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Implementation of Cinema 4D-based animation media to enhance English vocabulary among elementary school students

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Abstract: English vocabulary mastery is essential for elementary education, yet conventional instruction often provides limited visual contextualization. This study examined changes in English vocabulary achievement following instruction supported by Cinema 4D-based animation media. A quantitative pre-experimental design employing a one-group pre-test–post-test approach was implemented with 25 fourth-grade students at SD Negeri 2 Baubau, Indonesia. Students completed a vocabulary pre-test, participated in four instructional sessions incorporating three-dimensional animations, and subsequently completed a post-test. Data were analyzed using descriptive statistics, the Shapiro–Wilk normality test, and a paired-samples t-test. Results demonstrated an increase in vocabulary scores from a pre-test mean of 61.80 (SD = 11.45) to a post-test mean of 75.40 (SD = 11.98), representing an average improvement of 13.60 points. The improvement was statistically significant, $t(24) = 6.63$, $p < .001$, with a large effect size (Cohen's $dz = 1.33$). These findings indicate improved vocabulary achievement following animation-supported instruction. However, the absence of a control group limits causal interpretations, highlighting the need for further controlled investigations across diverse elementary educational contexts.

Keywords: Cinema 4D, Animation Media, English Vocabulary, Elementary School

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INTRODUCTION

English vocabulary is a foundational component of early foreign-language learning because it supports learners' ability to understand classroom instructions, recognize meaning in simple texts, and produce elementary oral and written expressions. However, vocabulary instruction can become difficult when new words are introduced mainly through verbal explanation, translation, or printed lists. For this reason, elementary learners generally benefit from repeated exposure, contextualized practice, and concrete visual representations that make unfamiliar lexical items easier to interpret and recall. Previous studies have reported positive vocabulary-learning outcomes through noun-word domino cards, image-supported instruction, audiovisual media, flashcards, digital Wordwall activities, and drill-based practice (Bulan & Idhar, 2021; Mahama & Arifin, 2021; Mardiana et al., 2021; Puspita et al., 2021; Rosyidi & Lailiyah, 2024; Wedananta et al., 2024; Yusuf et al., 2023). Ervin et al. (2024) similarly showed the potential of digital word-based media to enrich English vocabulary learning. Collectively, this literature suggests that vocabulary instruction can be strengthened when verbal input is supported by meaningful and visually accessible representations.

The increasing availability of digital learning technologies has expanded the range of media that teachers can use to present vocabulary. Digital environments can combine images, movement, text, sound, and teacher explanation in ways that conventional print materials cannot easily reproduce. Katasila and Poonpon (2022) examined blended instruction for primary-school vocabulary knowledge, while Chuang et al. (2022) explored thematic English learning supported by augmented reality to address vocabulary-learning motivation and enjoyment. Hsu and Hwang (2023) also discussed augmented reality in elementary English vocabulary learning, and Rahmawati (2024) reported the use of an Animal 4D application for elementary English vocabulary. Abedi and Chhibber (2023) further illustrated the growing role of digital environments in English proficiency development.

Three-dimensional media are particularly relevant because they can represent objects, environments, and spatial relationships more concretely than static two-dimensional images. Franata et al. (2023) developed interactive multimedia involving 3D animation, Munir and Wanti (2022) developed augmented-reality-assisted English learning media, Nanda et al. (2022) developed Android-based augmented-reality 3D card media for mathematics, and Putri and Rohmani (2024) reviewed 3D animation for elementary science learning. These studies demonstrate the broader educational potential of three-dimensional visualization, but they do not provide direct evidence regarding Cinema 4D-generated animation for English vocabulary learning. It is also important to distinguish interactive augmented-reality applications from pre-rendered animation. In the present study, Cinema 4D functions as an authoring and rendering tool used to create three-dimensional instructional scenes; students do not manipulate 3D objects in real time. This distinction matters because potential learning benefits may arise from the organization of visual representations rather than from interactivity itself.

The pedagogical contribution of digital media to English vocabulary instruction depends not only on technological features but also on how visual information is integrated with language learning activities. Previous studies have examined various approaches to supporting vocabulary acquisition, including audiovisual instruction (Puspita et al., 2021), blended learning (Katasila & Poonpon, 2022), augmented-reality-supported English learning (Chuang et al., 2022; Hsu & Hwang, 2023), and the use of Animal 4D applications (Rahmawati, 2024). These studies illustrate the growing application of multimedia resources in vocabulary instruction. However, the technologies differ in terms of visual representation, interactivity, and instructional implementation. In particular, augmented-reality applications allow learners to engage with digitally represented objects, whereas

pre-rendered three-dimensional animations provide structured visual scenes prepared before classroom instruction. This distinction is relevant because vocabulary learning may depend on the clarity of visual representations, the sequencing of target words, and opportunities for learners to connect linguistic expressions with observable objects and spatial relationships.

Effective implementation of animation-supported vocabulary instruction also requires appropriate pedagogical mediation. Visual materials alone do not necessarily ensure vocabulary development, particularly when learners have limited prior exposure to English. Teachers play an important role in introducing unfamiliar words, modeling pronunciation, directing attention to relevant visual information, encouraging verbal responses, and providing corrective feedback. Mayer's Cognitive Theory of Multimedia Learning emphasizes the coordination of verbal and visual representations to support meaningful learning while minimizing unnecessary cognitive processing (Mayer, 2021). Within this theoretical perspective, Cinema 4D-generated animations may provide contextual support for learning vocabulary related to rooms, household objects, and spatial prepositions by presenting words within coherent three-dimensional scenes. Nevertheless, the educational contribution of such media should be examined in relation to classroom implementation and observable learning outcomes rather than assumed from technological sophistication alone.

The present study is theoretically informed by Mayer's Cognitive Theory of Multimedia Learning, which proposes that meaningful learning can be supported when relevant verbal and visual information are coordinated while unnecessary cognitive processing is minimized (Mayer, 2021). From this perspective, animation can provide visible referents for vocabulary while the teacher introduces, models, and reinforces the corresponding English words. This is relevant for vocabulary related to rooms, household objects, and spatial prepositions because learners can observe not only what an object is but also where it is located in relation to another object.

Despite the growing literature on audiovisual vocabulary instruction, augmented reality, digital vocabulary tools, and 3D learning media, several research gaps remain. First, a technological-specificity gap persists. Previous studies have largely examined flashcards, audiovisual materials, Wordwall, augmented reality, mobile applications, or other digital platforms, whereas empirical evidence concerning pre-rendered animations created specifically with Cinema 4D for elementary English vocabulary remains limited. The distinction is important because Cinema 4D is not employed in the present study as a student-operated application but as a professional authoring environment through which instructional visualizations are designed and rendered before classroom use. Consequently, findings derived from augmented reality or interactive applications cannot automatically establish the educational value of Cinema 4D-generated instructional animation.

Second, a representational gap exists in the literature. Many technology-assisted vocabulary studies emphasize recognition of isolated objects, word-picture associations, or general vocabulary achievement. Comparatively less attention has been given to the use of three-dimensional animated scenes for simultaneously representing concrete nouns and relational vocabulary, particularly spatial prepositions. Vocabulary such as bedroom, table, or chair can be represented as visible objects, whereas expressions such as under, beside, behind, between, or above depend on relationships between objects. Three-dimensional scenes may therefore offer a distinctive visual context in which learners can observe these relationships rather than relying exclusively on verbal definitions or static illustrations. Third, a pedagogical gap remains because discussions of educational technology sometimes foreground technological features while giving less attention to the instructional mediation surrounding their use. Learning from animation cannot be separated from teacher explanation, pronunciation modeling, questioning, repetition, feedback, and opportunities for learners to respond. Therefore, it is necessary to examine Cinema 4D-generated animations not as an autonomous technological treatment but as supplementary visual media embedded within teacher-facilitated vocabulary instruction.

