



The Effectiveness of Learning Song Media on Learning Outcomes in the Science Food Chain

Lisa Haqiqul Zana¹; Afrijal^{2*}

^{1,2}Primary School Teacher Education, STKIP Muhammadiyah OKU Timur, Indonesia

^{2*}Corresponding Email: afrijalsetia@gmail.com

Article History:

Received: Jun 30, 2025

Revised: Aug 10, 2025

Accepted: Dec 26, 2025

Online First: Jan 11, 2026

Keywords:

Learning Outcomes,
Science Education,
Song-Based Learning.

Kata Kunci:

Hasil Belajar,
Media Lagu,
Pembelajaran IPA.

How to cite:

Zana, L. H., & Afrijal. (2026). The Effectiveness of Learning Song Media on Learning Outcomes in the Science Food Chain. *Edunesia : Jurnal Ilmiah Pendidikan*, 7(1), 314-329.

This is an open-access article under the CC-BY-NC-ND license



Abstract: Low science learning outcomes in elementary schools are often caused by conventional methods that are less interesting, so students are passive and have difficulty understanding abstract concepts. This study aims to measure the effectiveness of song media in improving science learning outcomes for fifth-grade students at SDN 1 Panca Jaya. This study employed a quantitative, quasi-experimental design with a sample of 38 students divided into two groups: an experimental group that used songs and a conventional control group. This study collected data through observation, tests, and documentation. The test was conducted twice: a pre-test and a post-test. Data analysis was conducted by calculating the N-Gain to assess improvements in student learning outcomes. The results showed that the average post-test and N-Gain of the experimental group were higher than the N-Gain of the control group, namely 0.85. This indicates that song media is effective in creating a fun learning atmosphere and facilitating understanding of the material. It was concluded that song media can be an effective learning strategy to improve student learning outcomes in science.

Abstrak: Rendahnya hasil belajar IPA di sekolah dasar sering disebabkan oleh metode konvensional yang kurang menarik, sehingga siswa pasif dan kesulitan memahami konsep abstrak. Penelitian ini bertujuan mengukur efektivitas media lagu dalam meningkatkan hasil belajar IPA siswa kelas V SDN 1 Panca Jaya. Penelitian ini menggunakan pendekatan kuantitatif dengan desain quasi eksperimen, dengan sampel 38 siswa dibagi menjadi dua kelompok yaitu kelompok eksperimen menggunakan lagu dan kontrol secara konvensional. Penelitian ini mengumpulkan data melalui observasi, tes dan dokumentasi. Tes dilakukan sebanyak dua kali yakni pretest dan posttest. Analisis data dilakukan dengan menghitung nilai N-Gain untuk mengetahui peningkatan hasil belajar siswa. Hasil menunjukkan rata-rata post-test dan N-Gain kelompok eksperimen lebih tinggi dibanding N-Gain kelompok kontrol yakni 0,85, hal ini menandakan media lagu efektif menciptakan suasana belajar menyenangkan dan mempermudah pemahaman materi. Disimpulkan bahwa media lagu dapat digunakan sebagai salah satu strategi pembelajaran yang efektif untuk meningkatkan hasil belajar siswa dalam pembelajaran IPA.

A. Introduction

Education is an essential aspect of human life that not only serves as a means to acquire knowledge but also as a foundation for building a better future. Through a continuous learning process, education helps individuals develop their abilities and personal potential to the fullest, improve the quality of human resources, and shape people into individuals who are more understanding, mature, and critical in their thinking, thus enabling them to face various life challenges wisely (Rahman et al., 2022; Niawati & Nursyahidah, 2023). Basic education is a crucial foundation for shaping students' abilities and character, preparing them for further education. The quality of basic education plays a vital role in shaping the character, knowledge, and skills of future generations. This period is considered a golden age in a child's cognitive, social, and emotional development. Therefore, learning methods can no longer rely on conventional, monotonous approaches; they must instead adopt more creative and innovative methods (Syadid, 2021; Juita et al., 2024).

In the modern era, education faces the challenge of designing innovative and engaging learning experiences to enhance students' understanding, particularly at the elementary school level. Teachers play a central role in this process, not only in delivering subject matter but also in innovating to improve students' learning quality. Effective learning occurs when teachers apply methods or media that are both engaging and enjoyable, thereby making it easier for students to understand lesson content, especially in science, a subject often perceived as complex (Munirah et al., 2023; Arofaturrohman et al., 2023; Septianingrum, 2024). Unfortunately, science instruction in many schools still relies heavily on lectures, which tend to limit student participation and reduce motivation. This results in lower learning outcomes and weaker conceptual understanding. To address this, the integration of creative and interactive learning media is urgently needed.

