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The Use of Prehistoric Cave Animation Videos as a Learning Medium Based on Critical Thinking Skills

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Abstract. *This study aims to examine in depth the effectiveness of using prehistoric cave painting animation videos as a learning medium in enhancing students' critical thinking skills, active engagement, and understanding of cultural context in art education at the secondary school level. The study employed a qualitative approach with a case study design involving 20 students who were purposively selected as participants. Data were collected through observations, written tests, and in-depth interviews to obtain a comprehensive understanding of both the learning process and outcomes. The analysis was conducted using the Conceptual Framework (artist, artwork, world, and audience), The Four Frames (subjectivity, cultural, structural, and postmodern), and Cognitive Load Theory to understand the dynamics of students' cognitive processes. The results indicate a significant improvement in students' analytical writing skills, classroom engagement, and understanding of cultural values embedded in artworks. In addition, students demonstrated stronger critical reflection and a high level of cognitive retention. These findings confirm that animation-based learning is effective not only as a visual medium but also as an integrative pedagogical approach.*

Keywords: *Animation Learning; Critical Thinking; Arts Education; Cultural Heritage; Cognitive Load*

Abstrak. *Penelitian ini bertujuan untuk mengkaji secara mendalam efektivitas penggunaan video animasi lukisan gua prasejarah sebagai media pembelajaran dalam meningkatkan kemampuan berpikir kritis, keterlibatan aktif, dan pemahaman siswa terhadap konteks budaya dalam pendidikan seni di tingkat sekolah menengah. Penelitian ini menggunakan pendekatan kualitatif dengan desain studi kasus yang melibatkan 20 siswa yang dipilih secara purposif sebagai partisipan. Data dikumpulkan melalui observasi, tes tertulis, dan wawancara mendalam untuk memperoleh pemahaman yang komprehensif mengenai proses dan hasil pembelajaran. Analisis dilakukan dengan menggunakan Kerangka Konseptual (seniman, karya seni, dunia, dan audiens), The Four Frames (subjektivitas, budaya, struktural, dan postmodern), serta Teori Beban Kognitif untuk memahami dinamika proses kognitif siswa. Hasil penelitian menunjukkan adanya peningkatan yang signifikan dalam keterampilan menulis analitis siswa, keterlibatan di kelas, dan pemahaman terhadap nilai-nilai budaya yang terkandung dalam karya seni. Selain itu, siswa menunjukkan refleksi kritis yang lebih kuat dan tingkat retensi kognitif yang tinggi. Temuan ini menegaskan bahwa pembelajaran berbasis animasi efektif tidak hanya sebagai media visual, tetapi juga sebagai pendekatan pedagogis integratif.*

Kata Kunci: *Pembelajaran Animasi; Berpikir Kritis; Pendidikan Seni; Warisan Budaya; Beban Kognitif.*

INTRODUCTION

Prehistoric paintings considered to be among the oldest in the world are scattered throughout various caves in the Maros region of South Sulawesi, Indonesia. These paintings, often referred to as rock paintings, represent an important part of Indonesia's cultural identity and history (Haedar et al., 2024). These works not only testify to the creativity of prehistoric humans, but also reflect the collective memory and symbolic expression of the ancient societies that once inhabited the region. As visual representations of the past, these artworks serve as invaluable media for understanding the

development of human imagination and communication through art. Therefore, the study and preservation of prehistoric cave paintings play a crucial role in maintaining cultural continuity, particularly when integrated within the context of art education.

The urgency of integrating prehistoric cave paintings into education arises from the increasing threats to their existence, whether due to natural degradation, environmental change, or human activity. The condition of the pigments and surfaces of the paintings has suffered significant damage, necessitating conservation efforts not only for their physical form, but also for their symbolic meaning and educational potential. Integrating the study of these cultural artifacts into school-based arts education, particularly at the public high school (SMA Negeri) level in South Sulawesi, can be an effective strategy for raising the younger generation's awareness of Indonesia's rich cultural heritage. In an era of globalization, where cultural homogenization often threatens local identities, learning that emphasizes understanding and appreciation of one's own cultural heritage is an important way to maintain and strengthen national identity (Richa Dewi Rahayu, 2021; Wulandari et al., 2024).

