



EFL vocabulary development through story-based activities using liveworksheets: A pre-experimental study in an Indonesian junior secondary school

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ABSTRACT

Vocabulary mastery is essential for EFL learners' ability to understand and use English effectively. This study investigated changes in students' vocabulary performance following the implementation of story-based learning activities through Liveworksheets at SMPN 7 Palopo. A quantitative pre-experimental design using a one-group pre-test-post-test approach was employed. The participants were 23 ninth-grade students selected purposively from class IX.B. Data were collected using a 20-item vocabulary test focusing on nouns, verbs, and adjectives related to animal topics. The intervention was conducted over four instructional sessions using story-based materials and interactive Liveworksheets activities. The data were analyzed using descriptive statistics and a paired-samples t-test with a significance level of .05. The results showed that the students' mean vocabulary score increased from 38.91 in the pre-test to 73.04 in the post-test, representing a 34.13-point increase. The proportion of students in the good and excellent categories also increased from 17.39% to 86.95%. The paired-samples t-test revealed a statistically significant difference between the pre-test and post-test scores, $t(22) = -17.201$, $p < .001$. These findings indicate substantial improvement in students' vocabulary performance following the intervention. However, because the study employed a one-group design without a control group, the improvement cannot be attributed exclusively to Liveworksheets. The study suggests that Liveworksheets-based, story-contextualized activities have potential as a supplementary approach to vocabulary instruction in junior secondary EFL classrooms.

1. INTRODUCTION

Vocabulary knowledge is a fundamental component of second or foreign language learning because it supports learners' ability to understand and produce meaningful language. Vocabulary knowledge involves more than knowing the meanings of individual words; it also includes knowledge of how words are used and understood in different contexts. Nation (2022) emphasizes that vocabulary learning is closely connected to learners' development of language knowledge and their ability to comprehend and



communicate in another language. Similarly, Schmitt (2019) highlights vocabulary as an essential dimension of second language development and argues that effective vocabulary instruction should consider how words are learned, practiced, and assessed. For EFL learners, limited vocabulary can therefore become a major constraint on their ability to participate successfully in reading, listening, speaking, and writing activities. In the Indonesian EFL context, vocabulary development is consequently an important component of English instruction, particularly at the junior secondary level, where learners are expected to develop sufficient lexical resources to engage with increasingly complex English texts and classroom tasks.

Despite its importance, vocabulary learning can be challenging for EFL learners because vocabulary development requires repeated exposure, meaningful practice, and opportunities to encounter words in different contexts. Vocabulary learning is not necessarily achieved through the memorization of isolated word lists. Research has increasingly emphasized the contribution of contextualized input and incidental learning to vocabulary development. Webb et al. (2023), in a meta-analysis of second language incidental vocabulary learning, demonstrated that learners can acquire vocabulary through exposure to meaningful language input, although the extent of learning may vary according to the conditions under which words are encountered. Story-based and contextualized instruction can provide learners with opportunities to encounter target vocabulary as part of meaningful discourse rather than as isolated linguistic items. Thi Lan Anh et al. (2021), for example, investigated story-based teaching for EFL vocabulary retention and demonstrated the relevance of narrative contexts for vocabulary learning. Such approaches can make vocabulary learning more meaningful by connecting unfamiliar words with coherent textual information and repeated encounters.

The development of digital technology has created additional opportunities for supporting vocabulary learning. Technology-assisted vocabulary learning has received considerable attention because digital environments can provide learners with repeated exposure, interactive activities, multimodal input, and immediate feedback. A meta-analysis by Hao et al. (2021) found a positive overall effect of technology-assisted vocabulary learning for EFL learners, indicating the potential of digital technologies to facilitate vocabulary development. Similarly, Yu and Trainin (2022) reported a positive overall effect of technology-assisted L2 vocabulary learning across a range of technological applications and instructional conditions. Haidari et al. (2020) also found a positive effect of digital technology-mediated foreign language instruction on vocabulary learning. These findings suggest that technology can provide valuable support for vocabulary development, although its effectiveness depends not simply on the presence of technology but also on how technological affordances are incorporated into instructional activities.