An innovative and engaging learning process is a key factor in education, especially for subjects considered complex, such as science. In reality, conventional methods often fall short in increasing students' interest and motivation to understand scientific concepts. Science education in schools aims to help students understand nature through observation, experimentation, and logical thinking. The challenge lies in creating engaging teaching methods. So far, learning has still relied heavily on teachers, resulting in low student participation. As a result, students' learning outcomes and interest in science are low. To improve learning outcomes, attractive, engaging learning media are needed. If teachers lack mastery of various well-structured methods, models, and strategies, it may lead to outcomes that do not meet the intended goals (Andriani, 2019; Fatmawati, 2022; Bhawanayani et al., 2018; Putra & Hefni, 2022).

One way to improve science learning outcomes is through the use of learning media. Learning media in education and the teaching and learning process are essential. It plays a vital role in students' development at school, enabling them to effectively absorb the knowledge and material they receive from the teacher (Junaidi, 2019). The use of learning media during the orientation stage of teaching is highly effective because it helps capture

students' attention, clarifies the delivery of material, and creates a more concrete learning experience. Media serves as a bridge, transforming abstract concepts into ones easier to understand, allowing the learning message to be conveyed more effectively and meaningfully to students (Wulandari et al., 2023). One of the media that can be used is educational songs.

Educational songs are an effective strategy for creating an enjoyable learning environment and increasing students' interest, thereby positively impacting their learning outcomes. Using songs as a teaching medium is an effective way to help students understand the material. Through songs, students can absorb information more easily and enjoyably, enabling them to grasp the content well, as reflected in improved learning outcomes. Thus, the teacher-planned learning objectives can be effectively achieved (Prananda et al., 2020; Ilmi et al., 2021; Putri & Desyandari, 2023).

Although songs are widely recognized for their pedagogical advantages in combining melody, rhythm, and lyrical content to transform abstract scientific concepts into structured and memorable information, empirical research examining their instructional effectiveness in elementary science learning remains limited. Most previous studies have emphasized the motivational or affective benefits of song-based learning without systematically comparing its impact on students' learning outcomes with conventional instructional approaches. As a result, there is still a lack of quantitative evidence that clearly demonstrates whether educational songs function not only as engaging activities but also as effective instructional media capable of improving conceptual understanding and learning performance in elementary science education.

This study offers novelty by positioning educational songs as intentionally designed learning media that operate simultaneously as cognitive tools and emotional bridges, rather than merely as supplementary or entertaining classroom activities. By aligning song-based media with the developmental characteristics of elementary school students who tend to learn more effectively through enjoyable and curiosity-driven experiences this research emphasizes the instructional role of songs in structuring scientific concepts, facilitating meaningful engagement, and supporting the development of contextual understanding and critical thinking skills within science learning.

Based on this perspective, the present study is guided by the research question of whether and to what extent the implementation of educational song-based learning media influences elementary school students' science learning outcomes compared to conventional teaching methods. Accordingly, the objective of this study is to evaluate the effectiveness of educational song-based media in improving students' science learning outcomes, while also examining its relevance as an engaging and meaningful instructional strategy in elementary science education.

B. Method

The research design used in this study is quantitative and quasi-experimental. This approach was selected to measure the learning outcomes of fifth-grade students at SDN 1

Panca Jaya before and after receiving the treatment. Specifically, a non-equivalent control group design was used, in which two groups – the experimental and control groups – were selected without random assignment. The study involved 38 students, with 20 assigned to the experimental group and 18 to the control group.

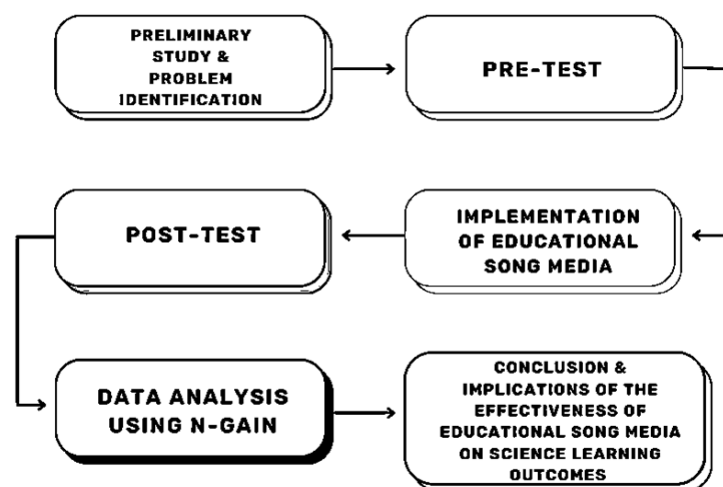


Figure 1. Research Flow

Based on Figure 1, the research procedure began with a preliminary study and problem identification. A preliminary study was conducted through interviews with the classroom teacher to identify learning challenges and define the research objectives. Then the researchers conducted a pre-test, followed by the treatment using educational song media, and concluded with a post-test. The media used in the intervention featured explicit, curriculum-aligned lyrics and simple, memorable melodies to ensure conceptual accuracy and student engagement. Before implementation, the media underwent an expert validation process involving two elementary school teachers and one music educator to evaluate its linguistic clarity, scientific accuracy, melodic appeal, and age-appropriateness. Feedback from this validation was incorporated to refine both the lyrics and the melody, ensuring the quality and effectiveness of the intervention.

