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Development of Edukids: A Digital Learning Media to Enhance Indonesian Vocabulary Mastery in Primary Students

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Abstract: This research aimed to develop and assess the effectiveness of Edukids, a digital-based learning media designed to improve Indonesian vocabulary mastery among second-grade elementary school students in Enrekang Regency. Despite previous efforts to enhance vocabulary mastery using traditional media, students continued to face challenges in vocabulary acquisition. This study employed a Research and Development (R&D) approach using the ADDIE model. The development process consisted of five stages: analysis, design, development, implementation, and evaluation. The trials included three stages: a small group trial with 10 students, a field trial with 66 students, and an experimental group (n=33) compared with a control group (n=33). Data were collected through pre-tests and post-tests, observation, interviews, and questionnaires. The N-gain was calculated to assess vocabulary improvement. The effectiveness of Edukids was tested using pre-test and post-test scores, with the experimental group showing a significant increase in vocabulary mastery. The experimental group's mean score improved from 68.32 (SD = 5.21) in the pre-test to 83.30 (SD = 6.10) in the post-test, with an N-gain of 0.58, indicating moderate improvement. Statistical analysis revealed significant differences between the experimental and control groups ($p \leq 0.05$), suggesting that Edukids was effective in enhancing vocabulary mastery. The Edukids learning media was found to be valid, practical, and effective in improving vocabulary mastery among second-grade students. The results suggest that this digital-based learning media can be a valuable tool for vocabulary instruction in elementary education.

Keywords: *Edukids learning media, digital learning media, Indonesian vocabulary, vocabulary mastery, primary education*

I. Introduction

Language skills play an important role in shaping students' social interaction, cognitive development, and emotional maturity. Mastery of language is a key factor for success in understanding various fields of knowledge. As a structured communication system, language consists of elements such as sentences, words, clauses, and phrases expressed orally or in writing. In the educational context, the use of the Indonesian language is formally regulated through Government Regulation of the Republic of Indonesia Number 63 of 2019, which emphasizes the importance of accurate and effective language use. In elementary schools, the Indonesian language subject serves as the foundation for developing literacy and numeracy skills, covering four main competencies: writing, listening, reading, and speaking. These competencies collectively build comprehensive language proficiency (Deda et al., 2023).

One key factor influencing language proficiency is vocabulary mastery. The broader a learner's vocabulary, the more effectively they can communicate and express ideas in both oral and written forms (Normurodovna, 2025). In the elementary school curriculum, vocabulary is considered an essential part of language development that must be cultivated early on (Chiriac, 2025)(Mastur et al., 2025). However, observations in Enrekang Regency show that many second-grade students face difficulties in acquiring new vocabulary and categorizing it appropriately. This gap between learning objectives and students' actual vocabulary mastery suggests a need for more effective media tools to support language learning.

Preliminary research conducted in Enrekang Regency, particularly at SDN 45 Talaga and SDN 137 Bamba, revealed that a significant proportion of students struggle with vocabulary acquisition. In a sample of 39 second-grade students, 73% were classified as having low vocabulary mastery, knowing fewer than 503 words based on a vocabulary test adapted from (Molita, 2017). This test measured students' receptive and productive vocabulary, assessing their ability to recognize and use words in context. Contributing factors to this low mastery include the dominance of local languages in daily communication, limited use of effective learning media, and students' lack of motivation to engage with vocabulary learning (Gunawan et al., 2023, 2025; Telaumbanua et al., 2024; Zafrullah et al., 2023).

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Various studies have shown the effectiveness of learning media in improving vocabulary mastery. Akmaliyah et al. (2021) demonstrated that a snakes-and-ladders game was effective in enriching Arabic vocabulary, while Brilianti & Sugirin (2024) found that contemporary puppet media improved Indonesian vocabulary learning. Yani (2022) reported the benefits of using flash cards for English vocabulary learning, and Nur Afidah et al. (2024a) emphasized the importance of instructional media in achieving learning success. In addition, technology-based media such as the Wordwall anagram game and digital dictionaries have been proven to enhance students' Indonesian vocabulary mastery(Nur Afidah et al., 2024a). However, the use of digital-based Edukids media specifically designed for second grade Indonesian language learning remains limited, particularly through a Research and Development (R&D) approach using the ADDIE model.

