rapid advancements in educational technology. Innovations such as gamification, interactivity, and personalization are reshaping how learners engage with language learning. Applications like Duolingo, Quizlet, and Memrise exemplify this trend by incorporating elements of game-based learning, providing learners with real-time feedback, and adapting content to individual progress (Shortt et al., 2023). These features not only make learning enjoyable but also enhance learner motivation and retention (Sanosi, 2018). The shift towards mobile learning and self-paced study is further accelerating the adoption of these platforms globally, making vocabulary acquisition more accessible beyond traditional classroom settings. Research suggests that learners benefit from these technological advancements through improved engagement and sustained interest in language learning (Gafni et al., 2017).

In Indonesia, educational institutions are increasingly embracing web-based learning applications to address the challenges of English language acquisition, particularly focusing on vocabulary mastery. As highlighted by the studies in this review, platforms like Duolingo and Quipper are widely used, reflecting the influence of global trends on local practices (Permatasari & Aryani, 2023). However, these tools are not merely adopted in their original forms; educators and institutions tailor them to align with the unique needs of Indonesian EFL learners. For example, teachers may integrate these applications into blended learning environments, combining online tools with classroom instruction to reinforce vocabulary practice (Endarto & Subekti, 2020). Additionally, local adaptations are evident in the emphasis on applications that provide cultural relevance and content suited to the Indonesian education system, such as spelling and game-based learning tailored to specific curricula (Susanto et al., 2022).

The studies reviewed also reveal the diversity in research methods, indicating an active exploration of how these applications impact various learner demographics, particularly university students. While university students are a major focus, there is room for further exploration of other learner groups, such as school students or working professionals, to understand the broader impact of these tools. This reflects both the challenges and opportunities in adapting global trends to local contexts, ensuring that web-based applications support effective

and inclusive learning outcomes for all Indonesian EFL learners.

2. Effectiveness in Web-Based Learning Applications

a. Impact on Vocabulary Mastery

Web-based learning applications have demonstrated significant effectiveness in enhancing vocabulary mastery among learners at various educational levels. Studies show that platforms such as Duolingo, Quizlet, and Memrise facilitate noticeable improvements in vocabulary acquisition through interactive and gamified elements. For instance, experimental research on Quizlet revealed a marked improvement in post-test vocabulary scores after one month of use, highlighting its positive impact on learners' retention and mastery (Sanosi, 2018). Similarly, research on Duolingo found that gamified learning strategies not only increase vocabulary but also enhance learner motivation and engagement through adaptive content and progress tracking (Shortt et al., 2023).

In Indonesia, the integration of web-based tools such as Quipper and Duolingo has shown promising results, particularly when combined with traditional teaching methods. The use of these applications in blended learning environments allows students to engage more actively with vocabulary exercises, which reinforces their learning beyond the classroom setting (Permatasari & Aryani, 2023). Additionally, context-specific adaptations, such as tailored vocabulary size tests for Indonesian EFL learners, further highlight the potential of these platforms in addressing the specific educational needs of local students (Endarto & Subekti, 2020).

b. Factors Contributing to Success

The success of web-based learning applications in enhancing vocabulary mastery can be attributed to several key factors. A crucial element is application design—particularly the incorporation of gamified elements such as levels, rewards, and progress tracking. These elements have been shown to enhance motivation by providing learners with engaging challenges and immediate recognition of their achievements (Gafni et al., 2017).

Another critical factor is the use of multimedia content, which enables the combination of text, visuals, and audio to support various learning styles. Applications like Memrise and Duolingo leverage multimedia to reinforce vocabulary learning through auditory and visual cues, making it easier for learners to associate words with meanings and improve recall (Pichugin et al., 2023).

Real-time feedback and motivation are also essential components that drive the effectiveness of these applications. Feedback mechanisms allow learners to correct mistakes immediately, fostering a sense of progress and reducing frustration. Applications like Quizlet and Duolingo use adaptive algorithms to adjust content based on individual learner performance, ensuring personalized learning experiences that maintain motivation and engagement (Sanosi, 2018).

