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The Influence of Using Audio-Visual Animation Media on Learning Outcomes

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ABSTRACT

This study examines the effect of animated audio-visual media on students' learning outcomes in Indonesian language lessons at MI NW Loang Sawak. Using a quantitative approach with a one-group pretest–posttest design, the research involved 11 sixth-grade students who were assessed before and after the implementation of animated audio-visual media. Data were collected through essay-based performance tests measuring students' ability to comprehend children's stories, including identifying themes, characters, settings, and moral messages. The results show an increase in the average score from 6.42 (pretest) to 6.74 (posttest), indicating a moderate improvement in students' comprehension skills. A paired sample t-test revealed a significant difference between the pretest and posttest scores ($t = 4.892$, $p < .01$), confirming that the use of animated audio-visual media had a meaningful impact on learning outcomes. These findings demonstrate that visual and auditory stimulation supports students' engagement and understanding, particularly in narrative comprehension. The study concludes that animated audio-visual media is an effective instructional tool for enhancing Indonesian language learning at the elementary school level.

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INTRODUCTION

Learning is a complex, lifelong process that involves dynamic interactions between individuals and their learning environments, resulting in changes in cognitive, affective, and psychomotor domains. From a contemporary educational perspective, learning is no longer viewed merely as the transmission of knowledge but as a constructive process that requires students' active engagement in building understanding through meaningful experiences (Arsyad, 2007; Schunk, 2020). Consequently, the quality of learning is highly dependent on how instructional experiences are designed to be contextual, engaging, and aligned with learners' characteristics.

The rapid advancement of digital technology has significantly transformed educational paradigms, shifting instruction from traditional teacher-centered approaches toward more flexible, interactive, and technology-enhanced learning environments. The integration of technology in education enables teachers to create richer learning experiences through diverse digital media, including audio-visual and animated resources (Sanjaya, 2009; Bond et al., 2020; Ali et al., 2023; Aini et al., 2023). Previous studies have demonstrated that the effective use of educational technology can enhance student engagement, instructional efficiency, and learning outcomes (OECD, 2021).

One widely used form of technology integration in education is animated audio-visual media. This type of media combines dynamic visual elements with audio components, allowing abstract concepts to be presented in a more concrete and comprehensible manner. Multimedia learning theory posits that the efficacy of learning is enhanced when information is presented concurrently via visual and auditory channels, as opposed to a singular modality (Hamalik, 1985; Mayer, 2021; Ali et al., 2025; Aini et al., 2025). Accordingly, animated audio-visual media hold considerable potential for improving conceptual understanding and learning retention among students.

Nevertheless, the effectiveness of animated audio-visual media is not automatic but largely depends on teachers' competencies in selecting, designing, and implementing instructional media in accordance with learning objectives and students' cognitive characteristics. Inappropriate or poorly designed media may increase cognitive load and hinder the learning process instead of facilitating it (Danim, 1994; Mayer, 2021). Therefore, the pedagogical use of instructional media must be grounded in sound instructional design principles to ensure meaningful contributions to students' learning outcomes.

In teaching Indonesian at the Madrasah Ibtidaiyah (Islamic elementary school), using animated audio-visual media is especially important because young learners need visual and sound stimulation to keep their attention and motivation. As a foundational subject, the Indonesian language plays a strategic role in developing students' literacy skills, communication abilities, and critical thinking from an early age (Sagala, 2008; Ministry of Education and Culture, 2022; Ali et al., 2026). Animated audio-visual media can support students in understanding language concepts more contextually while fostering positive attitudes toward language learning.

While many studies have looked at how audio-visual media is used in education, there are not many that specifically explore how animated audio-visual media affects learning outcomes in Indonesian language for students in Madrasah Ibtidaiyah, especially those that thoroughly evaluate thinking, feelings, and physical skills. This research gap points to the need for further empirical evidence to strengthen the understanding of the effectiveness of animated audio-visual media in primary language education. Therefore, this study aims to analyze the effect of animated audio-visual

media on students' learning outcomes while also contributing theoretically and practically to the development of technology-enhanced Indonesian language instruction at the elementary level.

METHOD

Research Design

This study employed a quantitative approach using a quasi-experimental design. The quantitative approach was selected because the data analyzed were numerical in nature and required statistical hypothesis testing. Quasi-experimental designs are frequently utilized in educational research, enabling researchers to implement specific treatments without complete randomization while preserving internal validity (Creswell & Guetterman, 2019). In this study, the treatment involved the use of audiovisual animation media in Indonesian language learning.

