

The Effect of the Talking Flashcards Device in Enhancing Students' Memory Retention in English Learning

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Abstract

This study aimed to examine the effect of the Talking Flashcards Device on students' memory retention in English vocabulary learning at SDN 2 Nanggala. The research employed a quantitative approach with a quasi-experimental design, specifically a nonequivalent control group design. The participants consisted of 45 elementary students, including 21 fourth-grade and 24 fifth-grade students. The experimental group was taught using the Talking Flashcards Device, while the control group received conventional instruction. The instruments used were pre-test, post-test, and follow-up test consisting of 20 multiple-choice items designed to measure students' vocabulary retention. Data were analyzed using descriptive statistics, Independent Samples t-test, Paired Samples t-test, and Repeated Measures ANOVA through SPSS version 27. The findings revealed that there was no significant difference between the experimental and control groups in the pre-test ($p > 0.05$), indicating comparable initial abilities. However, significant differences were found in both post-test and follow-up test results ($p < 0.05$), demonstrating the effectiveness of the treatment. The mean scores increased from 9.82 in the pre-test to 13.09 in the post-test and further improved to 15.27 in the follow-up test. The paired samples t-test showed a statistically significant improvement ($p < 0.001$) with a very large effect size (Cohen's $d = 1.327$). In addition, the Repeated Measures ANOVA confirmed a significant effect of time, indicating consistent improvement across all testing stages. These results suggest that the Talking Flashcards Device effectively enhances both short-term vocabulary mastery and long-term memory retention. The integration of visual and auditory elements supports stronger encoding and retrieval processes, in line with Dual Coding Theory. Therefore, this device can be recommended as an innovative and effective instructional medium for improving vocabulary learning, particularly for elementary students in rural EFL contexts.

Keywords

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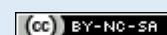
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Introduction

Vocabulary mastery plays a fundamental role in developing language skills, as it supports learners' ability to listen, speak, read, and write effectively. A sufficient vocabulary allows students to understand meaning and express ideas clearly in communication. (Nation, 2001) states that vocabulary is essential for mastering the four language skills. Similarly, vocabulary knowledge significantly influences students' overall language proficiency (Sari A., 2023). However, many elementary school students still experience difficulties in remembering and retaining new vocabulary, especially in English as a foreign language (EFL) contexts.

In the Indonesian context, English plays a strategic role in improving human resources and preparing students to face global challenges (Hamied S., 2022). English also functions as a global lingua franca used in various fields such as education, business, and communication (Crystal, 2012). However, English learning at the elementary level often faces challenges, particularly in rural areas. Students tend to use their local language in daily communication, which limits their exposure to English. In addition, low motivation and limited learning facilities make it difficult for students to engage actively in English learning (Supriadi et al., 2023). As a result, students often show low ability in remembering vocabulary.

Memory retention is a crucial factor in vocabulary learning. It refers to students' ability to store and recall information over time (Baddeley, 2020). Vocabulary retention occurs when new words are transferred from short-term memory to long-term memory through meaningful practice and repetition (Alzahrani, 2023). According to Dual Coding Theory, learning becomes more effective when information is presented through both visual and verbal channels (Paivio, 1986). This theory suggests that combining images and words can strengthen memory encoding and improve recall ability.

One of the innovative media that can support this process is the Talking Flashcards Device, which integrates visual and auditory elements in vocabulary learning. This device enables students to see images and hear pronunciation simultaneously, which enhances cognitive processing and memory retention. Previous studies have shown that flashcards are effective in improving vocabulary mastery and motivation (Wahyuningsih & Izzah, 2023). In addition, audio-supported flashcards have been proven to improve pronunciation and vocabulary retention among learners (Yowaboot & Sukying, 2022).

Despite these findings, most previous studies focused only on visual flashcards and short-term learning outcomes, and were mainly conducted in urban school settings. Research in rural elementary schools remains limited. Therefore, this study aims to investigate the effect of the Talking Flashcards Device on students' memory retention in English vocabulary learning at SDN 2 Nanggala. This study not only examines immediate learning outcomes but also evaluates long-term retention through a follow-up test, providing a more comprehensive understanding of vocabulary learning effectiveness.

Method

This study employed a quantitative approach using a quasi-experimental design to investigate the effect of the Talking Flashcards Device on students' memory retention in English vocabulary learning. A nonequivalent control group design was applied, involving two groups: an experimental group and a control group. The experimental group received treatment using the Talking Flashcards Device, while the control group was taught using conventional methods such as translation and memorization. This design was considered appropriate because the researcher could not randomly assign participants, yet it still allowed the examination of cause-and-effect relationships between the treatment and learning outcomes.