One technological platform that can be used to provide interactive vocabulary practice is Liveworksheets. The platform enables teachers to transform conventional worksheets into interactive digital activities and allows learners to complete different types of tasks through a digital environment. Such features are potentially relevant to vocabulary instruction because vocabulary learning benefits from opportunities for repeated practice, active retrieval, and feedback. Research on digital vocabulary learning has shown that feedback can contribute substantially to vocabulary development. Li (2023), for instance, found a significant positive effect of computer-mediated feedback on L2 vocabulary learning. Research on vocabulary-learning applications has likewise



emphasized the importance of instructional features and learning affordances when evaluating digital tools for vocabulary development (Lin et al., 2023). In the specific context of Liveworksheets, Khalid and Abdul Aziz (2022) reported improvements in vocabulary learning among upper-primary ESL learners, while Wati et al. (2023) found that the use of Liveworksheet supported students' vocabulary mastery. More recent research has also examined Liveworksheets in relation to vocabulary mastery and learners' perceptions of the platform (Aditya, 2025; Dewi, 2025). Collectively, these studies indicate that Liveworksheets has potential as a digital medium for providing interactive vocabulary learning activities.

However, the effectiveness of a digital platform should also be considered in relation to the pedagogical design of the learning activities provided through it. Technology alone does not guarantee meaningful vocabulary learning. The learning tasks, input, opportunities for practice, and contexts in which digital activities are implemented remain important considerations. Research on technology-supported language learning has demonstrated that different technological environments can support language development when they are integrated with appropriate pedagogical approaches (Fang et al., 2021; Tai et al., 2022). Similarly, digital reading can provide opportunities for vocabulary learning by exposing learners to target words within meaningful textual contexts. Zhu et al. (2024), through a meta-analysis of second and foreign language vocabulary learning through digital reading, found evidence that digital reading can facilitate vocabulary development. These findings suggest that interactive digital activities may be particularly useful when they are combined with meaningful language input rather than being limited to decontextualized vocabulary exercises.

In the context of SMPN 7 Palopo, preliminary classroom observations indicated that ninth-grade students experienced difficulties with basic English vocabulary. These difficulties were reflected in students' limited vocabulary knowledge and their challenges in participating actively in English learning activities. The existing learning process also provided relatively limited opportunities for students to engage with interactive digital learning media. These conditions indicate the need for learning activities that can provide students with accessible opportunities to encounter, practice, and reinforce vocabulary in a more engaging context. Accordingly, this study employs Liveworksheets as an interactive learning medium and incorporates story-based materials focusing on nouns, verbs, and adjectives. The combination is intended to provide repeated encounters with target vocabulary within meaningful texts while allowing students to practice vocabulary through interactive digital exercises.

Although previous studies have demonstrated the potential of technology-assisted vocabulary learning and have reported positive outcomes from the use of Liveworksheets, several aspects remain worthy of further investigation. Existing studies have examined Liveworksheets for vocabulary learning in different educational settings (Aditya, 2025; Khalid & Abdul Aziz, 2022; Wati et al., 2023), while research on story-based instruction has examined the contribution of narrative contexts to vocabulary learning (Thi Lan Anh et al., 2021). However, further evidence is needed concerning the implementation of Liveworksheets-based, story-contextualized vocabulary activities among junior secondary EFL learners in the Indonesian context. The present study therefore extends previous research by examining vocabulary development through interactive Liveworksheets activities organized around story-based materials and targeting nouns, verbs, and adjectives.



Based on this rationale, the present study investigates the use of Liveworksheets to develop students' vocabulary mastery at SMPN 7 Palopo. Specifically, it examines changes in students' vocabulary performance before and after the instructional intervention. The study addresses the following research question: Does the use of Liveworksheets improve students' vocabulary mastery at SMPN 7 Palopo? The findings are expected to contribute empirical evidence concerning the use of interactive digital worksheets for contextualized vocabulary learning in an Indonesian EFL classroom and to provide practical implications for teachers seeking to integrate digital learning media into vocabulary instruction.

2. METHODS

2.1. Research Design

This study employed a quantitative pre-experimental design using a one-group pre-test-post-test design to examine changes in students' vocabulary mastery following the implementation of Liveworksheet-based learning activities. The design consisted of a pre-test administered before the intervention, four treatment sessions using Liveworksheet, and a post-test administered after the intervention.

The one-group pre-test-post-test design was selected because the study was conducted with an intact class and the inclusion of a control group was not feasible due to institutional and practical constraints. The design enabled the researcher to compare students' vocabulary performance before and after the intervention within the same group. However, because the study did not include a control group, the observed changes cannot be attributed exclusively to the intervention with the same level of causal confidence as a controlled experimental design.