The design adopted was a one-group pretest–posttest design, in which the same group of students was administered a pretest, received the treatment, and subsequently completed a posttest to examine changes in learning outcomes. This design is widely used to evaluate the effectiveness of instructional interventions, as it enables the identification of learning gains following the treatment (Fraenkel et al., 2021).

Population and Sample

The population of this study consisted of all sixth-grade students of MI NW Loang Sawak in the 2021/2022 academic year, as documented in the original research records. All members of the population were included as research participants; therefore, total sampling was employed. This technique is appropriate when the population size is relatively small and all members can feasibly be involved in the study (Etikan & Bala, 2017). Including all sixth-grade students ensured that the findings accurately reflected the overall classroom condition.

Research Instruments

The main instruments used in this study were as follows:

1. Learning Achievement Test

The test was designed to measure students' abilities before and after the treatment. The instrument consisted of essay-type questions aligned with Indonesian language learning competencies, including characters and characterization, setting, theme, and moral messages in narrative texts, as specified in the research documentation. Content validity was examined by evaluating alignment with the curriculum and learning indicators. To enhance objectivity, scoring was conducted using a criterion-referenced rubric (Brookhart & Nitko, 2019).

2. Documentation

Documentation was utilized to obtain supporting data, such as students' previous semester scores and the school profile. The documentation method is suitable for gathering historical data that tests or direct observation cannot provide (Bowen, 2022).

Research Procedures

The study was conducted through the following stages:

1. Preparation: Developing test instruments, validating them, and preparing audiovisual animation media for instructional use.
2. Pretest Administration: Administering a pretest to all students to assess their initial abilities.

3. Treatment Implementation: Conducting Indonesian language instruction using audiovisual animation media based on the lesson plan.
4. Posttest Administration: Administering a posttest after the treatment to examine changes in learning outcomes.
5. Data Analysis: Processing pretest and posttest scores using statistical analysis.

This procedural model aligns with experimental research practices in education that emphasize treatment consistency and instrument standardization (Fraenkel et al., 2021).

Data Analysis Techniques

Data were analyzed using inferential statistics, specifically a paired-sample t-test. This test was applied to determine whether there was a significant difference between pretest and posttest scores within the same group. The paired-sample t-test is appropriate for one-group pretest-posttest designs, as it measures changes before and after the treatment (Gliner et al., 2021).

The analysis steps included:

1. Calculating score differences ($D = X - Y$) between pretest and posttest.
2. Determining the mean difference (MD).
3. Calculating the standard deviation of the differences (SDD).
4. Computing the standard error (SE).
5. Calculating the obtained *t* value.

The calculated *t* value was then compared with the critical *t* value at a 0.05 significance level. If *t*calculated > *t*table, the use of audiovisual animation media was considered to have a significant effect on students' learning outcomes.

Prior to conducting the t-test, data normality was examined using the Shapiro–Wilk test due to the small sample size. Statistical analyses were performed using commonly applied software in educational research, such as SPSS or JASP, in line with practices over the past five years (Aina et al., 2024).

Research Ethics

This study ensured ethical treatment of all participants, including (a) obtaining permission from the school authorities, (b) maintaining the confidentiality of student data, and (c) using the data solely for academic purposes. These ethical principles adhere to contemporary educational research guidelines (BERA, 2018).

Validity and Reliability

To ensure instrument quality:

1. Content validity was reviewed by experts in Indonesian language education.
2. Internal reliability may be assessed using Cronbach's Alpha, which is appropriate for test- or rubric-based instruments (Taber, 2018).
3. In experimental educational research, instrument validity is a critical factor to ensure that score changes genuinely reflect the effects of the treatment (Creswell & Plano Clark, 2018).

RESULT AND DISCUSSION

1. Research Results

1.1 Instrument Validation

The research instrument, in the form of an essay test, was used to measure students' ability to comprehend the content of children's stories presented through audiovisual animation media. Based on the research documentation, the instrument consisted of the following indicators: (1) the ability to respond politely, (2) comprehension of the presented story, and (3) the ability to identify the theme, characters, and moral message of the story. Each aspect was scored on a scale of 1–3, with a maximum total score of 10.

