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THE EFFECT OF AI-BASED MUSICALIZED MEDIA ON MOTIVATION AND LEARNING OUTCOMES IN SOCIAL STUDIES

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ABSTRACT

AI-based musicalization media were developed as an alternative learning method that integrates social studies material in the form of songs, supported by artificial intelligence technology. The purpose of this study was to determine the effect of AI-based musicalization media on students' motivation and learning outcomes at SMPN 1 Donomulyo. This study was motivated by the suboptimal use of interactive learning media, which led to low student motivation and learning outcomes. The study used a quantitative, nonequivalent control-group design. The research subjects were students of class IX A as the experimental class and class IX B as the control class. Data were collected using a learning motivation questionnaire and an essay test on social studies learning outcomes, and analyzed using a MANOVA. Based on the Multivariate Test table, an F value of 45.562 was obtained, with a p-value of 0.000 (< 0.05). Therefore, it can be concluded that AI-based musicalization media have a simultaneous effect on students' motivation and social studies learning outcomes. This finding confirms that AI media is recommended as an alternative social studies learning method in line with the development of educational technology.

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INTRODUCTION

In the era of the Industrial Revolution 4.0, education plays a role in forming a generation that is intelligent, creative, innovative, and adaptive to technological developments, including in the use of learning media (Yang & Gu, 2021). Teachers function as facilitators who utilize technology to deliver material, no longer as the sole source of learning. Technological developments require a transformation of learning media so that they are not only informative but also engaging and enjoyable for students (Febrina & Setiawan, 2024). Therefore, learning media should be designed to meet

students' needs and characteristics to increase their involvement in the learning process (Nuriyani et al., 2023).

However, classroom learning still faces challenges in integrating technology into learning, particularly in social studies at SMPN 1 Donomulyo. This is in line with a UNESCO report that states that several teachers experience difficulties in integrating technology due to limited digital competency (Entriza & Puspitasari, 2025). Initial observations at SMPN 1 Donomulyo indicate that the school has adequate technological support facilities, but the implementation of digital learning media is still limited. Social studies teachers still use the lecture method and have not optimized technology use in their teaching. A national survey by the Ministry of Education and Culture of the Republic of Indonesia found that more than 60% of junior high school teachers still use conventional methods as their primary learning approach, despite the availability of technological facilities (Yolanda, 2023). This situation leads to less varied learning, which affects low student motivation and participation in learning activities.

These efforts show that the musicalization media approach has been proven to have a positive psychological effect on students' mood and concentration, so that the learning process becomes more lively and touches the emotional side of students (Vigl et al., 2023). Musicalization in social studies learning allows students to understand social concepts through memorable rhythms and lyrics. In line with research (Safitri & Minsih, 2022) studies have shown that using songs in learning can improve students' memory and comprehension of the material. One form of artificial intelligence (AI)-based musicalization media is a learning innovation that combines the power of technology and art to create a more engaging, interactive, and meaningful learning experience (Warsini, 2022). Music plays a crucial role in creating a fun learning environment and encouraging students to be more active and enthusiastic in understanding the subject matter (Ma'rifat, 2017). With the support of AI technology, the process of creating songs from learning materials becomes more efficient, adaptive, and personal, so that teachers do not need special musical skills to create interesting media (Chen, 2024).

AI-based musicalization media allows students to gain repeated reinforcement of concepts through songs, thereby helping to strengthen long-term memory (Yuniarta & Utama, 2025). Lyrics structured according to the material's structure make it easier for students to understand the sequence of events, the characteristics of each period, and the differences in social life patterns over time. Furthermore, the musicalization approach helps simplify dense and complex social studies material into core lyrics that represent key concepts, thereby reducing students' cognitive load (Nahdiroh & Arisona, 2020). Thus, this medium supports concept elaboration, helps students connect new information to prior knowledge, and promotes a more structured understanding of the cognitive aspects.

The musicalization media approach aligns with constructivist learning theory, which emphasizes students' active role in constructing knowledge through meaningful learning experiences (Mohammed & Kinyo, 2020). Music serves not only as entertainment but also as a learning medium that integrates cognitive and affective

aspects. From a social constructivist perspective, learning emphasizes the importance of collaboration and discussion in building understanding. AI-based musicalization media can facilitate this interaction by enabling students to interpret the lyrics' meaning (Ni'matika et al., 2025). In addition, the use of music helps improve students' understanding and memory of learning materials (Sun et al., 2024). AI technology support also enables learning to be designed in a more personalized and adaptive manner based on student characteristics (Alam & Mohanty, 2023). The integration of musicalization media and AI has the potential to increase students' interactivity, engagement, and conceptual understanding in social studies learning.