Based on these issues and research gaps, this study aims to develop digital-based Edukids learning media to improve the Indonesian vocabulary mastery of second grade elementary school students in Enrekang Regency. This research also aims to examine the feasibility, practicality, and effectiveness of the developed media. Theoretically, the study contributes to the development of digital learning media in language education. Practically, the results are expected to provide an alternative learning medium that is interactive, engaging, and accessible for both teachers and students, whether in school or at home.

II. Method

This study used a Research and Development (R&D) approach based on the ADDIE model, which includes five stages: analysis, design, development, implementation, and evaluation. The ADDIE model was deliberately selected because it provides a systematic and iterative framework for developing instructional media that are aligned with learners' needs, pedagogical principles, and classroom contexts. The analysis stage focused on identifying instructional challenges and limitations in existing vocabulary learning practices at the elementary school level. The design and development stages enabled the integration of instructional design principles and digital technology to create interactive learning media aimed at improving vocabulary acquisition. Furthermore, the implementation and evaluation stages allowed the developed product to be tested in real classroom settings and refined based on empirical feedback, ensuring its practicality, effectiveness, and suitability for second-grade students.

Despite previous attempts to improve vocabulary acquisition through traditional media in Indonesian elementary schools, there remains a significant gap in the availability of effective digital tools specifically designed for vocabulary development. Recent studies have indicated that traditional methods, such as flashcards and puppet media, while effective, often fail to sustain student engagement over time. Studies by Nur Afidah et al. (2024b) on flashcards for English vocabulary, and by Khasanah & Burhan (2022) on puppet media for Indonesian vocabulary, highlighted the limitations of these media, particularly in fostering long-term engagement. Furthermore, recent technological advancements, such as the Wordwall anagram game (Aridasarie & Rohmah, 2024), show promise in enhancing vocabulary mastery, but a gap remains for comprehensive, interactive digital media designed specifically for second-grade students' vocabulary learning.

In the preliminary study conducted at SDN 45 Talaga and SDN 137 Bamba in Enrekang Regency, 39 second-grade students were assessed using a modified version of Molita (2017) vocabulary test, which measured both receptive and productive vocabulary. The test was administered in April 2024, and the instrument was validated by local language experts. Results revealed that 73% of students demonstrated low vocabulary mastery, knowing fewer than 503 words, a threshold based on Molita's classification for second-grade students. The vocabulary test was adapted to assess students' ability to recognize and use words in context, including tasks such as word-image matching, object identification, and sentence formation.

The development process included a small group trial with 10 students from SDN 45 Talaga, followed by a field trial involving 66 students from four schools in Enrekang Regency. These participants were divided into an experimental group (n=33) using Edukids and a control group (n=33) using traditional PowerPoint-based materials. Data collection methods included pre-tests and post-tests on vocabulary mastery, teacher and student questionnaires, and observations of student engagement.

In this study, participants were selected from four elementary schools in Enrekang Regency, namely SDN 45 Talaga, SDN 93 Parandean, SDN 27 Penja, and SDN 137 Bamba. The selection of these schools was based on several criteria: accessibility, willingness to participate, and the presence of second-grade classrooms. These criteria ensured that the sample was representative of the local educational context and that all participating schools had students at the appropriate grade level for the study.

The total sample consisted of 66 students, divided equally into an experimental group (n=33) and a control group (n=33). The assignment of students to either the experimental or control group was based on a random sampling method within each school. This random assignment helped minimize selection bias and ensured that both groups were comparable at the outset of the study.

1. Experimental Group: The experimental group (n=33) used the Edukids digital learning media during the intervention.
2. Control Group: The control group (n=33) used traditional PowerPoint-based learning materials that were similar in content but lacked the interactivity of the Edukids media.

Each school contributed one or two classes to either the experimental or control group, depending on the school's class size and the availability of classes. In the case where a school had more than one second-grade class, random assignment was applied to allocate each class to either the experimental or control group.

Table 1. Number of Research Subjects

No	School Name	Number of Students	Control Class	Experimental Class
1	SDN 45 Talaga	18	-	18
2	SDN 93 Parandean	15	-	15
3	SDN 27 Penja	20	20	-
4	SDN 137 Bamba	13	13	-
	Total	66	33	33

Data collection employed four techniques, which included observation, interviews, questionnaires, and vocabulary tests. Observations recorded student participation and engagement when using Edukids. Interviews with teachers and students explored learning needs and media preferences. Questionnaires for media and content experts assessed design quality, technical aspects, and content relevance. Student and teacher questionnaires evaluated clarity, attractiveness, and usability. Vocabulary mastery tests were conducted before and after the intervention. These tests consisted of matching words with images, pairing text with images, naming objects, and making sentences using the target vocabulary.