Fourth, a contextual and empirical gap remains in primary-school English learning in Indonesia. Evidence concerning sophisticated 3D animation has often emerged from different subjects, technologies, educational levels, or learning contexts. Consequently, there is limited context-specific evidence regarding how pre-rendered 3D animation may accompany English vocabulary instruction among elementary-school learners in a regular Indonesian classroom. Addressing this gap is particularly important because technological effectiveness cannot be assumed to transfer uniformly across learner populations, curricular themes, school environments, and instructional practices. These gaps collectively justify a focused investigation that evaluates vocabulary change in a clearly defined classroom context without assuming that the technology itself is inherently superior.

The novelty and original contribution of this study lie in the specific intersection of medium, vocabulary content, pedagogical integration, and elementary-school context. Rather than treating Cinema 4D as an interactive learning platform, this study conceptualizes the software as a production tool for creating pre-rendered three-dimensional animations embedded in teacher-facilitated vocabulary lessons. The animations visualize room environments, household objects, and object-location relationships, thereby linking concrete lexical items with spatial expressions within coherent scenes. This conceptualization differentiates the intervention from augmented-reality applications in which learners manipulate virtual objects directly.

The study therefore extends previous work on visual and digital vocabulary instruction by examining a distinctive form of 3D representation integrated with teacher explanation, pronunciation modeling, questioning, and follow-up practice. Its contribution is also contextual, as it provides empirical evidence from fourth-grade students at SD Negeri 2 Baubau, an elementary-school context that remains underrepresented in the literature discussed above. Furthermore, the study evaluates vocabulary development through descriptive pre–post analysis, inferential statistical comparison, and a standardized within-group effect size, enabling both the statistical significance and magnitude of observed change to be interpreted. Importantly, this original contribution is deliberately bounded. The study does not claim that Cinema 4D is superior to other instructional technologies, nor does it assume that the intervention alone caused any observed improvement. Instead, it provides initial, context-specific empirical evidence concerning vocabulary performance during instruction supported by Cinema 4D-generated animation and establishes a basis for subsequent controlled studies comparing different forms of visual and digital vocabulary instruction.

Accordingly, this study aimed to examine whether the use of Cinema 4D-based animation media was associated with a significant improvement in English vocabulary scores among fourth-grade students at SD Negeri 2 Baubau. The research question was: Does students' English vocabulary achievement improve significantly from pre-test to post-test after instruction supported by Cinema 4D-based animation media? The null hypothesis (H0) stated that there would be no statistically significant difference between pre-test and post-test vocabulary scores, whereas the alternative hypothesis (H1) stated that post-test vocabulary scores would be significantly higher after the intervention. By addressing this question within a clearly defined theoretical, technological, pedagogical, and classroom context, the study seeks to contribute focused empirical evidence to the wider discussion of visually supported vocabulary instruction in elementary education.

METHODS

Research Design

This study employed a quantitative pre-experimental research design using a one-group pretest–posttest approach to examine changes in English vocabulary achievement following instruction supported by Cinema 4D-based animation media. This design involved measuring students' vocabulary knowledge before and after an instructional intervention

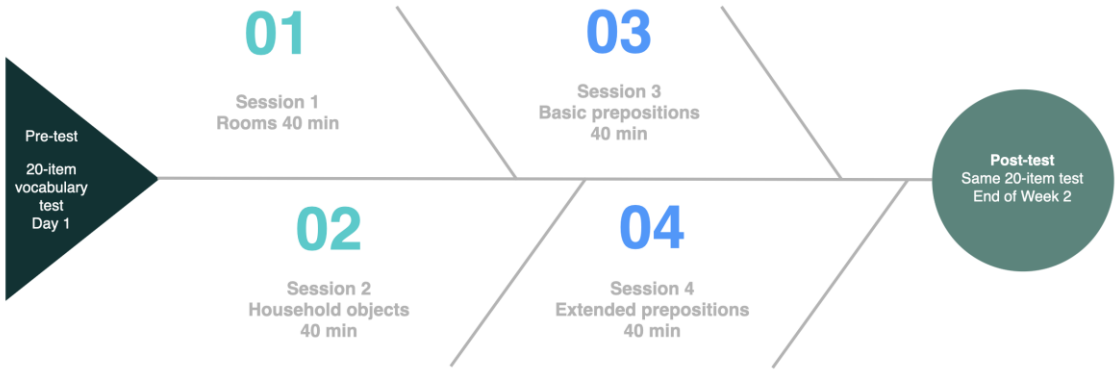


FIGURE 1. *One-group pretest–posttest intervention timeline*

without establishing a separate comparison group. The research followed the sequence O_1–X–O_2, where O_1 represented the vocabulary pre-test, X indicated the Cinema 4D-supported instructional intervention, and O_2 represented the vocabulary post-test.

The intervention was implemented over two weeks, consisting of four instructional sessions lasting approximately 40 minutes each. The research design enabled the comparison of vocabulary achievement within the same group across two measurement points. However, potential influences such as maturation, repeated testing, and regular classroom learning activities were acknowledged when interpreting the results. The implementation sequence is illustrated in **Figure 1**, which presents the actual instructional activities conducted throughout the study.

Figure 1 presents the study-specific sequence beginning with the baseline vocabulary assessment, followed by four instructional sessions, and concluding with the post-test. The sessions progressively addressed rooms in the house, household objects, basic prepositions, and extended prepositions. The timeline illustrates the two-week intervention period and the sequence of classroom activities preceding the final vocabulary assessment.

Participant

The study involved 25 fourth-grade students from SD Negeri 2 Baubau, Indonesia. Participants were selected through purposive intact-class sampling based on classroom accessibility, curriculum relevance, and the availability of students during the research period. One existing fourth-grade class was selected, and all participating students received the same instructional intervention. This sampling approach maintained the regular classroom environment and enabled the researchers to evaluate vocabulary development through repeated measurements. The characteristics of the participants are summarized in **Table 1**.

TABLE 1. *Characteristics of research participants*

Characteristic	Description
Research location	SD Negeri 2 Baubau
Educational level	Elementary school
Grade	Fourth grade
Number of participants	25 students
Sampling technique	Purposive intact-class sampling
Study design	One-group pretest–posttest
Intervention duration	Two weeks
Instructional sessions	Four sessions

TABLE 2. *Vocabulary assessment indicators and instrument specifications*

Indicator	Target vocabulary	Items
Rooms in the house	Bedroom, bathroom, kitchen, living room, dining room	5
Household objects	Bed, table, chair, sofa, cupboard	5
Basic prepositions	In, on, under, beside, behind	5
Extended prepositions	In front of, between, near, above, below	5
Total	20 vocabulary items	20

The sample size was informed by an a priori power analysis for a paired-samples t-test, assuming a standardized mean difference of 0.60, a significance level of .05, and statistical power of .80. The estimated minimum sample was approximately 24 participants, and the final sample comprised 25 students. Written parental consent and student assent were obtained before data collection. Institutional research authorization was issued by the Institute for Research and Community Service of Universitas Muhammadiyah Buton in 2025, with additional permission from the participating school. Participant confidentiality was maintained through anonymized data processing.