The population of this study consisted of fourth-grade and fifth-grade students at SDN 2 Nanggala, North Toraja, in the 2025/2026 academic year. The total number of participants was 45 students, including 21 students from grade four and 24 students from grade five. The sample was selected using purposive sampling, where participants were chosen based on specific criteria relevant to the research objectives, particularly students who had not previously received formal English instruction (Sugiyono, 2018). This sampling technique was considered suitable to ensure that the participants had relatively similar initial vocabulary knowledge.

Data were collected using tests as the primary instrument. The tests consisted of a pre-test, post-test, and follow-up test, each containing 20 multiple-choice items designed to measure students' vocabulary retention. The test items were developed based on the elementary English vocabulary syllabus and adjusted to the students' level, covering vocabulary related to colors, animals, and fruits. To ensure content validity, the instrument was reviewed and validated by two English education lecturers and one elementary school English teacher. Their suggestions were used to revise unclear instructions and inappropriate vocabulary items. In addition, a pilot test was conducted before the actual research to examine the reliability of the instrument. The reliability coefficient was calculated using Cronbach's Alpha through SPSS version 27, and the result showed that the instrument was reliable with a coefficient above 0.70. The pre-test was administered before the treatment to determine students' initial ability. The post-test was conducted after the treatment to measure immediate learning outcomes, while the follow-up test was given one week later to assess long-term memory retention. Each correct answer was scored 1, and incorrect answers were scored 0, resulting in a maximum score of 20 points. The use of tests as an instrument is consistent with (Brown, 2001), who states that tests are systematic procedures for measuring students' performance, and (Gay G. E. and Airasian, P., 2012), who emphasize the importance of pre-test and post-test in experimental research.

The treatment was carried out in several sessions, where the experimental group learned vocabulary related to colors, animals, and fruits using the Talking Flashcards Device. The learning activities included exposure to vocabulary through audio-visual media, pronunciation practice, repetition, and recall exercises. Meanwhile, the control group received conventional instruction without the use of flashcards. The procedures were conducted in a structured and sequential manner to ensure consistency across sessions.

The data collected were analyzed using SPSS version 27. Descriptive statistics, including mean, minimum, maximum, and standard deviation, were used to provide an overview of students' performance. To examine differences between groups, an

Independent Samples t-test was applied. A Paired Samples t-test was used to measure improvement within each group, while a Repeated Measures ANOVA was conducted to analyze students' performance across the pre-test, post-test, and follow-up test to determine long-term retention. The level of significance was set at 0.05. If the p-value was < 0.05 , the result was considered statistically significant.

Results

This section presents the findings of the study on the effectiveness of the Talking Flashcards Device in enhancing students' memory retention in English vocabulary learning at SDN 2 Nanggala. The results were obtained from statistical analyses of the pre-test, post-test, and follow-up test scores of both the experimental and control groups.

The data were analyzed using SPSS version 27. Descriptive statistics were calculated to provide an overview of students' performance, including mean scores, minimum and maximum values, and standard deviation. In addition, inferential statistical analyses were conducted to examine differences between groups and changes over time. Prior to hypothesis testing, normality and homogeneity tests were performed to ensure that the data met the assumptions required for parametric analysis.

Table 1. Descriptive Statistics of Students' Scores

Test	N	Minimum	Maximum	Mean	Std. Deviation
Pre-test	45	6	14	9.82	1.749
Post-test	45	9	18	13.09	2.054
Follow-up test	45	11	20	15.27	2.054

The normality test was conducted using the Shapiro–Wilk test. The results showed that all significance values were higher than 0.05, indicating that the data were normally distributed. For the control group, the significance values were 0.130 (pre-test), 0.198 (post-test), and 0.211 (follow-up test). Meanwhile, for the experimental group, the significance values were 0.789 (pre-test), 0.434 (post-test), and 0.121 (follow-up test). Therefore, the data met the assumption of normality for parametric statistical analysis.

To examine differences between the experimental and control groups, an Independent Samples t-test was conducted. A Paired Samples t-test was conducted to examine students' improvement from pre-test to post-test. The result showed a statistically significant difference between the pre-test and post-test scores, $t(44) = -8.899$, $p < 0.001$. This finding indicates that students' vocabulary achievement

improved significantly after the treatment using the Talking Flashcards Device. A Paired Samples t-test was also conducted to measure improvement within each group. The results indicated that both groups showed significant improvement from pre-test to post-test ($p < 0.05$).