The study applied a quasi-experimental non-equivalent control group design. Pre-tests measured initial vocabulary mastery, and post-tests measured improvement after using Edukids. Data analysis covered three main aspects: feasibility, practicality, and effectiveness. Feasibility was assessed from expert validation percentages, practicality from student and teacher response scores, and effectiveness from statistical analysis. Before hypothesis testing, normality was checked using the Kolmogorov–Smirnov test, and homogeneity was tested with Levene's test. Hypothesis testing used an independent t-test in SPSS 29.0 for Windows. A significance value of ≤ 0.05 indicated that Edukids had a statistically significant effect compared to the control group.

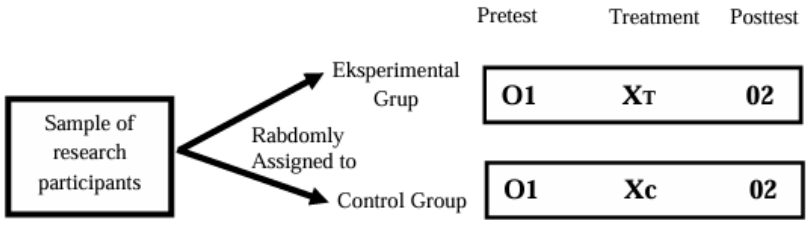

Figure 1 Trial Design

The following table summarizes the design and methodology used in this study, including the participants, instruments, procedures, data analysis techniques, and ethical considerations. This approach ensures a rigorous evaluation of the effectiveness of Edukids in enhancing vocabulary mastery among second-grade students.

Table 2. Summary of Research Design and Methodology

Component	Description
Participants	Sample: 66 second-grade students (n=33 experimental, n=33 control)
	Criteria: Ages 7-8, enrolled in selected schools.
	Sampling: Random sampling within schools
Instruments	Vocabulary Mastery Test: Modified Molita's test (e.g., word-image matching, sentence formation)
	Questionnaires: For teachers and students (assessing feasibility, engagement)
	Observation Checklist: Tracking participation and engagement
Procedure	Pre-test: Vocabulary mastery test before the intervention
	Intervention: 4 weeks, 2 sessions/week (Edukids for experimental, PowerPoint for control)
	Post-test: Vocabulary test after the intervention
	Observations: Tracking engagement and participation during the sessions
Data Analysis	N-gain Formula: N-gain = $\frac{\text{Post-test score} - \text{Pre-test score}}{\text{Maximum score} - \text{Pre-test score}}$
	Normality Test: Kolmogorov-Smirnov.- Independent t-test: Comparing post-test scores between groups
	Effect Size: Calculating the magnitude of improvement
Ethics	School Permission: Approval obtained from school principals and education officials
	Informed Consent: Written consent from parents, verbal assent from students

III. Results and Discussion

A. Results

The Edukids learning media was developed through the stages of the ADDIE model and produced in an interactive digital format tailored for Grade II elementary school students. The final product includes visual illustrations, a vocabulary list, interactive quizzes, and a navigation menu designed for both independent learning and teacher-guided instruction. The main interface consists of a home menu, a learning materials menu, and an interactive quiz menu. The home menu displays navigation icons with simple text labels that are easy for students to understand. Bright and contrasting background colors are used to attract attention, accompanied by character illustrations and learning objects placed proportionally to facilitate feature identification. The learning materials menu contains a list of vocabulary topics arranged progressively. The interactive quiz menu presents exercises in selecting the correct answer. A real-time scoring system is used to provide immediate feedback and help students monitor their learning progress. A simple and consistent interface design is maintained to reduce cognitive load while keeping students engaged throughout the learning process.

The validation results from the material expert showed a score of 89%**,** categorized as valid. This indicates that the media content aligns with curriculum standards, supports vocabulary mastery, and is suitable for the targeted grade level. The validation by the media expert also produced a score of 89%**,** categorized as valid, demonstrating high quality in design, technical aspects, and ease of use.

The validation results provided by subject matter experts in Indonesian language education indicate a consistently high level of content quality and instructional alignment. The presentation of the material demonstrates strong coherence with the intended learning outcomes, ensuring that instructional objectives are clearly reflected throughout the learning content. Experts also affirmed that the material is presented in a highly comprehensive manner, with systematic organization that supports student understanding. The structure of the content is considered well-sequenced, allowing learners to grasp concepts progressively without cognitive overload.