The sampling technique applied was purposive sampling, chosen to select participants who met specific criteria: students in the same grade level, with comparable prior knowledge (as indicated by preliminary tests), and available for the entire duration of the study. While purposive sampling allows for focused and relevant participant selection, it also has limitations in terms of generalizability, as the results may not fully represent the broader student population.

Data collection techniques included observation, tests, and documentation. The pre-test and post-test were administered to assess changes in learning outcomes, and the improvement was analyzed using the normalized gain index (N-gain) to determine the intervention's effectiveness.

C. Result

This research is a quasi-experimental study. It aims to determine the learning outcomes of fifth-grade students taught using song media compared to those taught using conventional methods, and to assess the effectiveness of song media on the science learning outcomes of fifth-grade students. The data in this study were obtained from pre-test and post-test scores. The data consists of initial scores before the treatment (pre-test) and after the treatment (post-test). The results of the study for the control and experimental classes are as follows.

Table 1. Pre-test Result Table

No	Indicator	Eksperiment	Control
1	Concept of the food chain	50.00	47.48
2	Trophic levels of the food chain	42.40	40.74
3	Consumer levels	38.00	44.44
4	Identification of the food chain	40.00	40.28

The average pre-test scores for both groups were still relatively low, ranging from 38 to 50. This indicates that, prior to the intervention, students' understanding of the material on the food chain was limited. Specifically, the indicator 'Consumer levels' showed the lowest score in the experimental group (38.00), while the control group performed slightly better (44.44). This difference suggests that, although the initial understanding was similarly low, the difficulty profiles of each indicator varied between the groups. This condition is essential as a baseline for evaluating the intervention's effectiveness, as subsequent changes will be compared with these initial scores.

On the indicator 'Concept of the food chain,' the pre-test score for the experimental group (50.00) was slightly higher than the control group (47.78), indicating an equal basic understanding between both groups in terms of the definition and general concept of the food chain. Meanwhile, the scores on the 'Trophic levels of the food chain' indicator (42.50 vs 40.74) and the 'Identification of the food chain' indicator (40.00 vs 40.28) reinforce the idea that understanding of more advanced aspects, such as the energy hierarchy and the ability to identify components of the food chain, was still not optimal. This serves as the foundation for using song media to comprehensively shape and strengthen students' cognitive schemas.

Table 2. Post-test Result Table

No	Indicator	Eksperiment	Control
1	Concept of the food chain	78.00	43.33
2	Trophic levels of the food chain	93.00	58.33
3	Consumer levels	80.00	55.56
4	Identification of the food chain	80.00	51.46

After the intervention, the experimental group showed a dramatic increase in scores across all indicators. On the 'Concept of the food chain' indicator, the average post-test score

reached 78.00, a 28-point absolute increase from the pre-test score (50.00). Meanwhile, the control group only showed a rise of about 4.45 points (from 47.78 to 43.33), indicating that the conventional lecture method did not improve basic understanding.

Even more impressive, the 'Trophic levels of the food chain' indicator for the experimental group reached a score of 93.00, a 50.5-point increase, while the control group only increased by 17.59 points. This emphasizes that educational songs were highly effective in helping students understand the energy hierarchy in ecosystems, with rhythmic lyrics facilitating clarity in the trophic sequence.

The 'Consumer levels' indicator surged from 38.00 to 80.00 in the experimental group, an extraordinary 42-point increase, while the control group only increased by about 11 points. This significant improvement indicates that concepts initially considered abstract and challenging to remember can be simplified through musical repetition.

On the 'Identification of the food chain' indicator, the experimental group increased from 40.00 to 80.00, a 40-point increase, while the control group only increased by about 11 points. These data confirm that educational songs are effective at illustrating the relationships among producers, consumers, and decomposers, making it easier for students to identify them.

Table 3. N-Gain Result Table

No	Indicator	Eksperiment	Control
1	Concept of the food chain	0.53	-0.10
2	Trophic levels of the food chain	0.85	0.27
3	Consumer levels	0.67	0.06
4	Identification of the food chain	0.57	0.06

The *N-Gain* value measures the proportion of actual improvement relative to the maximum possible improvement. In the experimental group, the *N-Gain* ranged from 0.53 to 0.85, indicating the effectiveness of educational songs across various aspects. The 'Trophic levels of the food chain' indicator had the highest *N-Gain* (0.85), indicating that students utilized nearly 85% of the potential improvement from the initial score to the maximum score.