Material

The instructional materials consisted of three-dimensional animations developed using Maxon Cinema 4D. Four pre-rendered animation segments were created, each lasting approximately five to seven minutes. The animations illustrated rooms, household furniture, and spatial relationships relevant to the fourth-grade English learning theme "Rooms in My House & Prepositions." The media were reviewed by an educational technology expert and an English education expert, producing an average validation score of 89.5%. The vocabulary indicators and specifications of the instrument are presented in **Table 2**.

The research instrument was a 20-item multiple-choice vocabulary achievement test containing four answer options per item. The instrument assessed students' recognition of room names, household objects, and spatial prepositions. Each correct response received one point, while incorrect responses received zero. Raw scores were multiplied by five to obtain scores ranging from 0 to 100. Content validity was evaluated through expert judgment, resulting in an S-CVI/Ave of 0.88. Internal consistency was assessed using KR-20, yielding a reliability coefficient of 0.76.

Procedure

The research procedure comprised preparation, pre-testing, instructional implementation, post-testing, and data documentation. During preparation, the researchers developed Cinema 4D-based animations, constructed vocabulary assessment instruments, conducted expert validation, and obtained institutional permission. The instructional materials were aligned with the fourth-grade English curriculum and organized into four vocabulary clusters to ensure systematic learning progression. The pre-test was administered before the intervention to determine students' initial vocabulary achievement. Subsequently, students attended four instructional sessions over two weeks, each lasting approximately 40 minutes. The first session introduced rooms in the house, while the second focused on common household objects. The third session addressed basic spatial prepositions, followed by extended prepositions in the fourth session. The intervention schedule and target vocabulary are detailed in **Table 3**.

TABLE 3. *Intervention schedule and target vocabulary*

Stage / Session	Focus	Target vocabulary	Duration
Pre-test	Baseline vocabulary assessment	20-item multiple-choice test	20 min
Session 1	Rooms in the house	Bedroom, bathroom, kitchen, living room, dining room	40 min
Session 2	Household objects	Bed, table, chair, sofa, cupboard	40 min
Session 3	Basic prepositions	In, on, under, beside, behind	40 min
Session 4	Extended prepositions	In front of, between, near, above, below	40 min
Post-test	Post-intervention assessment	Same 20-item multiple-choice test	20 min

During each session, the animations were displayed using a laptop connected to an LCD projector and classroom speakers. The teacher introduced vocabulary, activated prior knowledge, modeled pronunciation, and guided students in identifying objects and spatial relationships within animated scenes. Students participated through oral responses, vocabulary identification, guided exercises, and classroom discussions. Corrective feedback and reinforcement were provided to support vocabulary understanding. Following the fourth session, the post-test was administered using the same 20-item instrument. Both assessments lasted approximately 20 minutes. The use of an identical test enabled direct comparison between measurement occasions, although possible practice effects were considered in interpreting students' improvement.

Data Analysis

Data analysis involved descriptive statistics, normality testing, inferential comparison, and effect-size estimation. First, pre-test and post-test scores were organized and examined for completeness. Descriptive statistics, including means, medians, standard deviations, minimum scores, and maximum scores, were calculated to describe vocabulary achievement. Student scores were categorized into low (below 60), medium (60–79), and high (80–100) achievement levels. Second, paired difference scores were calculated by subtracting pre-test scores from post-test scores. The Shapiro–Wilk test was performed on these differences to evaluate the normality assumption required for parametric analysis. Third, a paired-samples t-test was conducted to determine whether vocabulary achievement changed significantly between the two assessment occasions. Statistical significance was established at $\alpha = .05$. Finally, the mean difference, 95% confidence interval, t statistic, degrees of freedom, and p value were reported. Cohen's dz was calculated by dividing the mean paired difference by the standard deviation of paired differences. This standardized effect size quantified the magnitude of within-group vocabulary change. Statistical findings were interpreted within the limitations of the pre-experimental research design.

RESULTS

The data include the number of participants, mean, median, standard deviation, minimum, and maximum scores for both the pre-test and post-test. These statistics provide an initial overview of score distribution and changes in vocabulary performance following the instructional treatment. The comparison between the two testing phases helps illustrate the general tendency of students' achievement after participating in the learning sessions.

TABLE 5. *Distribution of students by vocabulary score category*

Category	Cut-off score	Pre-test n (%)	Post-test n (%)
Low	< 60	9 (36%)	3 (12%)
Medium	60–79	14 (56%)	11 (44%)
High	80–100	2 (8%)	11 (44%)

As shown in **Table 4**, the mean vocabulary score increased from 61.80 (SD = 11.45) in the pre-test to 75.40 (SD = 11.98) in the post-test, representing an average increase of 13.60 points. The median score also increased from 60 to 75, indicating an upward shift in students' vocabulary performance between the two assessment occasions. Furthermore, the minimum score increased from 40 to 50, while the maximum score increased from 85 to 95. These descriptive findings demonstrate higher vocabulary achievement at post-test compared with pre-test among the participating students. However, descriptive statistics alone cannot determine whether the observed differences are statistically significant. Therefore, further inferential analysis was conducted to examine the statistical significance of the within-group vocabulary score changes.

Score Category Distribution

The scores were classified into three levels: low, medium, and high, based on predetermined cut-off points. This categorization provides a clearer picture of changes in students' performance across achievement levels after the intervention. By comparing the proportions in each category, the table illustrates how students shifted from lower to higher vocabulary achievement following the instructional treatment overall clearly.

Table 5 presents the distribution of students across three vocabulary achievement categories. The proportion of students in the low category decreased from 36% at pre-test to 12% at post-test, while the medium category declined from 56% to 44%. Conversely, the proportion in the high category increased from 8% to 44%. These findings indicate an upward shift in vocabulary achievement across the two assessment occasions. **Figure 2** visualizes this distribution, highlighting the reduced concentration of students in the low category and the increased representation in the high category.

TABLE 4. *Descriptive statistics for pre-test and post-test vocabulary scores*

Measure	n	Mean	Median	SD	Minimum	Maximum
Pre-test	25	61.80	60	11.45	40	85
Post-test	25	75.40	75	11.98	50	95

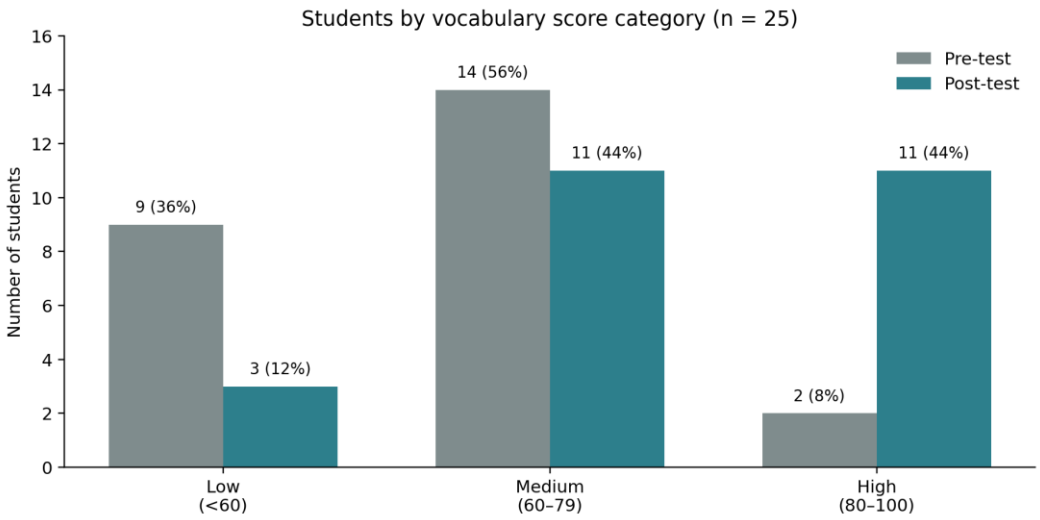


FIGURE 2. *Distribution of students across pre-test and post-test score categories*