To analyze changes over time, a Repeated Measures ANOVA was performed on the pre-test, post-test, and follow-up test scores. The results of the Repeated Measures ANOVA indicated a statistically significant effect, as shown in the Tests of Between-Subjects Effects table, with a significance value of $p < .001$ ($F = 2383.932$). This result confirms that there were significant differences in students' scores across the testing stages, indicating that the treatment had a strong impact on students' vocabulary retention.

Discussion

This study aimed to investigate the effect of the Talking Flashcards Device in enhancing students' memory retention in English vocabulary learning at SDN 2 Nanggala. Based on the findings, the results indicate that the use of the Talking Flashcards Device significantly improves students' vocabulary mastery and memory retention.

The results show that students' mean scores increased from 9.82 in the pre-test to 13.09 in the post-test and further improved to 15.27 in the follow-up test. This pattern indicates not only immediate learning improvement but also sustained retention over time. The higher score in the follow-up test suggests that students were able to retain and recall vocabulary more effectively after the treatment. In addition, the percentage improvement reached 33.26% from pre-test to post-test and 55.44% from pre-test to follow-up test, indicating a substantial increase in students' learning outcomes.

These findings are consistent with the concept of memory retention, which refers to the ability to store and recall information over time (Baddeley, 2020). The improvement in students' scores suggests that the learned vocabulary was successfully transferred from short-term memory to long-term memory through repeated exposure and practice (Alzahrani, 2023). This is also supported by the role of retrieval practice, which strengthens memory through repeated recall activities (Pan, 2023).

The effectiveness of the Talking Flashcards Device can be explained through the Dual Coding Theory (Paivio, 1986), which states that information is more easily remembered when presented through both visual and verbal channels. In this study, students learned vocabulary through images and audio simultaneously, enabling them to process information through multiple cognitive pathways. This dual input strengthens encoding and facilitates better recall.

Furthermore, the statistical analysis supports the effectiveness of the Talking Flashcards Device in improving students' vocabulary retention. The normality test indicated that all data were normally distributed, which confirmed that the assumptions for parametric analysis were fulfilled. The Paired Samples t-test revealed a statistically significant improvement between students' pre-test and post-test scores, $t(44) = -8.899$, $p < 0.001$. This finding indicates that students achieved better vocabulary mastery after receiving the treatment using the Talking Flashcards Device.

In addition, the Repeated Measures ANOVA showed a statistically significant effect across the testing stages, with a significance value of $p < 0.001$ and $F = 2383.932$.

This result confirms that students' vocabulary retention improved consistently from the pre-test to the post-test and follow-up test. The sustained improvement found in the follow-up test indicates that the students were able to retain vocabulary in their long-term memory.

These findings are in line with previous studies that highlight the effectiveness of flashcards in vocabulary learning. (Wahyuningsih & Izzah, 2023) and (Lisa, 2019) found that flashcards improve students' vocabulary mastery and motivation. Moreover, the integration of audio elements, as implemented in this study, is supported by (Nguyen T., 2023) and Yowaboot and (Yowaboot & Sukying, 2022), who reported that audio-supported flashcards enhance pronunciation and vocabulary retention. This is further supported by (Syahrir, 2023), who demonstrated that interactive learning media can significantly improve students' vocabulary mastery by increasing engagement and active participation.

Compared to conventional teaching, the experimental group showed greater improvement. The experimental group's mean score increased from 10.24 to 14.33 and reached 17.67, while the control group improved from 9.46 to 12.00 and 13.17. This indicates that the Talking Flashcards Device provides a more effective learning experience. The use of audio-visual media increases students' engagement and motivation, which contributes to better learning outcomes (Sari A., 2023)(Husnani, 2023)(Nasriandi, 2023).

The sustained improvement observed in the follow-up test also indicates that the learning effect was maintained over time. According to (Nation, 2019), Repeated and meaningful use of vocabulary plays an important role in strengthening long-term retention. However, it is important to consider that other factors, such as students' motivation, familiarity with test formats, and learning habits, may have influenced the results (Schmitt, 2010).

Overall, this study provides strong evidence that the Talking Flashcards Device is an effective instructional medium for improving both vocabulary mastery and long-term memory retention, particularly in rural elementary EFL contexts. The findings also contribute to existing literature by providing empirical evidence from a rural setting, which has been relatively underexplored in previous research.

Conclusion

This study concludes that the Talking Flashcards Device has a significant positive effect on students' memory retention in English vocabulary learning at SDN 2 Nanggala. The findings showed that there was no significant difference between the experimental and control groups before the treatment, indicating similar initial abilities. However, after the implementation of the Talking Flashcards Device, students in the experimental group demonstrated significantly greater improvement compared to those in the control group. The improvement was not only evident in the post-test results but also sustained in the follow-up test, indicating that the device effectively enhances both short-term learning outcomes and long-term memory retention.