Furthermore, the material shows a strong orientation toward learner needs. The content is appropriately tailored to students' characteristics and learning levels, enhancing its pedagogical relevance. The clarity of language used was evaluated as highly satisfactory, with simple and communicative expressions that facilitate comprehension. Media elements integrated within the material were deemed consistent with the learning objectives and supportive of content delivery, while animations and visual components were found to align effectively with the instructional material.

In addition, the accuracy and appropriateness of assessment components embedded in the material received strong endorsement from the experts. Quiz structures were assessed as accurate and relevant to the presented content, and their alignment with instructional objectives was clearly evident. Overall, the expert evaluation reflects a very high level of validity, suggesting that the learning material is pedagogically sound, conceptually accurate, and ready for implementation with only minimal refinement, if any, required to further optimize its instructional effectiveness.

The expert validation of media aspects demonstrates a very high level of quality and instructional suitability across all evaluated indicators. The learning media is perceived as visually appealing and systematically organized, contributing to a positive first impression and sustained learner engagement. Typography, layout, and color composition were judged to be clear, proportional, and aesthetically balanced, ensuring that visual elements support rather than distract from the learning content. The overall visual consistency enhances readability and facilitates efficient information processing.

From a functional perspective, the media exhibits strong usability and technical reliability. Navigation is intuitive and responsive, allowing users to interact with the material smoothly without encountering operational difficulties. Multimedia components, including images, animations, and interactive elements, were considered relevant and well integrated with the instructional content. These elements effectively reinforce conceptual understanding and maintain learners' attention throughout the learning process.

Moreover**,** the media demonstrates a high degree of alignment with pedagogical objectives. The presentation supports learning goals by encouraging active engagement and promoting comprehension through appropriate visual representation. The accuracy and clarity of displayed information were consistently rated at the highest level, indicating that the media successfully conveys instructional messages without ambiguity. Overall, the expert assessment confirms that the developed learning media possesses excellent visual, technical, and pedagogical quality, rendering it highly suitable for classroom implementation with minimal or no revision required.

The effectiveness of Edukids in improving vocabulary mastery was assessed by comparing the pre-test and post-test scores of both the experimental group (using Edukids) and the control group (using traditional PowerPoint-based materials). The following summarizes the results of the statistical analysis:

1. Vocabulary Mastery Improvement in the Experimental Group. The experimental group showed a significant improvement in vocabulary mastery. The pre-test mean score was 68.32 (SD = 5.21), while the post-test mean score increased to 83.30 (SD = 6.10). The N-gain was 0.58, indicating a moderate improvement in vocabulary mastery. A paired-samples t-test was performed to compare the pre-test and post-test scores, which revealed a statistically significant difference (p-value < 0.05), suggesting that the use of Edukids significantly enhanced vocabulary mastery in the experimental group.
2. Vocabulary Mastery Improvement in the Control Group. The control group, which used traditional PowerPoint-based learning materials, showed minimal improvement in vocabulary mastery. The pre-test mean score was 70.25 (SD = 6.45), and the post-test mean score increased slightly to 72.88 (SD = 6.90). The N-gain was 0.10, indicating only minimal improvement in vocabulary mastery. The difference between pre-test and post-test scores for the control group was not statistically significant (p-value > 0.05), suggesting that the traditional materials had little impact on vocabulary improvement.
3. Pre/Post-test Comparison for Experimental and Control Groups. The results from the pre-test and post-test for both groups are summarized in Table 5 a significant difference was found between the experimental and control groups in terms of vocabulary mastery improvement, as indicated by the independent t-test results.

Table 3. Pre/Post-test Comparison for Experimental and Control Groups

Group	Pre-test Mean (SD)	Post-test Mean (SD)	N-gain	p-value
Experimental	68.32 (5.21)	83.30 (6.10)	0.58	< 0.05
Control	70.25 (6.45)	72.88 (6.90)	0.10	> 0.05

N-gain Formula: $$\text{N-gain} = \frac{\text{Post-test score} - \text{Pre-test score}}{\text{Maximum score} - \text{Pre-test score}}$$

Experimental Group: N-gain = 0,58 (moderate improvement)

Control Group: N-gain = 0,10 (minimal improvement)

4. Effect Size and Confidence Interval.
   a) The effect size for the experimental group was calculated using Cohen's d, which yielded a large effect size (d = 1.35), suggesting a substantial impact of Edukids on vocabulary mastery.
   b) A 95% confidence interval for the difference in post-test scores between the experimental and control groups was also calculated. The interval did not overlap, indicating a significant difference in vocabulary improvement between the two groups.