The distribution of vocabulary scores improved from the pre-test to the post-test. Students in the low category decreased from 9 (36%) to 3 (12%), while those in the medium category declined from 14 (56%) to 11 (44%). In contrast, the high category increased substantially from 2 students (8%) to 11 students (44%). This pattern indicates an upward shift in vocabulary achievement and supports the descriptive findings that students performed better following the instructional intervention overall.

Normality of the Difference Scores

This analysis was conducted to determine whether the distribution of paired vocabulary score differences satisfied the normality assumption required for subsequent statistical analysis. The results of the normality test are presented in **Table 6**.

The Shapiro–Wilk test produced a W value of .942 with a significance level of p = .169 for the difference scores between post-test and pre-test results. Because the p value is greater than the conventional alpha level of .05, the null hypothesis of normality is not rejected. This result indicates that the distribution of the difference scores does not significantly deviate from a normal distribution. Therefore, the normality assumption required for a paired-samples parametric test is considered satisfied for the 25 participants included in this study.

Paired-Samples Comparison and Effect Size

Figure 3 illustrates the differences in mean vocabulary achievement between the pre-test and post-test, with error bars representing standard deviations. The higher post-test bar indicates improved average performance, consistent with the descriptive statistics presented in **Table 4** and the paired-samples comparison. The relatively similar error-bar lengths suggest that the variability of students' scores remained broadly comparable across the two assessment occasions. Although the mean performance increased, differences in vocabulary achievement among students remained evident. Therefore, the figure provides a visual representation of the observed group-level improvement without establishing that the instructional intervention independently caused the change.

TABLE 6. *Shapiro–Wilk test for post-test minus pre-test difference scores*

Variable	Shapiro–Wilk W	p	Interpretation
Difference score (Post – Pre)	.942	.169	Normality assumption not violated

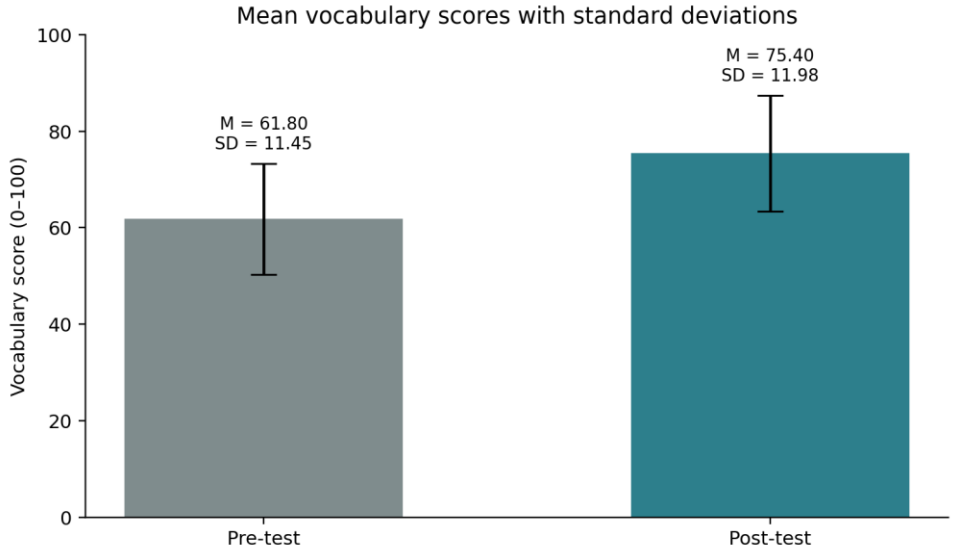


FIGURE 3. *Mean pre-test and post-test vocabulary scores (error bars = SD)*

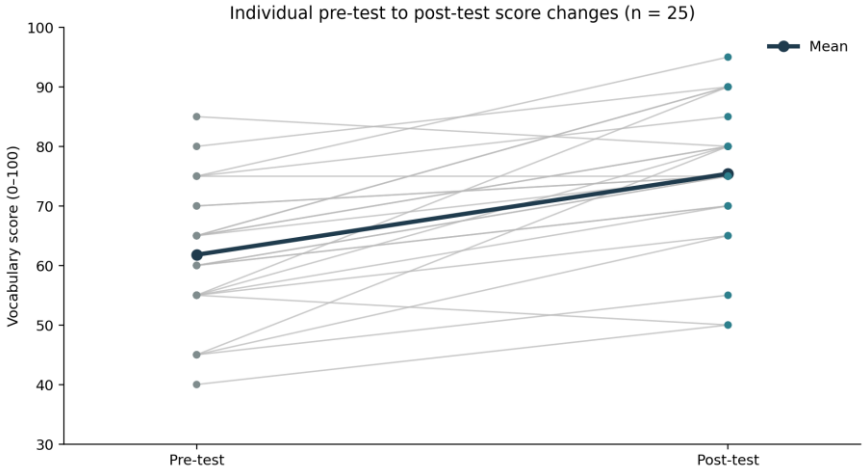


FIGURE 4. *Individual pre-test to post-test vocabulary score changes*

Figure 4 displays individual students' vocabulary score trajectories between the pre-test and post-test assessments. Most students demonstrated upward score trajectories, although the magnitude of change varied across participants. Several students showed substantial improvements, whereas others experienced smaller increases, relatively stable performance, or slight decreases. This variation indicates that the observed group-level improvement was not uniform across all participants. The individual trajectories complement the paired-samples analysis by illustrating differences in vocabulary development that are not fully captured by aggregated statistics. Nevertheless, these patterns represent changes observed during the study period and should not be interpreted as definitive evidence of a causal effect attributable exclusively to Cinema 4D-based animation media.

The group mean also increased from 61.80 to 75.40, confirming the descriptive improvement. Several students recorded substantial gains, those who began with lower or moderate pre-test scores and later reached higher score ranges. At the same time, the trajectories show that the magnitude of improvement varied across participants. Some students showed modest increases, while a small number displayed little change or slight decreases. This variation demonstrates that progress was not identical for every student. Nevertheless, the overall pattern remains positive because most individual score paths

move upward and the average trajectory shows a substantial increase between the two assessment points, supporting the conclusion that vocabulary performance generally improved after the instructional intervention.