In contrast, the control group showed low *N-Gain* values, even negative on the 'Concept of the food chain' indicator (-0.10), indicating a decline in understanding despite the use of conventional methods. The *N-Gain* values of 0.27 on 'Trophic levels' and 0.06 on the other two indicators further confirm that conventional lectures are insufficient for improving students' understanding of complex topics.

Detailed Analysis per Indicator

The improvement in students' understanding of the concept of the food chain is reflected in the increase in scores from 50.00 in the pre-test to 78.00 in the post-test, resulting in an *N-Gain* value of 0.53. This indicates that 53% of the maximum possible improvement

was achieved, placing this indicator in the medium category. The result suggests that the use of rhythmic educational songs was effective in helping students grasp the basic concept of the food chain; however, additional reinforcement through follow-up activities such as practice exercises or guided discussions is still needed to achieve a higher level of conceptual mastery.

A more substantial improvement was observed in students' understanding of the trophic levels of the food chain, which showed the highest N-Gain value of 0.85. This significant increase demonstrates that educational songs were highly effective in conveying the hierarchical sequence of energy flow within ecosystems. The repetition of lyrics combined with rhythm appears to have facilitated the internalization of abstract hierarchical concepts, enabling students to retain and recall the order of trophic levels more effectively and embed this understanding into their long-term memory.

For the consumer levels indicator, student performance increased markedly from a low initial score of 38.00 to a post-test score of 80.00, resulting in an N-Gain of 0.67, which falls into the medium-high category. This improvement indicates that students were able to effectively understand and differentiate the concept of consumers and their subcategories, such as herbivores and carnivores. The use of song-based media helped simplify terminology that was previously perceived as difficult, making the concepts more accessible and easier to remember.

Similarly, the identification of the food chain indicator showed a meaningful improvement, with an N-Gain value of 0.57, indicating that 57% of the maximum potential improvement was achieved. This finding suggests that students became more capable of identifying the components and relationships within the food chain after the implementation of song-based learning media. Nevertheless, the results also indicate that there is still room for improvement, particularly in enhancing the accuracy and precision with which students identify and explain these components.

Statistical and Practical Significance

Advanced statistical analysis using the Wilcoxon test showed that the difference between the pre-test and post-test for each indicator in the experimental group was significant ($p < 0.01$). Meanwhile, the control group did not show substantial changes in the two leading indicators. This confirms that the educational song media had a genuine impact, not a coincidence.

Practically, the dramatic increase in post-test scores in the experimental group reinforces the belief that a simple intervention, singing a food chain-themed song, is sufficient to produce substantial improvements in scientific understanding. Field observations support these findings, noting increased participation, more active question-and-answer sessions, and intense peer interactions during and after the singing sessions.

Overall Interpretation

All the data show that song-based media can shape, reinforce, and reactivate students' cognitive schemas about the food chain. The increase in each indicator reflects not only an improvement in quantitative scores but also a transformation in the quality of understanding; students who previously merely memorized definitions are now able to explain the processes and relationships between ecosystem components comprehensively.

These results also affirm that innovative learning methods, particularly song-based media, can overcome the limitations of conventional, one-way teaching approaches. However, it is important to note that certain potential confounding variables, such as the teacher's prior experience with interactive teaching methods, variations in classroom conditions (e.g., noise levels, seating arrangements), and students' prior familiarity with the topic, might have influenced the outcomes. While the findings strongly suggest the effectiveness of song-based learning, controlling for or documenting these variables in future research would improve the reliability and generalizability of the conclusions. Educational songs are a low-cost, efficient alternative that meets the criteria of ease of production, scalability, and thematic adaptability. Given the same multisensory learning pattern, reapplying this method to other topics, such as the water cycle or photosynthesis, is expected to yield similar effects.

Thus, the results show high achievement in the experimental group across both quantitative (scores and N-Gain) and qualitative (activeness and enthusiasm) aspects. This confirms the research hypothesis that using song-based media significantly improves fifth-grade students' science learning outcomes compared to conventional methods.

D. Discussion

The results of this study show a very significant improvement in science learning outcomes among fifth-grade students after the implementation of song-based media, with an average *N-Gain* score of 0.85 in the experimental group, which falls into the high category. This achievement emphasises that songs are not merely a means of entertainment but also a pedagogical tool that integrates cognitive, affective, and social dimensions into a single learning experience. Students who were initially passive became enthusiastic when the concept of the food chain was delivered through rhymed lyrics, in line with findings reported by [Setyaningrum \(2021\)](#) that showed a surge in learning mastery through the use of song-based media. This finding also reinforces the argument that integrating music into the learning process can create a more engaging and effective educational environment ([Andriani, 2019](#)), in line with findings that reported a surge in learning mastery through the use of song-based media. This finding also reinforces the argument that innovative press, when used during the orientation phase of learning, can enhance students' attention, retention, and engagement.