2.2. Research Setting and Participants

The study was conducted at SMPN 7 Palopo, located on Andi Pangeran Street No. 6, Luminda, Palopo City, South Sulawesi, Indonesia. The study was conducted from November to December 2024, following the school's academic calendar and English class schedule.

The population consisted of all ninth-grade students at SMPN 7 Palopo, comprising three classes (IX.A, IX.B, and IX.C) with a total of 60 students. The participants were selected using purposive sampling. One intact class, IX.B, consisting of 23 students, was selected based on the English teacher's recommendation and preliminary classroom observations indicating that the students had relatively low vocabulary proficiency. The selected class was therefore considered appropriate for examining changes in vocabulary performance following the intervention.

2.3. Research Instrument

The primary instrument was a vocabulary test designed to measure students' vocabulary mastery before and after the intervention. The test focused on three parts of speech: nouns, verbs, and adjectives. The vocabulary items were related to animal topics, including bekantan, orangutan, gorilla, and cendrawasih.

The test consisted of 20 items and was administered in two stages. The pre-test was administered before the intervention to establish the students' baseline vocabulary performance, while the post-test was administered after the four treatment sessions to measure their vocabulary performance following the intervention. The test materials addressed the same general animal-related topics covered during the intervention.



For scoring purposes, each correct answer was converted into a score on a 0–100 scale. The students' performance was subsequently classified into four categories according to the number of correct responses: excellent (16–20 correct answers; 80–100), good (11–15 correct answers; 55–75), average (6–10 correct answers; 30–50), and poor (0–5 correct answers; 0–25).

2.4. Data Collection

Data collection was conducted in three stages: pre-test, treatment, and post-test. Firstly, the pre-test was administered during the first meeting to assess the students' initial vocabulary mastery. The test consisted of 20 items related to animal topics, including bekantan, orangutan, gorilla, and cendrawasih. Before the test began, the researcher explained the instructions to the students and collected their responses after completion.

Secondly, the treatment was conducted over four instructional meetings. Each meeting focused on the same three target word classes—nouns, verbs, and adjectives—while using different reading texts and varied Liveworksheet exercises appropriate to the content of each session. The learning activities incorporated story-based materials related to Indonesian animals and provided students with opportunities to encounter and practice the target vocabulary through interactive digital exercises.

Lastly, the post-test was administered after the completion of the four treatment meetings to measure changes in students' vocabulary mastery. The post-test consisted of 20 items covering the same general animal-related topics addressed during the intervention. The students' post-test scores were then compared with their pre-test scores to determine changes in vocabulary performance.

Thus, the overall sequence of the intervention was:

Pre-test → Four treatment meetings using Liveworksheets → Post-test

2.5. Data Analysis

The data were analyzed quantitatively using SPSS version 29. Descriptive statistics were used to summarize students' vocabulary performance, including the mean and standard deviation for the pre-test and post-test scores, as well as the frequency and percentage of students in each performance category.

A paired-samples t-test was conducted to examine whether there was a statistically significant difference between students' pre-test and post-test scores. This test was appropriate because the two sets of scores were obtained from the same 23 participants before and after the intervention. The statistical analysis was conducted at the 0.05 significance level. The degrees of freedom were calculated as $N - 1$, resulting in 22 degrees of freedom.

The null hypothesis (H_0) stated that there was no statistically significant difference between students' vocabulary scores before and after the intervention, whereas the alternative hypothesis (H_1) stated that a statistically significant difference existed between the two sets of scores. The null hypothesis was rejected when the two-tailed p-value was lower than 0.05.



3. RESULTS

3.1. Students' Vocabulary Performance before the Intervention

The students' vocabulary performance before the intervention was assessed through a 20-item vocabulary pre-test. The test focused on nouns, verbs, and adjectives related to the animal topics addressed in the study. The descriptive results showed that the students' vocabulary performance was generally limited before the implementation of the Liveworksheet-based activities.

Table 1. Students' Vocabulary Performance in the Pre-Test

Score Range	Category	Frequency	Percentage
80-100	Excellent	0	0%
55-75	Good	4	17.39%
30-50	Average	14	60.87%
0-25	Poor	5	21.74%
Total		23	100%

As shown in Table 1, most students were classified in the average category, with 14 students (60.87%) obtaining scores between 30 and 50. Five students (21.74%) were classified as poor, while only four students (17.39%) reached the good category. None of the students achieved an excellent score. These results indicate that the participants generally had limited vocabulary mastery before the intervention.