Content validity was established by examining the alignment between the instrument and the basic competencies of Grade VI Indonesian Language subjects, particularly in listening to and comprehending children's stories. This validation approach is consistent with educational assessment standards that emphasize alignment between instruments, learning objectives, and clarity of indicators (Brookhart & Nitko, 2019).

1.2 Description of Learning Outcome Data

The study was conducted with 11 sixth-grade students at MI NW Loang Sawak. Learning outcome data were obtained through a pretest administered before the use of audiovisual animation media and a posttest administered after the intervention. The summary of pretest and posttest scores, as documented in the research data, is as follows:

a. Mean pretest score: 6.42
b. Mean posttest score: 6.74
c. Gain score: 0.32 points (moderate improvement category)

This increase indicates an improvement in students' ability to comprehend children's stories after participating in learning activities supported by audiovisual animation media.

1.3 Statistical Analysis

Statistical analysis was conducted using a paired-sample *t*-test, in accordance with the one-group pretest–posttest research design. Based on the statistical calculations reported in the original document:

a. Calculated *t* value (t_o) = 4.892
b. Critical *t* value at 5% significance level = 2.23
c. Critical *t* value at 1% significance level = 3.17

Since the calculated *t* value exceeded both critical values, the use of audiovisual animation media had a statistically significant effect on students' Indonesian language learning outcomes ($p < .01$). This finding is consistent with contemporary statistical interpretations, which indicate that an intervention is considered effective when the calculated *t* value surpasses the critical threshold and when the mean difference between posttest and pretest scores shows a consistent positive direction (Gliner et al., 2021).

2. Discussion

2.1 Effectiveness of Audiovisual Animation Media in Indonesian Language Learning

The findings of this study demonstrate that the implementation of audiovisual animation media resulted in an increase in students' learning outcomes by 0.32 points, which is categorized as a moderate level of improvement. Although the magnitude of the gain may not be classified as high,

statistical testing confirms that the effect is significant. This indicates that the observed improvement is not incidental but rather a direct consequence of the instructional intervention. In educational research, even moderate gains are considered meaningful when they are consistently achieved and supported by statistical evidence, particularly in elementary education contexts where cognitive and linguistic development occurs gradually. Therefore, the results suggest that audiovisual animation media constitute an effective instructional strategy for improving students' comprehension of children's stories compared to conventional teaching approaches.

Audiovisual animation media offer pedagogical advantages by presenting learning content in a more concrete, engaging, and easily understood manner for elementary school students. At this developmental stage, learners tend to rely heavily on sensory input and contextual cues to construct meaning. Animation-based media combine visual movement, sound, narration, and sometimes text, which helps transform abstract narrative elements into more accessible representations. Recent studies have shown that animation-based instructional media can increase students' attention span, reduce cognitive overload, and facilitate more efficient information processing (Nassaji et al., 2021). The dynamic nature of animations captures learners' interest more effectively than static text or oral explanations alone, thereby fostering sustained engagement during the learning process.

From a cognitive perspective, the effectiveness of audiovisual animation media can be explained through dual coding theory and multimedia learning principles. According to dual coding theory, information is processed through two distinct but interconnected channels: verbal and visual. When learners receive information simultaneously through spoken language and visual imagery, the likelihood of information being encoded and retained in working memory increases (Mayer, 2020). Audiovisual animation media capitalize on this mechanism by synchronizing narration with animated visuals, allowing students to form stronger mental representations of story content. This multimodal presentation not only enhances comprehension but also supports long-term memory retention, as learners are able to recall information through multiple cognitive pathways.

In the context of Indonesian language learning at the elementary level, understanding children's stories is a complex skill that requires more than basic listening ability. Students are expected to comprehend narrative structures, identify characters and their traits, recognize themes, understand causal relationships among events, and interpret moral messages embedded in the story. Conventional instructional approaches, which often rely on teacher-centered storytelling or textbook-based reading, may not adequately support all learners, especially those with limited listening comprehension or lower reading proficiency. Audiovisual animation media address this challenge by presenting stories through moving images and expressive audio elements, making narrative components more explicit and easier to grasp.

Specifically, the use of animation enables students to identify characters and their characteristics through visual cues such as facial expressions, gestures, and actions. Story themes become more apparent as visual scenes reinforce the central ideas conveyed in the narration. Relationships among events are clarified through sequential animations that illustrate cause-and-effect connections within the storyline. Moreover, moral messages, which are often abstract and implicit, can be more effectively conveyed when supported by visual symbolism and emotionally engaging scenes. As a result, students are better able to construct a holistic understanding of the story and articulate its key elements.