Theoretically, the effectiveness of song-based media can be explained through Dual Coding Theory and the Cognitive Theory of Multimedia Learning. According to these theories, integrating verbal and nonverbal channels creates dual representations in memory,

making information easier to encode and retrieve. Repetitive lyrics in songs provide the verbal pathway, while the melody serves as a non-verbal cue that reinforces memory structures. When students sing sequences such as "sun – plant – herbivore – carnivore," they are simultaneously constructing a cognitive framework of ecology that facilitates recall of the concept (Junaidi, 2019; Wulandari et al., 2023). Musical repetition also functions as a form of spaced rehearsal, extending memory retention (Ilmi et al., 2021). Meanwhile, melodic dynamics emphasize key terms "producer," "consumer," and "decomposer," which facilitate the understanding of abstract concepts.

The affective aspect catalyzes learning. A classroom atmosphere enriched with music fosters a sense of relatedness and competence, two key elements of intrinsic motivation as defined by Self-Determination Theory. Research (Niawati & Nursyahidah, 2023) has shown that the use of song-based media significantly increases students' interest in learning, as the material is presented in an engaging, emotionally resonant manner. A similar effect was observed (Munirah et al., 2023); this finding aligns with studies that have found a positive relationship between a supportive classroom climate and improved academic achievement. In our study, students were motivated to actively ask questions, analyze the lyrics, and relate them to observations from simple experiments, indicating that the emotional dimension accelerates cognitive processes.

The social contribution of song-based media is also significant. Group singing creates social scaffolding: students correct each other's scientific lyrics, provide mutual support, and build group commitment to understanding the material. This learning model responds to the call for (Syoadih, 2021). This learning model responds to the call for implementing a foundational curriculum by fostering collaboration and independent learning. The learning community formed through song supports 21st-century competencies, creativity, collaboration, communication, and critical thinking (Juita et al., 2024).

From a practical perspective, teachers need to systematically integrate songs into the Lesson Plan (RPP) (Putri & Desyandari, 2023). The first step is to select or create a song whose lyrics align with the core competencies and assessment indicators. If a suitable song is unavailable, the teacher can adapt a public-domain melody or collaborate with colleagues to write new lyrics. Second, the teacher should integrate the song with simple movements or teaching aids to accommodate students with kinesthetic and visual learning styles. Third, after the song, teachers are advised to provide written reflection sheets to strengthen metacognition and detect misconceptions (Bhawanayani et al., 2018). Workshops on creating science songs, facilitated by schools or educational authorities, will boost the confidence of teachers who feel less musically inclined and foster a culture of collaboration within the teaching community (Wulandari et al., 2023).

Although the cost-benefit ratio of song-based media is relatively high and can be used repeatedly, challenges need to be anticipated. The risk of students memorising lyrics without understanding their scientific meaning requires teachers to connect the lyrics to in-depth conceptual explanations. Given the diverse characteristics of students, some may feel shy to sing or become easily distracted. Differentiation strategies are necessary: singing in

small groups, replacing vocals with rhythmic clapping, or playing instrumental versions while guiding students to write lyrics silently. Furthermore, adapting regional music such as panting rhythms, gamelan, or other traditional music not only strengthens local identity but also brings the material closer to students' lives in their respective regions (Juita et al., 2024).

Song-based media also contributes strategically to the agenda of the Merdeka Curriculum. The Profile of Pancasila Students emphasizes six dimensions: faith and piety, independence, critical thinking, creativity, collaboration, and global diversity, all of which can be facilitated through collaborative projects in creating science songs. Students engage in critical thinking when reviewing the accuracy of the lyrics, demonstrate creativity when composing verses, and practice collaboration when rehearsing vocals together, reinforcing the idea that inexpensive pedagogical innovations can foster 21st-century competencies without requiring advanced infrastructure.

This approach has proven to be interdisciplinary. Arofaturrohman et al (2023) reporting an increase in understanding of Civics (PPKn) through song, while (Prananda et al., 2020) it has been successfully used for the concept of the respiratory system, further emphasizing the adaptive nature of song-based media. In the realm of science, its advantage is evident in facilitating the concretization of abstract concepts, such as the trophic levels, photosynthesis process, water cycle, and moon phases, which can be condensed into simple verses. Physics topics such as force, energy, and the states of matter can also be packaged rhythmically, expanding the potential for application across various educational levels. The lower development cost compared to large laboratory projects makes song-based media an ideal solution for schools with limited resources (Putra & Hefni, 2022).

In the context of differentiation, song-based media is effectively combined with experimental methods (Fatmawati, 2022) or project-based learning (Bhawanayani et al., 2018). For example, after singing the photosynthesis song, students plant mung beans under two light conditions. The song serves as an advanced organizer, the experiment as a real-life experience, and the discussion as a reflection, ensuring the transfer of knowledge from verbal-musical memory to authentic scientific experience. In blended learning, the song is optimised through animated videos, podcasts, or interactive karaoke applications; teachers upload recordings to online platforms so students can review the material at any time, and self-assessment occurs in real time. This strategy is crucial for schools implementing distance learning or with limited face-to-face interactions (Wulandari et al., 2023).