Figure 4 complements the paired-samples t-test by showing that the significant mean difference reflects improvement across many students rather than a few cases. The upward movement of the mean line is consistent with the average gain of 13.60 points and the large standardized effect size. However, the differing trajectories highlight the importance of considering individual responses when interpreting group-level outcomes. Students may have benefited to different degrees because of differences in prior vocabulary knowledge, engagement, learning pace, or responsiveness to the instructional activities. Therefore, the figure strengthens the evidence of improved vocabulary achievement while illustrating variation in student progress. Because the study did not include a control group, these gains should still be interpreted as changes observed during the intervention period rather than definitive evidence that the intervention alone caused improvement in students' vocabulary performance.

DISCUSSION

The principal finding was a substantial within-group improvement in English vocabulary performance after students received instruction supported by Cinema 4D-generated 3D animation. The shift toward higher score intervals and the large standardized pre-post difference indicate that the change was educationally meaningful within this group, not merely statistically detectable. At the same time, the result should be interpreted as an association between the intervention period and improved scores rather than definitive proof that Cinema 4D alone caused the gain, because the study did not include a control group.

A plausible explanation for the improvement is the additional visual support provided by the animations. Mayer's Cognitive Theory of Multimedia Learning proposes that learners can build more coherent mental representations when relevant words and visuals are coordinated and unnecessary processing is minimized Mayer (2021). In the present study, the 3D animations supplied visual referents for target vocabulary while instruction supplied the corresponding verbal labels and explanations. This may have helped students connect unfamiliar English words with concrete representations. The study did not directly measure cognitive processing, however, so this mechanism should be understood as a theoretically informed interpretation rather than a measured mediating effect.

The finding is broadly consistent with vocabulary studies using other visual and digital approaches. Puspita et al. (2021) reported audiovisual support for vocabulary learning, Katasila and Poonpon (2022) examined blended learning for primary vocabulary knowledge, Chuang et al. (2022) and Hsu and Hwang (2023) used augmented-reality approaches in elementary vocabulary learning, and Rahmawati (2024) examined an Animal 4D application for English vocabulary. Comparable vocabulary-oriented benefits have also been reported with image media, flashcards, Wordwall, domino cards, and drill-based practice (Bulan & Idhar, 2021; Ervin et al., 2024; Mahama & Arifin, 2021; Rosyidi & Lailiyah, 2024; Wedananta et al., 2024; Yusuf et al., 2023). These converging findings suggest that the common instructional advantage may lie less in a single software package than in providing repeated, meaningful, and visually supported encounters with target words.

The observed improvement can be interpreted through Mayer's Cognitive Theory of Multimedia Learning, which emphasizes the integration of verbal and visual information to support meaningful learning (Mayer, 2021). In the present study, Cinema 4D-generated animations provided three-dimensional representations of rooms, household objects, and spatial relationships, while the teacher facilitated vocabulary recognition through explanations, pronunciation modeling, questioning, and guided exercises. These learning activities may have supported students in connecting unfamiliar English vocabulary with concrete visual references. Particularly for spatial prepositions, animated scenes enabled

learners to observe object relationships that may be difficult to communicate through verbal explanations alone. However, cognitive processing and learning mechanisms were not directly measured; therefore, this interpretation remains theoretically informed rather than empirically established as a mediating mechanism.

The findings are broadly consistent with previous investigations highlighting the potential contribution of visual and digital learning media to English vocabulary development. Puspita et al. (2021) examined audiovisual media in vocabulary instruction, while Katasila and Poonpon (2022) investigated blended learning approaches for improving primary school students' vocabulary knowledge. Similarly, Chuang et al. (2022) and Hsu and Hwang (2023) explored augmented-reality-supported English vocabulary learning, whereas Rahmawati (2024) examined the implementation of the Animal 4D application in elementary English instruction. Studies involving flashcards, picture-supported instruction, Wordwall activities, and vocabulary games have also demonstrated the educational relevance of combining verbal information with meaningful visual representations (Bulan & Idhar, 2021; Ervin et al., 2024; Mahama & Arifin, 2021; Rosyidi & Lailiyah, 2024; Wedananta et al., 2024). These studies provide a broader context for understanding why visually supported vocabulary instruction may accompany improved learning performance.

Nevertheless, previous research has also reported findings that differ from the positive within-group pattern observed in the present study. Pramesti and Ningrum (2025), investigating YouTube-based animation videos for English vocabulary instruction, reported significant improvement within the experimental group but found no statistically significant difference between experimental and control groups. Similarly, Karakaş and Sarıçoban (2012) examined incidental vocabulary learning through subtitled animated cartoons and found that both subtitle and non-subtitle groups demonstrated significant vocabulary improvement, although the difference between the groups was not statistically significant. These findings illustrate an important distinction between improvements observed within a group and evidence that a particular instructional medium outperforms an alternative. Consequently, the significant vocabulary improvement identified in the present study should not be interpreted as demonstrating the superiority of Cinema 4D-based animation over conventional instruction or other digital learning media.

Additional evidence of variation in multimedia vocabulary learning outcomes was presented by Zhang et al. (2025) through a meta-analysis comparing first-language-based, picture-based, and combined verbal–pictorial learning conditions. Their findings indicated that combined verbal and pictorial input produced stronger immediate vocabulary outcomes than either input type alone. However, the difference between first-language-based and picture-based conditions was not statistically significant, while the advantage of combined input over picture-based input was less conclusive in delayed assessments. These findings suggest that the educational contribution of multimedia materials depends on the organization of instructional information, the types of representations provided, and the timing of vocabulary assessment. In relation to the present study, the use of three-dimensional animation may provide useful contextual information, but its comparative advantages and contribution to long-term vocabulary retention remain uncertain.

Differences between the present findings and previous research may also be associated with variations in educational settings, participant characteristics, instructional procedures, and assessment instruments. The current study involved 25 fourth-grade elementary school students who participated in four instructional sessions over two weeks. In contrast, Karakaş and Sarıçoban (2012) investigated university-level English language teaching students, while Pramesti and Ningrum (2025) examined students at the junior secondary educational level. Furthermore, the present study assessed vocabulary recognition immediately after the instructional intervention, whereas other investigations employed different learning materials, comparison conditions, and assessment procedures. These methodological differences limit direct comparisons of statistical outcomes and

suggest that vocabulary learning patterns should be interpreted within their respective educational contexts.

The present research also differs from studies investigating other forms of three-dimensional and interactive educational technologies. Franata et al. (2023) developed interactive multimedia involving 3D animation, whereas Munir and Wanti (2022) examined augmented-reality-assisted English learning media. Nanda et al. (2022) investigated Android-based augmented-reality 3D card media in mathematics learning, while Putri and Rohmani (2024) reviewed three-dimensional animation applications in elementary science education. Although these investigations highlight the broader educational applications of digital visualization, their technological characteristics, subject matter, and learning objectives differ from those examined in the present study. Cinema 4D was employed here as an animation development and rendering tool rather than an interactive application directly operated by students. This distinction is important because the educational experience involved teacher-guided observation of pre-rendered visual scenes rather than real-time manipulation of virtual objects.

An important contribution of the present study concerns the integration of concrete nouns and relational vocabulary within coherent three-dimensional instructional scenes. Vocabulary related to rooms and household objects can be introduced through recognizable visual representations, while spatial expressions require learners to identify relationships between objects. Animated scenes depicting objects positioned under, beside, behind, or between other objects may provide contextual support for interpreting these relationships. This instructional arrangement extends beyond presenting isolated vocabulary items by organizing words within visually meaningful situations. Nevertheless, because separate vocabulary domains were not analyzed independently, the study cannot determine whether spatial prepositions benefited more from animation-supported instruction than concrete nouns. Further investigation is required to establish whether different vocabulary categories respond differently to three-dimensional visual representation.