The effectiveness of the Talking Flashcards Device can be attributed to the integration of visual and auditory elements, which support stronger encoding and retrieval processes. This finding reinforces the principles of Dual Coding Theory, suggesting that multimodal learning media can significantly improve vocabulary

acquisition and retention. Therefore, this study contributes to the development of effective instructional strategies in EFL contexts, particularly for elementary students in rural areas with limited learning resources.

However, this study has several limitations. The use of a quasi-experimental design without random assignment limits the ability to fully control external variables such as students' motivation and prior learning experiences. In addition, the relatively small sample size and the focus on a single school may limit the generalizability of the findings. The duration of the study was also relatively short, which may not fully capture long-term retention over an extended period.

Based on these findings, it is recommended that teachers incorporate interactive and audio-visual media, such as the Talking Flashcards Device, to improve students' vocabulary learning and retention. Future research is suggested to involve larger sample sizes, different educational settings, and longer research durations to provide more comprehensive insights into long-term vocabulary retention. Further studies may also explore the integration of similar technologies with other language skills to expand their pedagogical impact.

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References

- Alzahrani, A. (2023). Retention of vocabulary through meaningful repetition in EFL classrooms. *Journal of Language Teaching and Research*, 14(1), 33–41.
- Baddeley, A. D. (2020). *Working Memory and Learning: A Practical Guide*. Routledge.
- Brown, H. D. (2001). *Teaching by Principles: An Interactive Approach to Language Pedagogy*. Pearson Education.
- Crystal, D. (2012). *English as a Global Language (2nd ed.)*. Cambridge University Press.
- Gay G. E. and Airasian, P., L. R. and M. (2012). *Educational research: Competencies for analysis and applications* (10th ed.). Pearson Education.
- Hamied S., F. A., and D. (2022). Teaching English in Indonesian schools: Issues and practices. *Indonesian Journal of English Language Teaching*, 17(1), 1–15.
- Asri, S., & Husnani Aliah, A. (2024). The use of spelling bee game to improve students' vocabulary. *Jurnal Serambi Ilmu*, 24(2), 206–215.
- Lisa, H. (2019). The effectiveness of flashcards on the motivation to increase English vocabulary among fourth-grade elementary school students. *JOALL (Journal of Applied Linguistics & Literature)*, 4(1), 35–45.
- Nasrum, M., Sari, P., & Nasriandi, N. (2023). Improve students' English vocabulary using the Smart TTS game app. *IDEAS: Journal on English Language Teaching and Learning, Linguistics and Literature*, 11(2), 1081–1090.
- Nation, I. S. P. (2001). *Learning vocabulary in another language*. Cambridge

- University Press.
- Nation, I. S. P. (2019). *Teaching and learning vocabulary* (2 (ed.)). Routledge.
- Nguyen T., H., and Le. (2023). Voice-assisted flashcards for pronunciation and vocabulary learning. *TESOL International Journal*, 18(4), 95–110.
- Paivio, A. (1986). *Mental Representations: A Dual Coding Approach*. Oxford University Press.
- Pan, S. et al. (2023). Retrieval practice and vocabulary retention: From passive to active memory. *Applied Cognitive Psychology*, 37(2), 315–328.
- Sari A., D., and P. (2023). The effect of talking flashcards on elementary students' vocabulary mastery. *Jurnal Pendidikan Dan Pembelajaran Bahasa Inggris*, 8(1), 12–23.
- Schmitt, N. (2010). *Researching Vocabulary: A Vocabulary Research Manual*. Palgrave Macmillan.
- Sugiyono. (2018). *Metode penelitian pendidikan: Pendekatan kuantitatif, kualitatif, dan R&D*. Alfabeta.
- Supriadi, B., Patak, A. A., & Korompot, C. A. (2023). Teaching EFL in a Rural School: Challenges and Strategies. *Pembelajaran Bahasa Inggris Di Sekolah Terpencil: Tantangan Dan Strategi*, 3(3), 208–215.
- Syahrir, S. (2023). Implementation of guessing the picture for increasing students' English vocabulary. *Edumaspul: Jurnal Pendidikan*, 7(2), 2426–2432.
- Wahyuningsih, S., & Izzah, N. S. (2023). Introducing English vocabulary to young learners through flashcards: Evidence from Indonesian elementary school teachers. *Jurnal Ilmiah Pendidikan Dasar*, 10(2), 88–99.
- Yowaboot, C., & Sukying, A. (2022). Using digital flashcards to enhance Thai EFL primary school students' vocabulary knowledge. *English Language Teaching*.