3.2. Students' Vocabulary Performance after the Intervention

Following the four treatment sessions using story-based materials and interactive Liveworksheet activities, the students completed the post-test. The post-test results showed a different distribution of vocabulary performance compared with the pre-test.

Table 2. Students' Vocabulary Performance in the Post-Test

Score Range	Category	Frequency	Percentage
80-100	Excellent	8	34.78%
55-75	Good	12	52.17%
30-50	Average	3	13.04%
0-25	Poor	0	0%
Total		23	100%

Table 2 shows that 12 students (52.17%) achieved scores in the good category, while eight students (34.78%) reached the excellent category. Only three students (13.04%) remained in the average category, and none were classified as poor. Compared with the pre-test distribution, the results indicate a substantial shift toward higher vocabulary performance following the intervention.

3.3. Descriptive Statistics of Pre-Test and Post-Test Scores

The differences between students' pre-test and post-test performance were further examined using descriptive statistics.



Table 3. Descriptive Statistics of Students' Vocabulary Scores

Test	N	Mean
Pre-test	23	38.91
Post-test	23	73.04
Test	N	Mean

As presented in Table 3, the mean vocabulary score increased from 38.91 in the pre-test to 73.04 in the post-test. The mean difference was therefore 34.13 points. The standard deviation was 11.883 for the pre-test and 12.045 for the post-test, indicating a relatively similar degree of score variation across the two assessments.

The descriptive results demonstrate a substantial improvement in the students' mean vocabulary performance after the intervention. However, because descriptive statistics alone cannot determine whether the observed difference was statistically significant, a paired-samples *t*-test was subsequently conducted.

3.4. Hypothesis Testing

A paired-samples *t*-test was used to determine whether the difference between the students' pre-test and post-test scores was statistically significant.

Table 4. Paired-Samples *t*-Test of Pre-Test and Post-Test Scores

Comparison	Mean Difference	SD	SE	95% CI of the Difference	<i>t</i>	df	<i>p</i>
Pre-test – Post-test	-34.130	9.515	1.984	-38.245 to -30.015	-17.201	22	< .001

The paired-samples *t*-test revealed a statistically significant difference between the pre-test and post-test scores, $t(22) = -17.201$, $p < .001$. The mean difference was -34.130 because the difference was calculated as pre-test minus post-test. In substantive terms, students' mean score increased by 34.13 points, from 38.91 to 73.04.

Since the *p*-value was below the predetermined significance level of .05, the null hypothesis was rejected. The findings therefore indicate that students' vocabulary performance was significantly higher after participating in the Liveworksheet-based instructional intervention.

Importantly, the result should be interpreted as evidence of a statistically significant pre-test–post-test improvement, rather than definitive proof that Liveworksheet alone caused the improvement, because the study employed a one-group pre-test–post-test design without a control group.

3.5. Summary of Findings

Overall, the results demonstrate a clear improvement in students' vocabulary performance following the four instructional sessions. The proportion of students in the excellent and good categories increased from 17.39% before the intervention to 86.95% after the intervention, while the proportion classified as average or poor decreased from 82.61% to 13.04%. The mean score also increased by 34.13 points, from 38.91 to 73.04. The paired-samples *t*-test confirmed that this pre-test–post-test difference was statistically significant, $t(22) = -17.201$, $p < .001$.

These findings provide empirical evidence of substantial improvement in the participants' vocabulary performance after the implementation of the Liveworksheet-



based learning activities. The interpretation and implications of these findings are discussed in the following section.

4. DISCUSSION

The present study examined changes in students' vocabulary mastery following the implementation of story-based learning activities through Liveworksheets. The findings showed a substantial improvement in students' vocabulary performance. The mean score increased from 38.91 in the pre-test to 73.04 in the post-test, representing a 34.13-point increase. The distribution of students' performance also shifted considerably: before the intervention, 17.39% of students were in the good category and none were in the excellent category, whereas after the intervention, 52.17% were categorized as good and 34.78% as excellent. In addition, the proportion of students in the average and poor categories decreased from 82.61% to 13.04%. The paired-samples *t*-test indicated that the difference between the pre-test and post-test scores was statistically significant, $t(22) = -17.201$, $p < .001$. These findings suggest that students demonstrated substantially higher vocabulary performance after participating in the intervention.