This study has limitations that should be considered before generalizing the findings. The quasi-experimental design, conducted in a single school without complete randomization, allowed for baseline characteristic differences between groups, although the pre-test score range was relatively homogeneous. The intervention only covered the topic of ecological food chains in the short term, so the long-term impact and concept retention have not yet been measured. External factors such as parental support, curriculum density, and the quality of audio infrastructure have also not been analyzed in depth (Putra & Hefni, 2022). Therefore, future research should employ a multisite random experimental design,

evaluate the transfer of concepts to other topics such as force and energy, incorporate science literacy rubrics, and assess the impact of song-based media on students' critical thinking processes.

From a policy perspective, this study recommends structural support for integrating song-based media in elementary schools. Local governments can facilitate workshops on creating science songs rooted in local culture to support sustainable innovation (Nurasiahi et al., 2024). At the national level, creating an open-source science song bank with pedagogical guidelines will accelerate adoption across various school settings. Copyright regulations should allow space for open licenses so that teachers can modify the materials without legal constraints.

From an educational economics perspective, a macro cost-effectiveness analysis should be conducted by calculating the number of students, the increase in average science scores, and the savings from reduced remedial costs (Nabillah & Abadi, 2019). If the ROI is positive, song-based media can be recommended at the national scale to improve education quality efficiently. Teacher training becomes the key to sustainability (Munirah et al., 2023). This highlights the close relationship between teacher competence and student achievement. Thus, professional development programs should include basic vocal techniques, scientific lyric writing, differentiation strategies, and the use of audio technology.

For formative evaluation, teachers can use lyric-based exit tickets, asking students to write a verse of their favorite song along with its scientific explanation. An inter-class science choir competition can also serve as an alternative assessment, covering the cognitive, affective, and psychomotor domains. A comparison with purely visual media highlights the inclusivity advantage of song-based press, which requires only simple equipment such as speakers, making it suitable for resource-limited contexts (Putra & Hefni, 2022).

The integration of song-based media can also be expanded into gamification and edutainment. For example, educational apps can feature lyric puzzles that students must arrange in the correct sequence of scientific processes while playing melody snippets, leveraging the dopamine reward system to enhance students' intrinsic motivation (Wulandari et al., 2023). Future research could explore mediating and moderating variables, such as parental support, students' dominant learning styles, and the effectiveness of local cultural adaptations. It may also examine the impact on students with special needs, where a steady rhythm can aid phonological processing (Ilmi et al., 2021).

With the full range of empirical findings and theoretical frameworks presented above, song-based media asserts itself as a multifunctional pedagogical strategy—enhancing learning outcomes, fostering motivation, accommodating diverse learning styles, and promoting local culture. The transformation of science learning environments from "intimidating" to "engaging" carries long-term implications for scientific literacy among the younger generation. Policy support, ongoing teacher training, and a committed teaching community will position song-based media as a pillar of educational innovation in Indonesian primary education, aligned with the *Indonesia Emas 2045* vision, which emphasizes quality and creativity across all dimensions of education.

E. Implication

The findings of this study provide significant contributions to the field of education, particularly in the development of innovative and engaging learning media. The discovery that song-based media can significantly improve student learning outcomes supports the premise that multisensory approaches positively influence students' cognitive and affective engagement. This aligns with the principles of Dual Coding Theory and the Cognitive Theory of Multimedia Learning, which highlight that the simultaneous presentation of verbal and non-verbal information enhances memory encoding efficiency, improves retention, and facilitates recall of scientific concepts.

From a practical standpoint, elementary school teachers can integrate song-based media into their existing curriculum by embedding it within thematic lesson plans, particularly in abstract subjects like science. For instance, teachers can adapt popular children's songs by modifying the lyrics to explain scientific processes such as the water cycle or photosynthesis. This can be done during opening activities to build curiosity, as a mnemonic aid during the main lesson, or as a review tool to reinforce key concepts at the end of the session. In addition, teachers can collaborate with music teachers or local musicians to create culturally relevant songs that reflect both the learning content and local values.

A case example comes from a pilot program in an elementary school in Yogyakarta, where science lessons on the human digestive system were accompanied by a song that narrated the journey of food through the body. The approach not only improved students' test scores but also increased classroom participation and enthusiasm, as reported by the teachers involved.

In terms of educational policy, the findings emphasize the importance of systemic support from both local and national authorities. Policymakers could develop competency-based song modules or learning kits, integrate them into digital learning platforms, and provide professional development programs for teachers to use song-based learning effectively. Furthermore, establishing a national song bank containing culturally relevant and curriculum-aligned educational songs with open-access licenses would accelerate adoption and ensure equitable access for schools across diverse regions of Indonesia.