The results of the independent t-test indicated a significant difference ($p \leq 0.05$) between the post-test scores of the experimental group, which used Edukids, and the control group, which used PowerPoint. The effect size analysis showed a large effect category, indicating that the use of Edukids provided a substantial improvement in students' vocabulary mastery. During the development process, revisions were made based on expert feedback and trial results. These revisions included clarifying instructions, adjusting quiz difficulty levels, and refining the visual layout. The changes were aimed at enhancing user comprehension, maintaining student engagement, and optimizing learning outcomes.

Table 4. Expert Validation for Material Experts

No	Statement	N	Mean (± SD)	% Validity	Evaluation Criteria
1	Presentation of material in accordance with learning outcomes.	3	4.00 (0.00)	100%	Very Good (85-100%)
2	Presentation of material is very comprehensive.	3	4.00 (0.00)	100%	Very Good (85-100%)
3	Material in the media is tailored to student characteristics.	3	4.00 (0.00)	100%	Very Good (85-100%)
4	Presentation of material is tailored to student development.	3	4.00 (0.00)	100%	Very Good (85-100%)
5	Media titles are consistent with learning material.	3	4.00 (0.00)	100%	Very Good (85-100%)
6	The language used is simple and communicative.	3	4.00 (0.00)	100%	Very Good (85-100%)
7	Material is explained sequentially.	3	4.00 (0.00)	100%	Very Good (85-100%)
8	Consistency of material with components.	3	4.00 (0.00)	100%	Very Good (85-100%)
9	The material is comprehensive.	3	4.00 (0.00)	100%	Very Good (85-100%)
10	Alignment of quizzes with learning objectives.	3	4.00 (0.00)	100%	Very Good (85-100%)
11	Accuracy of quiz structure with the material.	3	4.00 (0.00)	100%	Very Good (85-100%)
12	Alignment of images and animations with the material.	3	4.00 (0.00)	100%	Very Good (85-100%)
	Total	36	4.00 (0.00)	100%	Very Good (85-100%)

Note: "Very Good" (85-100%) means that the statement was fully met with no significant improvements required. All 3 material experts rated every item as "Very Good," resulting in a 100% validity score for each statement.

Table 5. Expert Validation for Media Experts

No	Statement	N	Mean (± SD)	% Validity	Evaluation Criteria
1	Symbol size consistency	3	4.00 (0.00)	100%	Very Good (85-100%)
2	Symbol, button, and frame placement consistency	3	4.00 (0.00)	100%	Very Good (85-100%)
3	Easy-to-read font type and size	3	4.00 (0.00)	100%	Very Good (85-100%)
4	Easy-to-read text color	3	4.00 (0.00)	100%	Very Good (85-100%)
5	Image quantity consistency	3	4.00 (0.00)	100%	Very Good (85-100%)
6	Displayed image size and quality consistency	3	4.00 (0.00)	100%	Very Good (85-100%)
7	Image/animation layout accuracy	3	4.00 (0.00)	100%	Very Good (85-100%)
8	Images used are relevant to the material	3	4.00 (0.00)	100%	Very Good (85-100%)
9	Use of engaging animations	3	4.00 (0.00)	100%	Very Good (85-100%)
10	Music is appropriate for the students' characteristics	3	4.00 (0.00)	100%	Very Good (85-100%)
11	Music and animations are appropriate	3	4.00 (0.00)	100%	Very Good (85-100%)
12	The cover of the learning media is appropriate	3	4.00 (0.00)	100%	Very Good (85-100%)
13	The appearance of the learning media aligns with the content	3	4.00 (0.00)	100%	Very Good (85-100%)
14	Flexibility of the learning media (can be used independently or with guidance)	3	4.00 (0.00)	100%	Very Good (85-100%)
15	Instructions for using the learning media are appropriate	3	4.00 (0.00)	100%	Very Good (85-100%)
16	Ease of operation of the learning media is appropriate	3	4.00 (0.00)	100%	Very Good (85-100%)
17	Use of navigation buttons on the learning media is appropriate	3	4.00 (0.00)	100%	Very Good (85-100%)
18	Accuracy of interactive link performance	3	4.00 (0.00)	100%	Very Good (85-100%)
19	Consistency of navigation form and placement in the media is appropriate	3	4.00 (0.00)	100%	Very Good (85-100%)
20	Functionality of the media is appropriate	3	4.00 (0.00)	100%	Very Good (85-100%)
	Total	60	4.00 (0.00)	100%	Very Good (85-100%)

Note: "Very Good" (85-100%) means that the statement was fully met with no significant improvements required. All 3 media experts rated every item as "Very Good," resulting in a 100% validity score for each statement.