The purpose of this study was to determine the effect of AI-based musicalization media on the motivation and learning outcomes of social studies students at SMPN 1 Donomulyo. From a scientific perspective, studies on the use of AI in social studies learning are still very limited, especially in integrating AI with an arts approach, specifically musicalization. Most previous studies have focused more on AI in science, mathematics, or language learning. Another gap lies in the lack of empirical research that simultaneously tests the effects of AI-based musicalization media on student motivation and learning outcomes. Therefore, this study has novel value because it integrates AI technology with an arts approach in the context of social studies learning, particularly on history and social change materials. In practice, this media can be implemented by teachers across various schools with limited capacity to create learning songs or animations. With AI support, the process of developing songs from material texts becomes faster and more efficient. Conceptually, this study also strengthens the paradigm that social studies learning needs to be developed more creatively and innovatively to meet the challenges of learning in the digital era.

RESEARCH METHODS

The study used a quantitative, quasi-experimental, nonequivalent control-group design. The study was conducted at SMPN 1 Donomulyo, Malang Regency, with grade IX students. In this study, there were two groups: the experimental group, which would be taught using AI-based musicalization media for grade IX A students, and the control group, which would be taught using lecture and assignment methods for grade IX B students.

Table 1. Research Design

Group	Pretest	Treatment	Postest
Class IX A (Experiment)	O_1	Musicalization Media	O_2
Class IX B (Control)	O_1	Lecture and Assignment Method	O_2

Data were collected through questionnaires and essay tests. A closed-ended questionnaire was used to measure students' learning motivation, where respondents were asked to select answers from a list. The essay test consisted of a six-item pretest and posttest learning outcome test. The pretest was used to assess students' initial learning

outcomes before the treatment, and the posttest was used to assess students' learning outcomes after the treatment in both the experimental and control classes.

Hypothesis testing using inferential statistics, including a MANOVA (Multivariate Analysis of Variance), was conducted to examine the effect of a single independent variable (AI-based musicalization media) on two dependent variables (motivation and learning outcomes) simultaneously. The research hypothesis includes the null hypothesis (H_0), which states that AI-based musicalization media do not affect student motivation and learning outcomes. Meanwhile, the alternative hypothesis (H1) states that AI-based musicalization media affect student motivation and learning outcomes.

RESULTS AND DISCUSSION

AI-based musicalization media in this study are used as a learning tool to support the achievement of KD 3.7, namely the ability to analyze changes in Indonesian society from prehistoric times to the Hindu-Buddhist and Islamic kingdoms in economic, social, and cultural aspects, as well as KD 4.7, namely the ability to present analysis results in various forms in integrated social studies learning. The learning media are interactive musical animation videos developed using artificial intelligence (AI) technology, featuring visual elements, audio, song lyrics, and historical narratives, arranged in a single learning flow.

Research data on the influence of AI-based musicalization media on students' motivation and learning outcomes in social studies were collected through questionnaires and essay tests. Based on the research results, the following data were obtained.

Table 2. Average Scores for Questionnaire and Essay Test Completion

Variabels	Average	
	Experimental Class	Control Class
Students' motivation to learn social studies	78,84	72,06
Pretest Social Studies Learning Outcomes	41,09	41,09
Posttest Social Studies Learning Outcomes	82,44	78,56

Source: Data Analysis Results, 2025

Based on Table 2, there is a difference in the average between the experimental and control classes for student motivation to learn social studies and student learning outcomes. In the motivation-to-learn-social-studies variable, the experimental class has an average score of 78.84, while the control class has an average score of 72.06. These data indicate a difference in the average scores between the two classes in the variable of student motivation to learn social studies.