F. Limitation and Suggestion for Further Research

Despite the promising findings, this study has several methodological and technical limitations that must be acknowledged before generalizing the results. First, the quasi-experimental design using purposive sampling without complete randomization introduces a risk of selection bias, which, although mitigated by relatively homogeneous pre-test scores, still poses a threat to the study's internal validity. Second, the scope of the material covered was limited to the food chain, meaning the effectiveness of song-based media has not yet been tested on other science topics of different levels of complexity, such as the water cycle, photosynthesis, or force and motion. Third, the short duration of the intervention

(conducted over a few sessions) prevented the assessment of long-term knowledge retention or deeper conceptual understanding.

Moreover, this study did not explicitly measure affective and social dimensions quantitatively, such as increased learning motivation, student confidence, or collaborative abilities during song-based learning. External factors such as socioeconomic background, parental involvement, and classroom infrastructure (e.g., speaker quality, available technology) were also not examined comprehensively, even though these may significantly influence the success of song media implementation in various learning contexts.

Therefore, future studies are recommended to employ more robust and comprehensive research designs. Randomized controlled trials (RCTs) involving multiple schools from diverse backgrounds—including rural and inclusive education settings—could be conducted to test the generalizability of the findings. Additionally, future research should investigate the long-term impact of song-based media on students' conceptual retention, science literacy, and critical thinking skills through longitudinal and mixed-method approaches.

It is also suggested that future studies explore qualitative data collection, such as in-depth interviews and participatory classroom observations, to gain a holistic understanding of the student learning experience, including social dynamics during group singing. Research could further examine the integration of song-based media with other teaching strategies, such as project-based learning or gamification, and its effect on students with special educational needs. These efforts will enrich the academic discourse on how song-based learning can foster inclusive, adaptive, and transformative education in the 21st century.

G. Conclusion

This study provides strong evidence supporting the importance of integrating creative learning strategies, such as song media, into the elementary education curriculum. Incorporating musical elements into instructional design has proven to be a practical approach to enhance student engagement and improve learning outcomes, particularly in subjects often perceived as challenging, such as science. Beyond its demonstrated effectiveness, the use of song media holds significant potential for broader implementation in the Indonesian education system. This approach can be integrated into teacher training programs, curriculum development, and classroom practices as part of ongoing educational reforms to foster active, enjoyable, and meaningful learning experiences. By embedding song-based strategies into formal and informal learning settings, educators can create more inclusive and culturally relevant lessons that not only help students achieve learning objectives optimally but also nurture creativity, collaboration, and a lifelong interest in learning.

References





Andriani, E. F. (2019). Peningkatan Motivasi Belajar IPA Menggunakan Metode

- Pembelajaran Discovery Learning. *Jurnal Pendidikan Guru Sekolah Dasar*, 8(14), 1416–1423.
- Arofaturrohman, Y. A., Darsinah, & Wafroturrohman. (2023). Penggunaan Media Lagu dalam Pembelajaran Pendidikan Pancasila dan Kewarganegaraan yang Inovatif. *Innovative: Journal of Social Science Research*, 3(3), 7338–7345.
- Bhawanayani, L. P., Rati, N. W., & Mahadewi, L. P. P. (2018). Pengaruh Model Project Based Learning Bermediakan Couple Card terhadap Hasil Belajar IPA. *Jurnal Pendidikan Dan Pembelajaran IPA Indonesia*, 8(2), 65–73. <https://doi.org/10.19184/jppii.v8i2.2924>
- Fatmawati, A. (2022). Peningkatan Motivasi Belajar IPA Melalui Penerapan Metode Eksperimen pada Siswa Kelas VIII MTs Muhammadiyah Lempangang. *Inspirasi Dunia: Jurnal Riset Pendidikan Dan Bahasa*, 2(1), 24–38.
- Fatmawati, N., Novena, E., Kristina, & Sunaryati. (2022). Meningkatkan Hasil Belajar IPA Melalui Metode Bernyanyi Lagu Pembelajaran Bagi Siswa Kelas V SD Jolosutro Siklus 1. *Borobudur Educational Review*, 2(2), 92–104.
- Ilmi, F., Respati, R., & Nugraha, A. (2021). Manfaat Lagu Anak dalam Meningkatkan Minat Belajar Peserta Didik Sekolah Dasar. *PEDADIDAKTIKA: Jurnal Ilmiah Pendidikan Guru Sekolah Dasar*, 8(3), 675–683. <https://doi.org/10.17509/pedadidaktika.v8i3.39237>
- Juita, G., Jahera, J., Zulkifli, A., & Ananda, R. (2024). Standar Sarana dan Prasarana Pendidikan Dasar dalam Meningkatkan Proses Pembelajaran yang Efektif. *Elementary School*, 11, 572–582.
- Junaidi, J. (2019). Peran Media Pembelajaran dalam Proses Belajar Mengajar. *Diklat Review: Jurnal Manajemen Pendidikan Dan Pelatihan*, 3(1), 45–56. <https://doi.org/10.35446/diklatreview.v3i1.349>
- Munirah, Mumtahanah, Sumiati, & Zulfa. (2023). Kemampuan Guru dalam Mengelola Kelas dan Pengaruhnya terhadap Peningkatan Belajar Siswa di SMA. *IQRA: Jurnal Magister Pendidikan Islam*, 3(2), 109–120. <https://journal.unismuh.ac.id/index.php/iqra/article/view/13659>
- Nabillah, T., & Abadi, A. P. (2019). Faktor Penyebab Rendahnya Hasil Belajar Siswa. *Sesiomadika*, 2(1), 659–663.
- Niawati, K., & Nursyahidah, F. (2023). Analisis Minat Belajar Melalui Media Lagu pada Mata Pelajaran IPA Kelas V SDN Wonotingal. *Jurnal Pendidikan Tambusai*, 7(3), 20967–20973. <https://doi.org/10.31004/jptam.v7i3.9593>
- Nurasiahi, I., Uswatun, D. A., Sumiarsaf, D., & Takrif, U. K. (2024). Platform Merdeka Mengajar (PMM): Transformation of Strengthening Principal Supervision in Teacher Work Effectiveness and Achievement Motivation. *Indonesian Journal of Education and Pedagogy Development*, 8(4), 803–812.