From a pedagogical perspective, the findings emphasize the importance of integrating digital animation with structured classroom instruction. The teacher's role extended beyond displaying animated materials and included introducing vocabulary, modeling pronunciation, guiding observation, encouraging responses, providing corrective feedback, and reinforcing learned words. These activities suggest that the instructional experience involved multiple learning components rather than exposure to animation alone. Previous research on digital learning environments has similarly emphasized the importance of instructional design, teacher facilitation, and the alignment of educational media with learning objectives (Dewi, 2022; Kartikasari & Suryarini, 2023; Okra, 2023; Sugiantara et al., 2024). Therefore, Cinema 4D-based animation should be considered supplementary instructional media that may complement established vocabulary teaching practices rather than a replacement for teacher-mediated learning.

Several methodological limitations should be considered when interpreting the findings. First, the pre-experimental one-group pre-test–post-test design did not include a comparison group, making it impossible to isolate the contribution of Cinema 4D-based animation from other influences, including repeated testing, maturation, and regular classroom learning experiences. Second, the relatively small sample of 25 students from one elementary school limits the generalizability of the findings to other educational populations and settings. Third, the same vocabulary assessment instrument was administered at both measurement occasions, introducing the possibility that familiarity with the test items contributed to higher post-test scores. Fourth, the post-test was conducted immediately after the instructional period, preventing conclusions about long-term vocabulary retention. Finally, the assessment focused on vocabulary recognition rather than productive language abilities, such as spontaneous speaking, sentence construction, or independent writing. Students' motivation, engagement, and confidence were also not systematically measured using validated instruments.

Future research should address these limitations through controlled experimental or quasi-experimental designs involving larger samples from multiple schools. Comparisons between Cinema 4D-generated animation, static picture media, conventional audiovisual instruction, and other digital learning approaches would help clarify whether different instructional representations produce distinguishable vocabulary outcomes. Delayed post-tests should also be incorporated to evaluate vocabulary retention beyond immediate assessment. Furthermore, future investigations could examine receptive and productive vocabulary separately, particularly differences between concrete nouns and spatial prepositions. Additional attention should be given to students' prior knowledge, instructional engagement, animation complexity, and teacher facilitation as potential factors associated with vocabulary learning outcomes. Such investigations would provide a stronger empirical foundation for understanding the educational conditions under which three-dimensional animation can contribute meaningfully to elementary English vocabulary instruction.

Overall, the present study contributes context-specific evidence of improved English vocabulary performance during a two-week instructional period supported by Cinema 4D-generated animation. Its principal contribution lies in examining pre-rendered three-dimensional visualizations integrated with teacher-facilitated instruction for concrete and relational vocabulary in an Indonesian elementary school classroom. When considered alongside supporting, contrasting, and statistically non-significant findings from previous research, the results suggest that the potential value of animation-based vocabulary instruction should be understood in relation to instructional design, classroom context, and assessment conditions rather than technological features alone. The findings therefore provide a basis for further comparative research while avoiding unsupported claims concerning the independent effectiveness or superiority of Cinema 4D-based animation media.

CONCLUSION

This pre-experimental one-group pretest–posttest study found that 25 fourth-grade students obtained higher English vocabulary scores after participating in four Cinema 4D-supported instructional sessions over two weeks. Mean scores increased from 61.80 (SD = 11.45) to 75.40 (SD = 11.98), and the paired analysis showed a statistically significant mean increase of 13.60 points, $t(24) = 6.63$, $p < .001$, with a large standardized pre–post difference (Cohen's $dz = 1.33$). These findings indicate that Cinema 4D-based visualizations have potential as a classroom support for teaching vocabulary related to rooms, household objects, and spatial prepositions. The findings should not be interpreted as evidence that the intervention alone caused the observed improvement. The study involved one school, a small sample, a short intervention, no control group, the same test at both measurement points, and no delayed assessment of retention. Accordingly, Cinema 4D is best viewed as a promising instructional support whose effectiveness should be examined further through controlled studies with larger samples, equivalent pre-/post-test forms, and follow-up assessments.

AUTHOR CONTRIBUTIONS

The contributions of all authors were identified in accordance with the Contributor Roles Taxonomy (CRediT) to ensure transparency and accountability throughout the research process.

Farisatma: Conceptualization, Methodology, Investigation, Project administration, Writing – original draft, and Writing – review & editing.

Isaac John Ibanga: Conceptualization, Validation, Supervision, and Writing – review & editing.
Fitriani B: Methodology, Investigation, Resources, Data curation, and Writing – review & editing.
Irman Matje: Software, Validation, Visualization, and Resources.
Fahril Ramadhani: Investigation, Formal analysis, Data curation, Visualization, and Writing – original draft.
All authors contributed to the development and completion of the manuscript according to their respective responsibilities. The authors collectively take responsibility for the integrity of the research, the accuracy of the reported findings, and the academic content of the publication. All authors have read, reviewed, and approved the final version of the manuscript and agreed to its submission for publication.

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ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The research involved 25 fourth-grade students at SD Negeri 2 Baubau, Indonesia. Institutional research authorization was issued by the Institute for Research and Community Service (Lembaga Penelitian dan Pengabdian kepada Masyarakat/LPPM), Universitas Muhammadiyah Buton, in 2025, and permission was obtained from the participating school. The institutional authorization constituted research permission; no separate research ethics committee approval number was assigned. Before participation, written informed consent was obtained from parents or legal guardians, alongside age-appropriate assent from participating students. Participation was voluntary, and students could withdraw without academic consequences. Participant identities were anonymized through coded records to protect confidentiality. The manuscript reports aggregated educational assessment results. Separate authorization for the publication of identifiable photographs, recordings, or personal information has not been documented and should not be presumed.

DECLARATION OF COMPETING INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the research reported in this manuscript. The research findings and their interpretation were prepared in accordance with principles of academic integrity, transparency, and responsible scientific reporting.

DATA AVAILABILITY STATEMENT

The data supporting the findings consist of students' vocabulary pre-test and post-test scores, descriptive statistical summaries, and paired-comparison results. Because the participants were elementary school children, individual-level information requires appropriate confidentiality protection. The availability of anonymized datasets, research instruments, and supporting statistical materials is subject to institutional requirements and participant consent. Requests for access may be directed to the corresponding author,

Farisatma, at farisatma.umbuton@gmail.com, and will be considered in accordance with applicable ethical and data-protection requirements.

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DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE MANUSCRIPT PREPARATION PROCESS

During the preparation of this work, the authors used Claude (Claude Opus 5.5, Anthropic) in order to improve the language and readability of the manuscript. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the published article.