Table 6. Pre/Post-test Comparison for Experimental and Control Groups

Group	Pre-test Mean (± SD)	Post-test Mean (± SD)	N-gain	p-value	Effect Size (Cohen's d)
Experimental	68.32 (5.21)	83.30 (6.10)	0.58	< 0.05	1.35 (Large)
Control	70.25 (6.45)	72.88 (6.90)	0.10	> 0.05	0.32 (Small)

B. Discussion

The validation results demonstrated that the Edukids learning media achieved a high level of feasibility in both material and design aspects. The material expert's assessment yielded a score of 89% in the valid category, indicating that the content is aligned with the applicable curriculum and supports the achievement of basic competencies in vocabulary mastery for second-grade elementary school students. The material is organized sequentially, progressing from simple to more complex vocabulary, thus facilitating the learning process. In addition, the vocabulary is presented alongside relevant visual illustrations, reinforcing the association between words and their meanings. This finding is consistent with the principles of dual coding theory, which posits that information presented through both text and images enhances memory retention.

This study aimed to assess the effectiveness of Edukids in enhancing vocabulary mastery among second-grade students. The results indicated that the experimental group, using Edukids, showed a moderate improvement in vocabulary mastery (N-gain = 0.58), with a statistically significant difference between pre-test and post-test scores. This finding is consistent with previous research, such as that by Kazu & Kuvvetli (2023) which demonstrated the efficacy of digital learning tools in vocabulary acquisition. The experimental group's improvement can be attributed to several factors, including the interactive and visually engaging nature of Edukids, which aligns with dual coding theory. This theory suggests that learning is enhanced when information is presented both verbally and visually, which was a core feature of Edukids' design.

From the design perspective, the media expert's validation also obtained a score of 89% in the valid category. This confirms that the technical, aesthetic, and usability aspects were well met. Edukids was designed with simple navigation, clear icons, and contrasting background colors to capture students' attention. Illustrations were proportionally placed to avoid visual overload and facilitate feature identification. The consistent visual design helps reduce students' cognitive load while maintaining engagement throughout the learning process. These results are in line with prior research emphasizing that simple, yet engaging interface design can enhance student engagement and learning effectiveness.

Teacher and student feedback reinforced the experts' validation findings. Teachers noted that Edukids facilitated material delivery, increased time efficiency, and promoted student participation (Zhu et al., 2023). Students expressed high enthusiasm toward the media, citing its attractive visual design, ease of navigation, and interactive quizzes with instant scoring as major strengths. Such positive responses indicate that Edukids effectively met the needs of its end-users both teachers and students in creating an engaging and effective learning experience.

The media's effectiveness was tested by comparing pre-test and post-test vocabulary mastery scores between the experimental group using Edukids and the control group using PowerPoint (Rezai et al., 2024). The Kolmogorov–Smirnov normality test and Levene's homogeneity test confirmed that the data met the assumptions for parametric analysis. The independent t-test revealed a statistically significant difference ($p \leq 0.05$) in post-test scores between the two groups. Effect size analysis indicated a large effect, suggesting that the use of Edukids had a substantial positive impact on vocabulary mastery. This improvement can be attributed to the media's interactive features, use of bright colors, contextually relevant illustrations, and immediate feedback system, which motivated students to correct errors promptly.

Throughout the development process, revisions were made based on expert feedback and trial results. Improvements included clarifying instructions for better comprehension, adjusting quiz difficulty levels to accommodate varying abilities, and refining the visual layout for greater clarity and appeal. These user-centered revisions demonstrate that the development of Edukids was adaptive and responsive to formative evaluation, ensuring that the media effectively met its intended learning objectives.

The findings of this study have important implications for vocabulary learning in elementary schools. Edukids effectively combines the functions of instructional media and a tool for independent learning. It can be used by teachers to diversify instructional methods and by students to learn independently outside the classroom. This is particularly relevant for lower-grade levels, where visual and interactive approaches are crucial for maintaining focus and interest.