The improvement is consistent with the broader literature showing that technology-assisted vocabulary learning can support vocabulary development. Hao et al. (2021), through a meta-analysis of technology-assisted vocabulary learning for EFL learners, reported a positive overall effect of technology-supported vocabulary instruction. Similarly, Yu and Trainin (2022) found a positive overall effect of technology-assisted L2 vocabulary learning across different technological environments and instructional conditions. Haidari et al. (2020) also reported positive effects of digital technology-mediated foreign language instruction on vocabulary learning. The present findings therefore correspond with the broader evidence that digital technology can provide useful conditions for vocabulary development. However, the findings should be understood in relation to the particular instructional implementation in this study rather than interpreted as evidence that technology itself automatically produces vocabulary gains.

One possible explanation for the observed improvement is the opportunity for students to engage in repeated and interactive vocabulary practice. The Liveworksheets activities provided students with opportunities to work directly with target vocabulary through digital exercises rather than relying exclusively on conventional worksheet-based activities. This feature is relevant to vocabulary learning because developing vocabulary requires opportunities to encounter, process, and retrieve lexical items. Nation (2022) emphasizes the importance of repeated encounters and meaningful learning opportunities in vocabulary development, while Schmitt (2019) argues that vocabulary instruction should provide appropriate opportunities for learning, practicing, and developing lexical knowledge. The improvement observed in the present study may therefore be related to the repeated engagement with nouns, verbs, and adjectives during the four instructional sessions.

The findings are also consistent with research specifically examining Liveworksheets as a vocabulary-learning medium. Khalid and Abdul Aziz (2022) reported that interactive Liveworksheets could support vocabulary learning among upper-primary ESL learners. Wati et al. (2023) likewise found that the use of Liveworksheet activities was associated with improved vocabulary mastery. More recent studies have continued to examine Liveworksheets as a medium for vocabulary instruction and have reported



positive learning outcomes or favorable learner perceptions (Aditya, 2025; Dewi, 2025). The present study adds to this emerging body of evidence by examining the use of Liveworksheets with ninth-grade Indonesian EFL learners and by integrating the platform with story-based materials. Thus, the contribution of the present study lies not simply in confirming that digital worksheets can be used for vocabulary practice, but in providing additional evidence concerning their implementation in a junior secondary EFL classroom.

Another important consideration is the role of contextualized vocabulary learning in the intervention. The target vocabulary was presented through story-based materials concerning Indonesian animals rather than being introduced exclusively as isolated lexical items. This approach may have helped students associate unfamiliar words with meaningful textual contexts. Vocabulary learning can benefit from contextualized exposure because learners encounter words in relation to surrounding linguistic information rather than having to process them as disconnected items. Webb et al. (2023), in their meta-analysis of incidental second language vocabulary learning, demonstrated that exposure to meaningful language input can contribute to vocabulary development. Similarly, Zhu et al. (2024) found evidence supporting vocabulary learning through digital reading. These findings provide a useful theoretical basis for understanding why combining digital activities with contextualized texts may be beneficial.

The story-based component may also have contributed to students' engagement with the target vocabulary. A story provides a coherent sequence of events and relationships among people, objects, and actions, which can make lexical items more meaningful than when they are presented independently. Thi Lan Anh et al. (2021) found that story-based teaching could support vocabulary retention among EFL learners. In the present study, the stories focused on Indonesian animals, including *bekantan*, *orangutan*, *gorilla*, and *cendrawasih*. Such content may have provided a familiar or meaningful thematic context in which students could encounter the target vocabulary. Nevertheless, the present study did not separately measure the contribution of the story-based component. Therefore, it is not possible to determine whether the vocabulary gains resulted primarily from the digital platform, the contextualized stories, the combination of both, or other aspects of the instruction.

The role of feedback is another possible explanation for the observed improvement. Interactive digital learning environments can provide learners with opportunities to receive information about their responses and revise their understanding. Li (2023) found positive effects of computer-mediated feedback on L2 vocabulary learning, suggesting that feedback delivered through digital environments can contribute to vocabulary development. In the present study, the interactive nature of Liveworksheets potentially enabled students to receive more immediate responses to their task performance than would be available through conventional paper-based exercises. Such feedback may have helped students recognize incorrect responses and reinforce correct vocabulary knowledge. However, because the present study did not separately measure students' use of feedback or compare different feedback conditions, this interpretation should be regarded as a plausible explanation rather than a directly tested mechanism.