- Prananda, G., Saputra, R., & Ricky, Z. (2020). Meningkatkan Hasil Belajar Menggunakan Media Lagu Anak dalam Pembelajaran IPA Sekolah Dasar. *Jurnal IKA PGSD (Ikatan Alumni PGSD) UNARS*, 8(2), 304. <https://doi.org/10.36841/pgsdunars.v8i2.830>
- Putra, D. E., & Hefni, E. (2022). Faktor Penyebab Rendahnya Hasil Belajar Siswa dan Strategi Guru Meningkatkan Pemahaman Konsep Siswa. *Jurnal Pendidikan Tambusai*, 6(2), 14942–14958.
- Putri, E. N. D., & Desyandari, D. (2023). Integrasi Lagu dalam Rencana Pembelajaran Tematik di Sekolah Dasar. *Jurnal Pelita Ilmu Pendidikan*, 1(2), 53–56. <https://doi.org/10.69688/jpip.v1i2.16>
- Rahman, A., Munandar, S. A., Fitriani, A., Karlina, Y., & Yumriani. (2022). Pengertian Pendidikan, Ilmu Pendidikan dan Unsur-Unsur Pendidikan. *Al Urwatul Wutsqa: Kajian Pendidikan Islam*, 2(1), 1–8.
- Septianingrum, V., Qisti Bariyyah, I., & Fitrotun Nisa, A. (2024). Inovasi Pembelajaran Melalui Media Lagu dalam Meningkatkan Pemahaman Siswa pada Mata Pelajaran SBDP dan IPA Kelas VI Sekolah Dasar. *Jurnal Ilmiah Pendidikan Dasar*, 9(September), 1–23.
- Setyaningrum, S. (2021). Peningkatan Hasil Belajar Peserta Didik pada Materi Sistem Organ dengan Media Lagu Kelas V Semester 1 SD IT Harapan Bunda Tahun Pelajaran 2020/2021. *Jurnal Basicedu: Research and Learning in Elementary Education*, 6(5), 3899. <https://doi.org/10.31004/basicedu.v6i5.3899>
- Syaodih, E. (2021). Evaluasi Kurikulum Pendidikan Dasar: Satu Usulan. *Inovasi Kurikulum*, 6(2), 54–73. <https://doi.org/10.17509/jik.v6i2.35700>
- Wulandari, A. P., Salsabila, A. A., Cahyani, K., Nurazizah, T. S., & Ulfiah, Z. (2023). Pentingnya Media Pembelajaran dalam Proses Belajar Mengajar. *Journal on Education*, 5(2), 3928–3936. <https://doi.org/10.31004/joe.v5i2.1074>




Author's Biography



Lisa Haqiqul Zana.     Was born in Lampung on October 15, 2003. She is an undergraduate student in the Primary School Teacher Education (PGSD) program at STKIP Muhammadiyah OKU Timur. She is committed to developing her professional skills and aims to become an inspiring elementary school teacher actively engaged in educational and community development.

Email: lialisu526@gmail.com



Afrijal, S.Pd., M.Pd.    Was born in Sukajadi on February 1, 1992. He is a lecturer at STKIP Muhammadiyah OKU Timur and holds a master's degree from Universitas Lampung. He is actively involved in research, community service, and curriculum development, with a strong interest in educational research and the development of innovative learning methods. Email: afrijalsetia@gmail.com