The findings of this study are consistent with recent research indicating that learning based on interactive digital media significantly enhances narrative literacy and comprehension among elementary school students (Kurniawati et al., 2023). Such media not only support cognitive processing but also encourage active participation, as students are more motivated to listen attentively and discuss story content. In summary, audiovisual animation media represent a pedagogically sound and empirically supported approach to improving children's story comprehension in Indonesian language learning. While the observed improvement falls within the moderate category, its statistical significance and theoretical grounding highlight the potential of animation-based media as an effective tool for enhancing learning outcomes in elementary education.

2.2 Analysis of Learning Outcome Improvement

Although the numerical gain of 0.32 points may appear modest, several important aspects should be considered:

(1) A small sample size (n = 11).
In elementary education research, small samples often result in limited score variability. However, the *t*-test results indicate that the observed improvement is statistically significant, suggesting that the gain is not attributable to chance.

(2) One-group research design
In a one-group pretest–posttest design, score improvement becomes meaningful when accompanied by consistency in the direction of change. The data show that nearly all students experienced improvements, with only one student showing a slight decrease (D = 0.2). This consistent pattern strengthens the validity of the findings.

(3) Alignment between media and student characteristics
Elementary school students are at the concrete operational stage according to Piaget, making visual media particularly effective for supporting comprehension. Recent studies support this claim, demonstrating that children aged 10–12 show significant improvement when learning materials are presented in dynamic visual formats (Anderson et al., 2020).

(4) Student engagement and learning motivation
Animation media enhance student motivation due to their engaging nature and relevance to children's experiences. Recent findings by Gunawan and Rasyid (2022) indicate that moving visual stimuli positively affect intrinsic motivation and attention in reading and listening to narrative texts.

2.3 Relationship Between Findings and Previous Literature

The findings of this study are strongly aligned with a growing body of empirical research published within the last five years, which emphasizes the effectiveness of multimedia particularly animation, video, and audio in enhancing students' language learning outcomes. Collectively, these studies highlight the pedagogical advantages of moving beyond traditional, text-dominated instructional approaches toward more multimodal learning experiences that engage multiple senses and cognitive processes.

Widyaningsih and Setiawan (2021) demonstrated that animation media significantly improve elementary school students' reading and listening comprehension of stories. Their findings suggest that animated content helps learners visualize narrative structures, characters, and events, thereby

reducing cognitive load and supporting meaning-making processes. For young learners, who often struggle with abstract textual representations, animation provides concrete visual cues that bridge the gap between written or spoken language and conceptual understanding. This aligns with cognitive theory of multimedia learning, which posits that learners comprehend information more effectively when it is presented through a combination of visual and auditory channels rather than text alone.

Similarly, Kurniawati et al. (2023) found that educational animation substantially increases student interest and engagement in learning activities. Student interest is a critical affective factor that influences attention, motivation, and persistence in learning tasks. Animated media, through the use of color, movement, sound, and storytelling elements, can create a more attractive and emotionally engaging learning environment. Increased interest not only enhances students' willingness to participate but also positively affects information retention and comprehension. In this context, animation functions not merely as a supplementary tool but as a strategic medium that fosters active learning and sustained attention, particularly in elementary education settings.

Firmansyah (2022) further supports these conclusions by showing that multimedia use has a significant influence on language learning outcomes, especially in narrative comprehension. Multimedia materials that integrate video, audio narration, images, and text allow students to process linguistic input in a more holistic manner. Narrative texts, which often involve complex sequences of events, character motivations, and implicit meanings, become easier to understand when learners can simultaneously hear the narration, see visual representations, and connect them with written language. This multimodal exposure helps students construct deeper comprehension and develop stronger interpretive skills.

Overall, the convergence of findings from these recent studies reinforces the notion that the integration of videos and audio in teaching can effectively address the limitations of conventional learning methods that rely heavily on text and abstract explanations. Traditional approaches may disadvantage learners with lower reading proficiency or limited prior knowledge, whereas multimedia-based instruction offers more inclusive and accessible learning pathways. By engaging multiple sensory modalities, video and audio materials support diverse learning styles, enhance comprehension, and promote meaningful learning experiences. Therefore, the use of multimedia, particularly animation-based resources, represents a pedagogically sound strategy for improving language learning outcomes and enriching instructional practices in elementary education.