However, the integration of local cultural heritage into the formal education system remains relatively limited. Arts education in many public high schools tends to focus on technical skills and aesthetic appreciation, rather than conceptual and cultural understanding (Alkhahfi Akhmad & Syukur, 2026; Muslimin, nd; Syarifuddin, 2017; Yulia & Ario Sumilih, 2026). Teachers often place more emphasis on visually appealing work without engaging students in critical reflection on meaning, context, or cultural significance (Richa Dewi Rahayu, 2021; Wulandari et al., 2024). This pedagogical approach is partly influenced by the background of arts and culture teachers, who do not always come from fine arts education. As a result, material on art history or cultural heritage is often underdeveloped or even not included in the curriculum. This condition results in students possessing artistic skills, but lacking the critical and cultural literacy to interpret artworks as historical and social texts. This problem is a crucial issue in education, demanding a more innovative, culturally responsive learning approach based on the development of critical thinking.

In response to these challenges, this research aims to develop and implement animation-based learning media featuring prehistoric cave paintings as the main material. Through digital animation, students can interact with visual representations of ancient art in a dynamic and interactive manner, thereby stimulating curiosity, imagination, and critical thinking skills. (Makawi, 2022a). This research uses a qualitative approach with a case study design, which integrates quantitative approaches, such as pre- and post-assessment of students' critical thinking skills, with qualitative methods, including classroom observations, interviews, and content analysis of student reflections. This combination allows for a more comprehensive understanding of how animation-based learning media can influence learning outcomes, the role of teachers, and student engagement in arts education.

Although various previous studies have examined the use of animation in learning, most have focused on cognitive or motivational aspects without explicitly integrating cultural heritage. Research exploring the use of digital technology to preserve and reinterpret traditional arts in modern educational contexts is still very limited. (Amelia Maramis & Djirong, 2019; Yang, 2023) Therefore, this research fills this gap by connecting digital innovation with local cultural content, particularly in South Sulawesi. This research positions animation not only as a learning tool but also as a cultural medium capable of reviving ancestral art forms and encouraging students' critical engagement with history and identity.

The significance of this research lies in its dual contribution, namely in educational innovation and cultural preservation. Pedagogically, this research offers an interdisciplinary model that combines art, technology, and cultural heritage-based education to develop students' critical and imaginative abilities. Culturally, this research supports the national mission in advancing culture as mandated in Article 32 paragraph (1) of the 1945 Constitution of the Republic of Indonesia, which emphasizes that the state advances national culture amidst world civilization by guaranteeing the freedom of society to maintain and develop its cultural values. By integrating local cultural heritage

into modern learning practices, this research strengthens the sustainability of cultural values in the younger generation, so that traditional wisdom and creativity remain relevant amidst rapid changes in the times.

Based on preliminary observations conducted in several public high schools in South Sulawesi, it was found that the arts and culture learning process is still dominated by a conventional, teacher-centered approach, with limited and less varied media use. Students tend to be passive and have not yet demonstrated critical thinking skills in interpreting works of art, especially those related to local cultural contexts such as prehistoric cave paintings. Furthermore, material on cultural heritage is often presented textually without adequate visualization, making it difficult for students to understand deeply. These findings align with research by (Hidayat & Fadillah, 2019) which shows that the use of interactive visual-based learning media can increase student engagement and understanding, but has not specifically developed aspects of critical thinking based on cultural context. Other research by (Wahyuni et al., 2018) also highlighted the effectiveness of animated media in increasing learning motivation, but it is still limited to basic cognitive aspects and has not integrated local cultural heritage content as a learning resource. Thus, the research gap lies in the lack of integration between animated media, strengthening critical thinking, and the contextual use of local cultural heritage in arts learning, which is the main focus of this study.

METHODS

The research method used in this study is a qualitative approach with a case study design using the Conceptual Framework and The Frames model developed by Maras. (Freeman, 1995) This model was chosen because the main focus of this research is the implementation of critical thinking-based learning through animated video media featuring prehistoric cave paintings from Maros. The choice of this model is in line with the character of the research that integrates cultural heritage, arts education, and digital media innovation in the context of learning at the secondary school level. This approach allows for in-depth exploration of how local cultural content can be effectively integrated into formal education through visual communication and arts learning.