To address these limitations and threats to validity, future research could use a randomized controlled trial (RCT) design with random assignment at both the student and school levels. This would help reduce selection bias and increase the internal validity of the study. Additionally, conducting the study in a wider range of schools, including those with diverse student populations, would help enhance the generalizability of the findings.

Future studies should also explore the long-term effects of using Edukids. A longitudinal study could assess whether the improvements observed in vocabulary mastery are sustained over time or whether the novelty effect diminishes. It would also be valuable to investigate the impact of the intervention on other language skills, such as reading comprehension and speaking, to evaluate the broader applicability of digital learning tools in language education.

Examining the role of teacher training in the successful implementation of digital learning tools like Edukids could help identify strategies for maximizing the effectiveness of such interventions. Research could also explore how teacher-student interactions during the use of Edukids influence learning outcomes, providing a more nuanced understanding of the factors that contribute to its success.

Although the findings suggest that Edukids positively influences students' vocabulary mastery, limitations related to the sample size and research context must be considered. The study involved only 66 students from four elementary schools in Enrekang Regency, which restricts the generalizability of the results to broader educational settings with different learner characteristics and instructional conditions.

Another limitation concerns the relatively short duration of the intervention, which was conducted over a four-week period. While significant improvements were observed, these gains may reflect a novelty effect, indicating that longer intervention periods are necessary to examine the sustainability of vocabulary development over time.

Potential bias in the assessment instruments also warrants attention when interpreting the findings. Although the vocabulary test was adapted from Molita's (2017) instrument and validated by local experts, test design limitations and possible social desirability bias in questionnaire responses may have influenced the results.

Finally, teacher-related factors such as instructional quality, digital competence, and levels of engagement may have affected the effectiveness of the intervention. Differences in how teachers integrated Edukids into classroom instruction highlight the importance of teacher readiness and professional development in maximizing the impact of digital learning tools.

IV. Conclusion and Suggestion

The results of this study demonstrate the potential of Edukids as an effective tool for enhancing vocabulary mastery among second-grade students. The experimental group, which used Edukids, showed a moderate improvement in vocabulary mastery, supported by a significant statistical difference between pre-test and post-test scores. These results align with dual coding theory and previous research on the use of digital learning media in language education. However, the study also has several limitations, including its small sample size, short duration, and the potential biases introduced by teacher effects and the novelty of the intervention.

Considering the findings of this study, Edukids should be integrated into the second-grade language curriculum as a supplementary tool to support vocabulary development, supported by systematic teacher training and ongoing professional assistance to ensure effective classroom implementation. A structured monitoring and evaluation system involving regular assessments, classroom observations, and stakeholder feedback is also essential to optimize its use. At the operational level, a semester-long pilot implementation with standardized lesson plans and feedback mechanisms is recommended to assess real-world effectiveness, while future replication studies using randomized cluster designs should examine medium-term outcomes such as vocabulary retention, reading comprehension, and teacher perceptions to strengthen the evidence base for broader implementation.

References

Akmaliyah, Hudzaifah, Y., Ulfah, N., & Pamungkas, M. I. (2021). Child-friendly teaching approach for arabic language in nn indonesian islamic boarding school. *International Journal of Language Education*, *5*(1), 501–514. https://doi.org/10.26858/IJOLE.V5I1.15297

Aridasarie, Z., & Rohmah, Z. (2024). Enhancing multimodal literacy: puppetry for English-speaking skills development. *Cogent Education*, *11*(1). https://doi.org/10.1080/2331186X.2024.2370754;JOURNAL:JOURNAL:OAED20;REQUESTEDJOURNAL:JOURNAL:OAED20;PAGE:STRING:ARTICLE/CHAPTER

Brilianti, A. E., & Sugirin, S. (2024). Boosting Young EFL Learners' English Vocabulary Acquisition by Utilizing Puppet Pictures as Storytelling Media. *Journal of Foreign Language Teaching and Learning*, *9*(2), 161–179. https://doi.org/10.18196/FTL.V9I2.21622

Chiriac, R. (2025). The Importance of Teaching ESL Vocabulary in Primary School. *LiBRI. Linguistic and Literary Broad Research and Innovation*, *10*(1), 15–26. https://doi.org/10.70594/LIBRI/10.1/2

Deda, Y. N., Disnawati, H., & Daniel, O. (2023). How Important of Students' Literacy and Numeracy Skills in Facing 21st-Century Challenges: A Systematic Literature Review. *Indonesian Journal of Educational Research and Review*, *6*(3), 563–572. https://doi.org/10.23887/IJERR.V6I3.62206