2.4 Statistical Interpretation in an Educational Setting

The calculated *t* value of 4.892 indicates a very strong effect. From an educational perspective, this value suggests that animation-based instruction produces a substantial impact rather than random variation. This interpretation aligns with contemporary educational research guidelines, which emphasize the importance of considering both effect magnitude and statistical significance (Cohen et al., 2020).

A higher *t* value reflects a greater difference between pretest and posttest scores. Thus, it can be concluded that audiovisual animation media diversify instructional practices and enhance the quality of students' information processing.

2.5 Educational Implications

This study yields several important implications:

(1) Teachers should utilize animation media as a primary instructional strategy.
Indonesian language learning, particularly in listening and story comprehension, is well suited to animation media, as it accommodates students' acquisition needs and increases engagement.

(2) Schools should provide multimedia facilities.
Recent studies highlight the importance of technological infrastructure in supporting digital learning in elementary education (Firmansyah, 2022).

(3) Teacher training is essential.
Effective implementation of animation media requires more than simply displaying videos; teachers must design structured pre-viewing, while-viewing, and post-viewing activities (Nassaji et al., 2021).

2.6 Research Limitations

Despite the positive findings reported in this study, several limitations should be carefully considered when interpreting the results. First, the use of a one-group pretest–posttest design constitutes a major methodological constraint. Without the inclusion of a control or comparison group, it is not possible to fully attribute the observed improvement in students' learning outcomes solely to the implementation of audiovisual animation media. External variables such as students' prior exposure to similar learning materials, maturation effects, teacher intervention styles, or contextual classroom dynamics may have influenced the results. Consequently, the internal validity of the study is limited, as alternative explanations for the observed learning gains cannot be entirely ruled out.

Second, the relatively small sample size (n = 11) represents another important limitation. While the sample reflects the actual number of students in the observed classroom context, such a limited number of participants restricts the statistical power of the analysis and reduces the generalizability of the findings. The results, therefore, should be interpreted as context-specific and may not be readily extrapolated to broader populations, such as students from different schools, regions, or socio-cultural backgrounds. Larger and more diverse samples would be necessary to enhance external validity and to better capture variability in students' learning responses to audiovisual media.

Third, although the study employed inferential statistical analysis using a paired-sample t-test to determine the significance of pretest and posttest differences, effect size analysis was not conducted. In contemporary educational research, effect size measures are considered essential because they provide information about the magnitude and practical significance of an intervention, beyond mere statistical significance. The absence of effect size analysis limits the depth of interpretation, as statistically significant results do not necessarily indicate meaningful educational impact. Future studies should therefore include effect size calculations to offer a more comprehensive understanding of how strongly audiovisual animation media influences learning outcomes.

In light of these limitations, future research is encouraged to adopt more rigorous experimental or quasi-experimental designs, such as randomized controlled trials or non-equivalent control group

designs. Additionally, involving larger sample sizes and conducting effect size analyses would strengthen inferential validity and provide more robust evidence regarding the effectiveness of audiovisual animation media in Indonesian language learning at the elementary school level.

CONCLUSION

The results of the study indicate that the use of audiovisual animation media has a significant effect on improving the Indonesian language learning outcomes of sixth-grade students at MI NW Loang Sawak. Based on the comparison between pretest and posttest scores, the mean score increased from 6.42 to 6.74 after the implementation of the media. This improvement suggests that students were able to better comprehend children's story materials when learning was supported by both visual and auditory stimuli. Statistical analysis using a paired-sample t-test further confirmed these findings, with a calculated t-value of 4.892, which substantially exceeded the critical t-values at both the 5% and 1% significance levels. These results demonstrate that the observed improvement was not due to chance but rather reflects a genuine effect of the use of audiovisual animation media in the learning process.

From a pedagogical perspective, the findings underscore the effectiveness of audiovisual animation media in enhancing students' comprehension of Indonesian language materials, particularly in listening skills and understanding narrative elements. The achievement of post-intervention scores exceeding the minimum mastery criteria indicates that this media facilitates greater student focus, motivation, and the development of a more structured understanding of the learning content. Therefore, audiovisual animation media can be recommended as a relevant and adaptive instructional strategy to improve the quality of teaching and learning outcomes at the elementary school level, especially in subjects that require narrative literacy skills.

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