These features are particularly beneficial in remote or self-paced learning environments, where teacher intervention may be limited but the need for continuous motivation remains crucial.

3. Challenges of Implementation

c. Technical and Infrastructural Barriers

One of the main challenges in implementing web-based learning applications is the technical and infrastructural limitations that exist, particularly in remote and underdeveloped areas. In Indonesia, where the quality of internet connectivity varies significantly across regions, learners in rural areas face difficulties accessing web-based platforms consistently (Pramana & Darmawan, 2021). Many students lack access to reliable internet services or appropriate digital devices, which limits their participation in web-based learning.

This digital divide presents a significant challenge to achieving equitable learning outcomes, as students in urban areas tend to have better access to technology and internet infrastructure than those in remote regions. The success of web-based applications also depends on the availability of stable power supplies and technical support, both of which are often insufficient in rural communities. As a result, efforts to promote web-based language learning may unintentionally widen educational inequalities rather than bridge them.

d. Pedagogical Challenges

From a pedagogical perspective, teacher readiness and the effective integration of web-based applications into the curriculum are significant challenges. Although technology can facilitate personalized learning and provide engaging content, many educators feel unprepared or lack the necessary skills to use these tools effectively. Studies have found that teachers may require additional training and support to incorporate web-based applications into their teaching practices (Susanto et al., 2022).

Another challenge is the integration of web-based applications within traditional curricula. Teachers often struggle to align the content and structure of these platforms with their existing lesson plans and learning objectives. Without proper alignment, the use of web-based tools can become fragmented, limiting their potential to enhance learning outcomes (Gaol et al., 2024). Furthermore, there is often a mismatch between the standardized assessments used in schools and the interactive, self-paced learning approach promoted by these applications, which can create confusion among both students and teachers.

Additionally, web-based platforms may not fully address the importance of teacher-student interaction in language learning. While these applications provide useful tools for independent learning, language acquisition often benefits from collaborative activities and direct feedback from teachers. Ensuring that web-

based applications complement rather than replace traditional pedagogical approaches is essential for achieving balanced and effective language education.

This study on web-based applications for vocabulary acquisition among Indonesian EFL learners faces several limitations. First, access to relevant data and studies may be limited, as much of the existing literature focuses on global contexts, making it challenging to draw comprehensive conclusions specific to Indonesia. The generalization of findings from other regions might not fully capture the unique challenges faced by Indonesian learners, such as infrastructure limitations and varying levels of internet access. Second, the evolving nature of technology presents another limitation.

As digital platforms rapidly evolve, the tools and applications analyzed in this study may become outdated, potentially limiting the relevance of findings for future educational practices. Additionally, context-specific adaptations of web-based applications, such as their integration into Indonesian curricula, require ongoing exploration to ensure alignment with future educational needs and technological advancements.

Conclusion

This systematic review reveals that web-based applications, such as Duolingo, Quipper, and Memrise, play a crucial role in enhancing vocabulary acquisition among Indonesian EFL learners over past five years (2019-2024). The findings reflect a balanced use of qualitative, quantitative, and mixed-method approaches, indicating that research in this field has aimed to explore not only measurable outcomes but also learner experiences and engagement. However, challenges remain, including technological disparities that hinder access to these platforms in remote areas, the limited availability of longitudinal studies on vocabulary retention, and a need for research targeting a wider range of learner populations, such as secondary school students and professionals. Future studies should address these gaps by conducting long-term evaluations, expanding research to include diverse learner groups, and exploring how local infrastructure and pedagogical practices impact the effectiveness of web-based learning applications. Furthermore, the development of localized web-based tools tailored to Indonesia's unique educational context will be essential to ensuring that digital learning solutions are both inclusive and impactful.

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