REFERENCES

1. Abedi, S. R., & Chhibber, S. (2023). Leveraging Social Media Platforms to Enhance Students' English Proficiency: A Comprehensive Analysis. In *Language, Technology, and Social Media* (Vol. 1, Issue 2, pp. 34–42). WISE Pendidikan Indonesia. https://doi.org/10.70211/ltsm.v1i2.76
2. Bulan, A., & Idhar, I. (2021). Developing Noun Words Domino Card (NWDC) Learning Media to Improve English Vocabulary Mastery of Junior High School Students. In *VELES Voices of English Language Education Society* (Vol. 5, Issue 2, pp. 192–205). Universitas Hamzanwadi. https://doi.org/10.29408/veles.v5i2.4028
3. Chuang, H.-C., Gunawan, V., Wu, W.-C., & Chuang, K.-L. (2022). Using Thematic English Learning and Augmented Reality to Enhance Vocabulary Learning Motivation and Enjoyment of Elementary School Students. In *2022 International Conference on Advanced Learning Technologies (ICALT)* (pp. 256–258). IEEE. https://doi.org/10.1109/icalt55010.2022.00083
4. Dewi, C. (2022). Digital Literacy Analysis of Elementary School Students Through Implementation of E-Learning Based Learning Management System. In *Journal of Education Technology* (Vol. 6, Issue 2, pp. 199–206). Universitas Pendidikan Ganesha. https://doi.org/10.23887/jet.v6i2.44160
5. Ervin, E., Ariyani, A., & Mawe, R. (2024). Using Word wall Media to Increase Students' English Vocabulary Treasury. In *Indonesian Journal of Pedagogical and Social Sciences* (Vol. 3, Issue 2). Universitas Negeri Makassar. https://doi.org/10.26858/.v3i2.56980
6. Fauziah, M., Fauziah, Y., & Dzulkurnain, M. I. (2024). Development of lesson study-based learning materials to enhance reading skills of elementary school students. In *Multidisciplinary Science Journal* (Vol. 7, Issue 1, p. 2025062). Malque Publishing. https://doi.org/10.31893/multiscience.2025062
7. Franata, H., Sahputra, E., Wijaya, A., & Marhalim, M. (2023). Interactive Multimedia Introduction To 3D Animation-Based Body Management Procedures For Muhammadiyah 1 Elementary School Students Bengkulu City. In *Jurnal Komputer, Informasi dan Teknologi* (Vol. 3, Issue 1). Indonesian Journal Publisher.

https://doi.org/10.53697/jkomitek.v3i1.1194
8. Guslinda, G., Kurniaman, O., Firdaus, L. N., & Hadriana, H. (2024). Developing Local Wisdom-Based Teaching Materials on “Family Addressing Terms" for Elementary School Students: Validation Analysis Using the 4D Model. In *Multidisciplinary Journal of School Education* (Vol. 13, Issue 1). Jesuit University Ignatianum - Ignatianum University Press. https://doi.org/10.35765/mjse.2024.1325.15
9. Hsu, T.-C., & Hwang, G.-J. (2023). The Application of Augmented Reality in English Vocabulary Learning for Elementary School Students. In *Learning, Design, and Technology* (pp. 2997–3014). Springer International Publishing. https://doi.org/10.1007/978-3-319-17461-7_28
10. Karakaş, A., & Sarıçoban, A. (2012). The impact of watching subtitled animated cartoons on incidental vocabulary learning of ELT students. Teaching English with Technology, 12(4), 3–15. https://doi.org/10.11648/j.cls.s.2017030101.11
11. Kartikasari, E., & Suryarini, D. Y. (2023). Implementation of Blog-Based Learning Media: Community Service for Elementary School Teachers. In *Journal of Education Method and Learning Strategy* (Vol. 1, Issue 2, pp. 46–51). PT. Riset Press International. https://doi.org/10.59653/jemls.v1i02.50
12. Katasila, P., & Poonpon, K. (2022). The Effects of Blended Learning Instruction on Vocabulary Knowledge of Thai Primary School Students. In *English Language Teaching* (Vol. 15, Issue 5, p. 52). Canadian Center of Science and Education. https://doi.org/10.5539/elt.v15n5p52
13. Kowiyah, & Margiaty, A. (2024). Development of Two-Dimensional Figure Jenga Media to Improve Students’ Learning Outcome in Elementary School. In *JIP Jurnal Ilmiah PGMI* (Vol. 10, Issue 1, pp. 89–101). State Islamic University of Raden Fatah Palembang. https://doi.org/10.19109/jip.v10i1.23940
14. Kurniawati, D. S., Suryawan, A., & Rahmawati, P. (2023). The Influence of the Problem Based Learning Model Assisted by Media Bio Briquettes to Students ’ Science Process Skills. In *Journal of Elementary School Education* (pp. 182–187). PT. Berlian Pustaka Indonesia. https://doi.org/10.62966/joese.v1i3.323
15. Mahama, S., & Arifin, M. B. U. (2021). The Effect of Using Image Media to Increase English Learning Outcomes for Class 6 Students at Elementary School. In *Academia Open* (Vol. 4). Universitas Muhammadiyah Sidoarjo. https://doi.org/10.21070/acopen.4.2021.3050
16. Mardiana, M., Jaya, W. S., & Marcela, E. D. (2021). The Effect Of Using Image Media and Vocabulary Mastery on Narrative Composition Ability in Elementary School Students. In *IJLHE: International Journal of Language, Humanities, and Education* (Vol. 4, Issue 2, pp. 109–114). STKIP PGRI Bandar Lampung. https://doi.org/10.52217/ijlhe.v4i2.860
17. Mayer, R. E. (2021). *Multimedia learning* (3rd ed.). Cambridge University Press. https://doi.org/10.1017/9781316941355
18. Mukhtar, M., Kune, S., & Syamsuddin, R. (2022). The Effect of Multiple Intelligences-Based Learning Strategies on the Naturalist Intelligence of Elementary School Students. In *Pedagogik Journal of Islamic Elementary School* (pp. 213–226). Institut Agama Islam Negeri (IAIN) Palopo. https://doi.org/10.24256/pijies.v5i2.2791
19. Munir, F. S., & Wanti, P. (2022). Development of English Learning Media for Elementary School Students Assisted Augmented Reality Technology Based Android. In *Edumaspul: Jurnal Pendidikan* (Vol. 6, Issue 2, pp. 1839–1849). STKIP Muhammadiyah Enrekang. https://doi.org/10.33487/edumaspul.v6i2.4392
20. Nanda, L. K. S., Trisniawati, T., & Muanifah, M. T. (2022). Development of Android-Based Augmented Reality 3D Card Media for Elementary School Students. In *AlphaMath : Journal of Mathematics Education* (Vol. 8, Issue 1, p. 88). Lembaga Publikasi Ilmiah dan Penerbitan Universitas Muhammadiyah Purwokerto. https://doi.org/10.30595/alphamath.v8i1.12920
21. Novitasari, W., & Herwin. (2023). How do Teachers Enhance Elementary School Students’ Numeracy Through the Integration of Singing and Jarimatika Methods? In

Jurnal Penelitian Pendidikan (Vol. 15, Issue 1, pp. 63–72). STKIP PGRI Pacitan. https://doi.org/10.21137/jpp.2023.15.1.8