The findings also have implications for the design of technology-mediated vocabulary instruction. Previous research suggests that the pedagogical value of technology depends on how digital tools are integrated into learning activities rather than on the technology alone. Lin et al. (2023), for example, emphasized the importance of



evaluating vocabulary-learning applications according to their learning and instructional affordances. Fang et al. (2021) similarly demonstrated that technology-supported language learning can produce meaningful learning outcomes when technological resources are incorporated into appropriate pedagogical tasks. From this perspective, the positive results observed in the present study may be associated with the combination of three elements: contextualized vocabulary input, interactive digital practice, and repeated engagement with target lexical items. Liveworksheets functioned as the delivery and practice medium, while the instructional content and task design provided the pedagogical structure.

The findings nevertheless need to be interpreted cautiously because of the study design. The one-group pre-test–post-test design demonstrated a statistically significant difference between students' scores before and after the intervention, but it did not include a comparison group. Consequently, alternative explanations for the observed improvement cannot be completely ruled out. Students may have benefited from repeated exposure to the target vocabulary, familiarity with the test format, classroom instruction more generally, or other factors occurring during the study period. Therefore, although the results indicate substantial improvement following the intervention, they should not be interpreted as definitive evidence that Liveworksheets alone caused the improvement. This limitation is particularly important when comparing the present findings with studies using stronger experimental or quasi-experimental designs.

The study also has implications for English teachers in junior secondary contexts. The results suggest that interactive digital worksheets can be incorporated into vocabulary instruction to provide additional opportunities for students to practice target words. Rather than replacing teacher-guided instruction, Liveworksheets can be used as a supplementary medium through which teachers organize contextualized vocabulary tasks and provide students with opportunities for active practice. The use of story-based materials may also help teachers move beyond isolated vocabulary memorization by presenting lexical items within meaningful contexts. Nevertheless, teachers should select digital activities according to learning objectives and ensure that technological features serve the pedagogical purpose of vocabulary development.

Overall, the findings support the view that Liveworksheets can be a useful medium for contextualized vocabulary learning among junior secondary EFL learners. The substantial increase in mean scores and the statistically significant pre-test–post-test difference are consistent with previous evidence on technology-assisted vocabulary learning (Haidari et al., 2020; Hao et al., 2021; Yu & Trainin, 2022) and with emerging research on Liveworksheets specifically (Khalid & Abdul Aziz, 2022; Wati et al., 2023). At the same time, the present study extends this evidence by integrating Liveworksheets with story-based vocabulary activities focused on nouns, verbs, and adjectives in an Indonesian junior secondary classroom. The findings therefore suggest the potential value of combining interactive digital practice with meaningful contextualized input. Future research should employ a control or comparison group, larger samples, and longer intervention periods to examine whether the observed gains can be replicated and to determine more precisely which components of the intervention contribute most strongly to vocabulary development.



5. CONCLUSION

This study examined the use of Liveworksheets-based learning activities to support students' vocabulary mastery at SMPN 7 Palopo. The findings demonstrated a substantial improvement in students' vocabulary performance following the four instructional sessions. The mean score increased from 38.91 in the pre-test to 73.04 in the post-test, representing a 34.13-point increase. The distribution of students' performance also shifted toward higher achievement levels, with the proportion of students in the good and excellent categories increasing from 17.39% to 86.95%. The paired-samples *t*-test further indicated that the difference between the pre-test and post-test scores was statistically significant, $t(22) = -17.201, p < .001$.

These findings suggest that the implementation of interactive Liveworksheets activities, particularly when combined with story-based and contextualized vocabulary materials, was associated with improved vocabulary performance among the participating students. The results also indicate the potential of interactive digital worksheets to provide students with additional opportunities to encounter, practice, and reinforce vocabulary in an engaging learning environment. From a pedagogical perspective, Liveworksheets may therefore serve as a useful supplementary medium for vocabulary instruction in junior secondary EFL classrooms.

However, the findings should be interpreted within the limitations of the research design. Because the study employed a one-group pre-test-post-test design without a control group, the observed improvement cannot be attributed exclusively to Liveworksheets. Other factors, including repeated exposure to the target vocabulary, classroom instruction, and familiarity with the assessment, may also have contributed to the improvement. Therefore, the findings provide evidence of significant vocabulary development following the intervention but do not establish a definitive causal relationship.

Future studies should employ larger samples, comparison or control groups, and longer intervention periods to provide stronger evidence concerning the effectiveness of Liveworksheets for vocabulary learning. Further research could also examine how specific features of interactive digital worksheets, contextualized stories, and feedback contribute to vocabulary development. Despite these limitations, the present study provides empirical evidence that Liveworksheets-based, story-contextualized activities have potential as a practical supplementary approach to supporting vocabulary learning among Indonesian junior secondary EFL learners.

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