Gunawan, R. N., Mastur, S. N., & Wibowo, U. B. (2023). The Involvement of school administrative staff in harnessing information technology: A systematic literature review. *Jurnal Keilmuan Manajemen Pendidikan*, *9*(02), 245–256. https://doi.org/10.32678/tarbawi.v9i01.9124

Gunawan, R. N., Nur, M. I., & Tusshalihah, M. (2025). Educational Management Publication Trends In The Scopus Database: An Analysis Of The Evolution Of Research Development. *Elementaria: Journal of Educational Research*, *3*(1), 64–75. https://doi.org/10.61166/ELM.V3I1.85

Kazu, İ. Y., & Kuvvetli, M. (2023). A triangulation method on the effectiveness of digital game-based language learning for vocabulary acquisition. *Education and Information Technologies 2023 28:10*, *28*(10), 13541–13567. https://doi.org/10.1007/S10639-023-11756-Y

Khasanah, R. M., & Burhan, A. (2022). From drawings to puppet shows: practical ways in teaching vocabulary to primary school EFL learners. *Erudita: Journal of English Language Teaching*, *2*(1), 50–62. https://doi.org/10.28918/ERUDITA.V2I1.5328

Mastur, S. N., Niron, M. D., & Gunawan, R. N. (2025). Developing an outstanding curriculum. *Education 3-13*, *53*(6), 1054–1056. https://doi.org/10.1080/03004279.2023.2278180

Molita, D. A. (2017). *Kemampuan Penggunaan Kosakata Bahasa Indonesia pada Anak Usia 6–7 tahun di Desa Klatakan Berdasarkan Tes Penguasaan yang Bersifat Pasif-Reseptif dan Aktif-Produktif*.

Normurodovna, M. A. (2025). BUILDING VOCABULARY: EFFECTIVE STRATEGIES FOR LEARNERS. *International Conference on Medical Science, Medicine and Public Health*, 4–11. https://econfseries.com/index.php/8/article/view/547

Nur Afidah, W., Widayati, M., Sudiyana, B., & Veteran Bangun Nusantara Sukoharjo, U. (2024a). The use of puppet stage media in learning language skills in children of KB Darul Falah. *At Turots: Jurnal Pendidikan Islam*, *6*(1), 210–226. https://doi.org/10.51468/JPI.V6I1.541

Nur Afidah, W., Widayati, M., Sudiyana, B., & Veteran Bangun Nusantara Sukoharjo, U. (2024b). The use of puppet stage media in learning language skills in children of KB Darul Falah. *At Turots: Jurnal Pendidikan Islam*, *6*(1), 210–226. https://doi.org/10.51468/JPI.V6I1.541

Rezai, A., Soyoof, A., & Reynolds, B. L. (2024). Effectiveness of informal digital learning of English on EFL learners' vocabulary knowledge: a mixed-methods investigation. *Computer Assisted Language Learning*. https://doi.org/10.1080/09588221.2024.2350419;WGROUP:STRING:PUBLICATION.

Telaumbanua, Y. A., Mendrofa, D. R. C., Hura, M. R. N., Waruwu, A., & Tafona'o, P. D. (2024). Second-Semester Students' Challenges towards Vocabulary Mastery in English Language Learning. *English Teaching and Linguistics Journal (ETLiJ)*, *5*(2), 120–129. https://doi.org/10.30596/ETLIJ.V5I2.20473

Yani, S. A. (2022). *PSYCHOLINGUISTIC ANALYSIS: THE INFLUENCE OF THE USING PUPPET FINGER AS A MEDIA TO INCREASE THE CHILD'S VOCABULLARY AT TK ATTAQY CLASS B JALAN TANGGUK BONGKAR X NO.15 MEDAN*. *9*(2).

Zafrullah, Z., Suyanto, S., Wahyuni, A., Ayuni, R. T., & Novilanti, F. R. E. (2023). Development of Android-based Learning to Improve Computational Thinking Skills in Junior High School. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, *7*(2), 1309–1320. https://doi.org/10.31004/CENDEKIA.V7I2.2239

Zhu, T., Zhang, Y., & Irwin, D. (2023). Second and Foreign Language Vocabulary Learning through Digital Reading: A Meta-Analysis. *Education and Information Technologies 2023 29:4*, *29*(4), 4531–4563. https://doi.org/10.1007/S10639-023-11969-1.