22. Nuzulia, N. (2021). The Effectiveness of The use of Snake and Ladder Media in The Material of The Kingdoms of Islam, Hinduism and Buddhism Based on The Hots Problem of Students Learning Outcomes in Elementary Schools. In *Madrosatuna: Journal of Islamic Elementary School* (Vol. 5, Issue 1, pp. 17–23). Universitas Muhammadiyah Sidoarjo. https://doi.org/10.21070/madrosatuna.v5i1.1392
23. Okra, R. (2023). The development of educational game-based learning media in natural science subject for elementary school students. In *Jurnal Inovasi Teknologi Pendidikan* (Vol. 10, Issue 2, pp. 122–132). Universitas Negeri Yogyakarta. https://doi.org/10.21831/jitp.v10i2.54890
24. Pratiwi, W. O., Sunyono, S., Rohman, F., & Firdaus, R. (2024). Unveiling the needs for ethnoscience-based e-worksheets to enhance nature of science and environmental awareness of elementary school students. In *Indonesian Journal of Science and Mathematics Education* (Vol. 7, Issue 1, p. 118). Raden Intan State Islamic University of Lampung. https://doi.org/10.24042/ijsme.v7i1.21099
25. Pramesti, C. E., & Ningrum, Y. S. (2025). The effectiveness of YouTube animation videos to improve students' vocabulary mastery. Premise: Journal of English Education and Applied Linguistics, 14(3), 866–885. https://doi.org/10.24127/pj.v14i3.13686
26. Puspita, A., Sutarsyah, C., & Burhanuddin, B. (2021). The implementation of Audio Visual Media in improving students' vocabulary mastery through WhatsApp. In *U-Jet: Unila Journal of English Language Teaching* (Vol. 10, Issue 2). Lembaga Penelitian dan Pengabdian kepada Masyarakat Universitas Lampung. https://doi.org/10.23960/ujet.vol10.i2.202102
27. Putri, A., & Rohmani. (2024). Effectiveness of Digital Learning Media Using 3D Animation to Improve Elementary School Science Learning Outcomes : Literatur Review. In *RUKASI: Jurnal Ilmiah Perkembangan Pendidikan dan Pembelajaran* (Vol. 1, Issue 2). PT Ruang Publikasi. https://doi.org/10.70294/xv6n5d69
28. Rahmawati, L. (2024). Use of the Animal 4D Application to Improve English Vocabulary for Elementary School Children. In *Scientechno: Journal of Science and Technology* (Vol. 3, Issue 1, pp. 22–40). Yayasan Pendidikan Islam Daarut Thufulah. https://doi.org/10.55849/scientechno.v3i1.709
29. Reed, S. S., Mullen, C. A., & Boyles, E. T. (2021). Correction to: Problem-Based Learning in Elementary School. In *SpringerBriefs in Education*. Springer International Publishing. https://doi.org/10.1007/978-3-030-70598-5_6
30. Riskyka, Lubis, R. R., & Yusnita, N. C. (2023). Development of Media Puzzle Using Game Based Learning Approach to Improve Learning Outcomes Student Mathematics in Elementary School. In *Journal of Elementary School Education* (pp. 188–194). PT. Berlian Pustaka Indonesia. https://doi.org/10.62966/joese.v1i3.338
31. Rosyidi, Z., & Lailiyah, N. (2024). The Implementation of the Demonstration Method Through Flashcard Media to Enhance English Vocabulary Comprehension in Elementary School Students (MI/SD). In *DIDAKTIKA: Jurnal Pendidikan Sekolah Dasar* (Vol. 7, Issue 1, pp. 7–16). Universitas Negeri Yogyakarta. https://doi.org/10.21831/didaktika.v7i1.69588
32. Sari, N. A., Rahayu, D. W., Kasiyun, S., & Ghufron, S. (2022). Implementation of the School Literacy Movement in Fostering Reading Interest in Elementary School Students. In *Jurnal Sekolah Dasar* (Vol. 7, Issue 2). Universitas Buana Perjuangan Karawang. https://doi.org/10.36805/jurnalsekolahdasar.v7i2.2120
33. Sugiantara, I. K., Yudiana, K., & Sukmayasa, I. M. H. (2024). Canva-Based Interactive Digital Comics on Science Content to Enhance Elementary School Students' Learning Outcomes. In *International Journal of Language and Literature* (Vol. 8, Issue 1, pp. 41–53). Universitas Pendidikan Ganesha. https://doi.org/10.23887/ijll.v8i1.93084
34. Suratin, S. I., Lestari, R., & Sabarudin, S. (2023). Implementation and Reinforcement of Religious Moderation Attitudes Among Students at Lempuyangwangi Public

Elementary School, Yogyakarta. In *HEUTAGOGIA: Journal of Islamic Education* (Vol. 3, Issue 2, pp. 237–248). Al-Jamiah Research Centre. https://doi.org/10.14421/hjie.2023.32-08

35. Suryanto, S., & Brawijaya, A. (2024). Exploring Elementary School English Teachers' Voices in Gaining Students' Attention in Learning. In *Journal of English and Education (JEE)* (pp. 1–16). Universitas Islam Indonesia (Islamic University of Indonesia). https://doi.org/10.20885/jee.v10i1.33714
36. Susanti, E. R. (2020). Using Big Books to Promote the Elementary School Students' Participation in English Classes. In *PANYONARA: Journal of English Education* (Vol. 2, Issue 2, p. 97). Institut Agama Islam Negeri Madura. https://doi.org/10.19105/panyonara.v2i2.3620
37. Syamsuriyanti, S., Nurfaega, N., & Nawir, M. (2021). The Effect of PowerPoint Media on the Learning Outcomes of Elementary School Students in Social Studies subjects. In *Pedagogik Journal of Islamic Elementary School* (pp. 165–174). Institut Agama Islam Negeri (IAIN) Palopo. https://doi.org/10.24256/pijies.v4i2.2960
38. Wedananta, I. K. Y. P., Utami, I. G. A. L. P., & Suprianti, G. A. P. (2024). Advancing Elementary Vocabulary Education with Wordwall-Based Digital Media. In *Journey: Journal of English Language and Pedagogy* (Vol. 7, Issue 2, pp. 306–317). IKIP Budi Utomo Malang. https://doi.org/10.33503/journey.v7i2.843
39. Widayanti, I., & Juhji, J. (2023). Developing STEM-Based PowToon Animation Videos to Enhance Critical Thinking Skills in Elementary School Students. In *Journal of Integrated Elementary Education* (Vol. 3, Issue 2, pp. 98–108). UIN Walisongo Semarang. https://doi.org/10.21580/jieed.v3i2.17483
40. Yusnan, M., Asnidar, A., & Ramadhani, F. (2024). Implementing interactive videos based on local cultural values to enhance character education among elementary school students. *Premiere Educandum: Jurnal Pendidikan Dasar dan Pembelajaran*, *14*(2). https://doi.org/10.25273/pe.v14i2.22262
41. Yusuf, F., Usman, H., & Irfan, M. (2023). The Use of Drill Method to Improve Elementary School Students' Learning Outcomes in Vocabulary. In *JETLEE : Journal of English Language Teaching, Linguistics, and Literature* (Vol. 3, Issue 1, pp. 13–21). Institute Agama Islam Negeri Lhokseumawe. https://doi.org/10.47766/jetlee.v3i1.1137
42. Zainuddin, Z. (2024). Development of an Islamic-based English textbook for third Grade Elementary Students. In *ELEMENTARY : Journal of Primary Education* (Vol. 2, Issue 1, pp. 1–7). Institut Ilmu Keislaman Zainul Hasan Genggong. https://doi.org/10.55210/elementary.v2i1.345
43. Zhang, C., Sala, G., & Gobet, F. (2025). Effectiveness of L1 and pictures in multimedia conditions on learning second-language vocabulary: A meta-analysis. Educational Research Review, 47, Article 100681. https://doi.org/10.1016/j.edurev.2025.100681