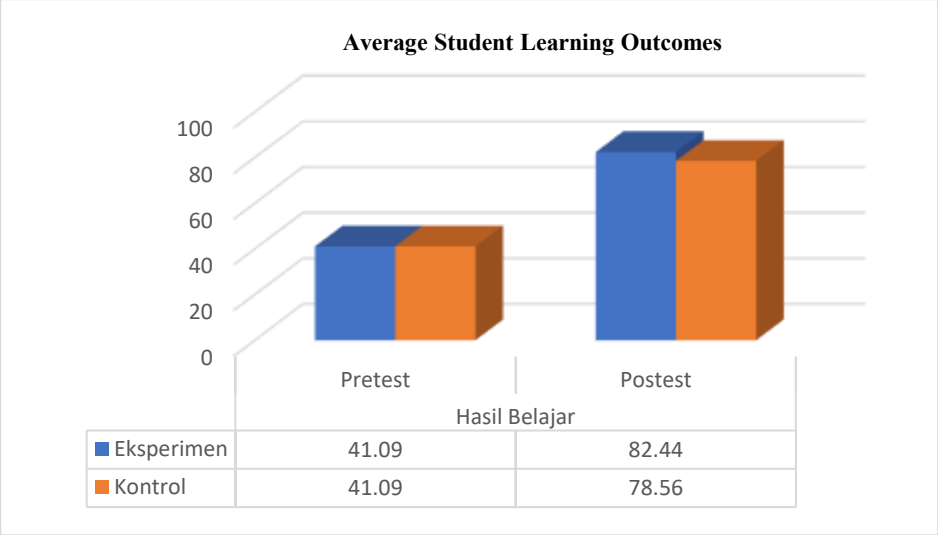

Figure 1. Average Learning Outcome Score
Source: Data Analysis Results, 2025

Based on Figure 1, the average pretest score for the social studies learning outcomes variable was 41.09 in the experimental and control classes. This data indicates that both classes had equivalent initial abilities before the treatment. After the treatment, the experimental class's average posttest score was 82.44, while the control class's was 78.56. This data indicates a difference in the average posttest scores between the two classes.

Hypothesis testing was conducted using a MANOVA test to determine the simultaneous effect of AI-based musicalization media on students' learning motivation and social studies learning outcomes. The following results were obtained.

Table 3. Results of Multivariate Test Analysis

Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	.999	2.468E4[a]	2.000	61.000	.000
	Wilks' Lambda	.001	2.468E4[a]	2.000	61.000	.000
	Hotelling's Trace	809.104	2.468E4[a]	2.000	61.000	.000
	Roy's Largest Root	809.104	2.468E4[a]	2.000	61.000	.000
Kelas	Pillai's Trace	.599	45.562[a]	2.000	61.000	.000
	Wilks' Lambda	.401	45.562[a]	2.000	61.000	.000
	Hotelling's Trace	1.494	45.562[a]	2.000	61.000	.000
	Roy's Largest Root	1.494	45.562[a]	2.000	61.000	.000

Source: SPSS Output, 2025

Based on the MANOVA test results in Table 3, Multivariate Tests, the Wilks' Lambda value was 0.401, with an F value of 45.562 and a significance value of 0.000. The significance value is smaller than 0.05 (Sig. <0.05), so H_0 is rejected, and H_1 is accepted. Thus, it can be concluded that AI-based musicalization media have a simultaneous effect on students' learning motivation and social studies learning outcomes at SMP Negeri 1 Donomulyo.

Table 4. Results of Effect Size Test (Partial Eta Squared Test)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1470.081[a]	12	122.507	.761	.686	.152
Intercept	54731.552	1	54731.552	340.098	.000	.870
Motivasi	1470.081	12	122.507	.761	.686	.152
Error	8207.356	51	160.929			
Total	109060.000	64				
Corrected Total	9677.438	63				

Source: SPSS Output, 2026

Based on the Partial Eta Squared value in the table above, the magnitude of motivation's influence on learning outcomes is 0.152, which falls within the large category. This indicates that motivation accounts for 15.2% of the variation in student learning outcomes, a figure that is complex and likely influenced by factors beyond the studied variables.

The results of this study are in line with research (Chiu et al., 2024) found that AI-based learning methods significantly improved students' motivation and academic achievement through adaptive, interactive, and personalized learning experiences that encouraged active engagement in the learning process. Similar research by (Nurhasmiati et al., 2026) shows that AI-based interactive learning media are effectively used in science and social studies subjects to improve students' conceptual understanding and learning engagement, making learning more meaningful. Research (Nafidatul & Ratnaningrum, 2024) that interactive learning media designed with AI elements significantly increase student participation in learning activities and understanding of the material, which, in turn, improve overall learning outcomes. The accumulation of these findings supports the assumption that AI-supported learning media not only enrich the learning experience but also act as a catalyst for motivation and mastery of academic competencies, making it relevant to the context of research on AI-based musicalization media at SMP Negeri 1 Donomulyo.

The results of this study are demonstrated not only through data analysis but also through findings that emerged during the learning process. The first finding was an increase in students' emotional engagement and attention. This was evident in students' responses, which showed interest, enjoyment, and involvement during the presentation of the material. In social studies learning, emotional engagement plays a crucial role due to the narrative and conceptual nature of the material, which requires a high level of concentration (Khoirunnida & Yusuf, 2022). The use of musical elements in the presentation of the material created a more conducive learning atmosphere. Furthermore, the development of AI-based media also influenced variations in how learning is presented. This finding is in line with research results (Karim & Susanti, 2025) which states that AI technology in learning is associated with increased student learning engagement.

The second finding relates to strengthening the memory of social studies concepts

through musical rhythm and repetition. The use of music in AI-based learning media allows for the presentation of social studies concepts not only verbally but also through structured rhythmic and repetitive patterns (Lv, 2023). Observations show that students more easily remember terms, concepts, and the sequence of social studies material when presented in the form of songs or repetitive rhythms. Rhythm, in this case, functions as a cognitive marker that helps the process of grouping and encoding information, thus facilitating recall of the material. During the learning process, students memorized and recalled material more quickly when social studies concepts were presented through musicalization. Within the framework of multimedia learning theory developed by Richard E. Mayer, the use of dual representations, namely verbal and auditory, plays a role in assisting the process of selecting and organizing information in working memory, thus supporting storage in long-term memory. The data obtained showed that students were able to recall material through parts of the song lyrics used in learning (Mayer, 2024).

The third finding relates to increased self-efficacy in learning. Self-efficacy is a student's belief in their ability to understand material and complete learning tasks (Kaskens et al., 2020). Observations show that students are more willing to participate in learning activities, such as answering questions, expressing opinions, and engaging in learning activities. This finding aligns with Albert Bandura's social cognitive theory, which explains that self-efficacy is related to effort, persistence, and resilience in the face of learning difficulties (Scott et al., 2024). In social studies learning, self-efficacy is one aspect of the process of understanding concepts, engaging in social cause-and-effect reasoning, and interpreting social phenomena. The data obtained shows changes in student participation throughout the learning process.

Theoretically, the results of this study are related to the theory of student engagement, which places emotional, cognitive, and behavioral involvement as part of the learning process (Amaliana & Kardoyo, 2024). AI-based media for musicalization were used to present social studies material with interactive, varied features. The use of this media demonstrated student engagement during the learning process, including attention, understanding, and participation. These findings also align with the results of a systematic review (Putra et al., 2024) which shows a relationship between the use of AI in learning and student engagement and learning motivation.

In addition, the results of this study are related to motivation theory, especially intrinsic motivation, which includes aspects of feeling capable, autonomy, and interest in learning activities (Urhahne & Wijnia, 2023). AI-based media presents social studies material in audio and music formats, with varying presentations and difficulty levels. Throughout the learning process, students' responses to the learning activities were evident. This aligns with research (Zhou et al., 2025) which shows a relationship between the use of AI-based learning media and student learning motivation.

Overall, the use of AI-based musicalization media in social studies learning is associated with the presentation of material that is more contextually relevant and

connected to students' daily lives. The presentation of relevant material shows a relationship with students' learning motivation during the learning process. The connection between the material and everyday experiences is also related to the process of understanding concepts and remembering the material (Anggarwati et al., 2024). The data obtained show a relationship between the use of this media and variables related to learning motivation and social studies learning outcomes. Thus, learning relevance is one aspect of the affective and cognitive processes involved in the use of AI-based musicalization media (Urbaite, 2025).

CONCLUSION

Based on the analysis of the data, this study concluded that AI-based musicalization media had a significant influence on the motivation and learning outcomes of IX-grade students at SMPN 1 Donomulyo, Malang Regency. This was supported by the results of the MANOVA test, which showed a Wilks' Lambda value of 0.401, an F value of 45.562, and a significance of 0.000 (< 0.05), indicating that H_0 was rejected and H_1 was accepted. The research findings during the learning process also strengthened the analysis, indicating that students felt happy, interested, actively involved, and able to retain the memory of social studies learning through meaningful rhythmic and repetitive musical patterns. In addition, AI-based musicalization media also increased students' confidence in their ability to understand the material and complete learning tasks. These findings confirm that AI-based musicalization media can be an innovative and relevant learning approach for improving students' motivation and learning outcomes in social studies. The integration of artificial intelligence technology with musical elements can create a more interesting, interactive, and meaningful learning experience for students.

In practice, this learning media can be recommended as an alternative learning strategy that supports more creative learning and aligns with the characteristics of today's digital generation. For future development, further research is recommended to test the application of AI-based musicalization media by expanding the research variables, educational levels, or other subjects, and by assessing its effectiveness in the long term to obtain more comprehensive results.

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