The use of the Conceptual Framework and The Frames provides a comprehensive analytical structure, allowing researchers to examine art not only as a visual product but also as a cultural and educational phenomenon. This framework helps connect the creative, aesthetic, and cognitive aspects of the learning process, while The Frames enable analysis from multiple perspectives: conceptual, structural, cultural, and critical. This ensures that the learning process fosters the development of higher-order thinking skills in students.

The research location was deliberately chosen to represent both cultural relevance and educational applicability. This research was conducted at SMA Negeri 4 Bantimurung, involving 20 students based on their cultural backgrounds and local knowledge, located in Maros Regency, South Sulawesi, Indonesia. This school was chosen because it is close to the Leang-Leang Prehistoric Park, one of the most important prehistoric cave complexes in the world known to contain the oldest figurative paintings, dating back over 45,000 years. The school's proximity to this cultural site makes it an ideal setting for research that combines arts education, cultural awareness, and field-based learning. Students at this school are also frequently involved in local cultural and environmental activities, thus providing a supportive context for the implementation of educational innovations based on local heritage.

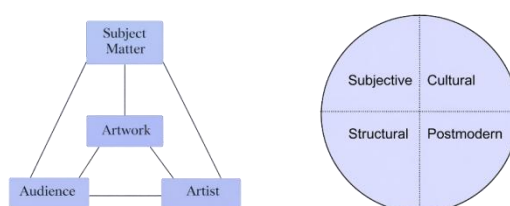


Figure 1. The Conceptual Framework (left) and The Four Frames (right) approaches in the study of prehistoric art.

This research was conducted at SMA Negeri 4 Bantimurung, located in Bantimurung District, Maros Regency, South Sulawesi. The school is located approximately 45 kilometers northeast of Makassar City and is near the entrance to Bantimurung–Bulusaraung National Park, an area renowned for its karst landscape, waterfalls, and prehistoric cave systems. This strategic location allows direct access to important archaeological sites such as Leang Timpuseng, Leang Pettae, and Leang Pettakere, where the world's oldest handprints and animal paintings have been found.

The proximity of the school to the archaeological site allows for field-based art learning. Students are not only introduced to prehistoric art concepts through digital animations in the classroom, but also have the opportunity to observe and study authentic rock paintings in their natural environment. This combination of classroom and field learning reinforces experiential understanding and encourages students to connect theory with observation and creativity with cultural context.

School facilities, including a multimedia room and art studio, are utilized in the design, presentation, and testing of animation-based learning media. Collaboration with arts and culture teachers also plays a crucial role in aligning animation content with the national arts curriculum and ensuring that the media supports the development of students' critical and creative thinking skills, as emphasized in the Pancasila Student Profile framework.

The data collection process in this study was carried out through observation and interviews. Observations were carried out in several prehistoric caves in Maros Regency to obtain visual and contextual data regarding cave paintings and the surrounding environmental conditions, then continued at SMA Negeri 4 Bantimurung. Meanwhile, interviews were conducted with twenty (20) students of SMA Negeri 4 Bantimurung who were selected based on their cultural background and knowledge of local traditions, especially in the context of Arts and Culture learning. This interview aimed to obtain an in-depth perspective regarding local wisdom and its relevance in education. The interview instrument was compiled based on Freeman's Conceptual Framework theory which was adapted to the research theme.

The data analysis technique in this study was carried out on data obtained through questionnaires, interviews, and Focus Group Discussions (FGDs) to develop culture-based learning materials. The analysis used Freeman's Conceptual Framework approach which includes four dimensions: the artist, artwork, art audience, and era or art world. The artist dimension is used to understand culture from the perspective of artists to ensure the accuracy and authenticity of South Sulawesi cultural data. The artwork dimension focuses on the analysis of art objects as a source of visual data in the development of two- and three-dimensional models based on augmented reality (AR). The art audience dimension is used to identify community interest and appreciation of culture as a basis for compiling learning materials in accordance with the Pancasila Student Profile in the Independent Curriculum. Meanwhile, the era or art world dimension is analyzed through literature reviews and in-depth interviews to critically understand the historical context of culture so that the data obtained is valid and suitable for use as learning materials.

RESULTS AND DISCUSSION

The research results obtained from twenty (20) students were analyzed quantitatively and qualitatively regarding the use of animated video media of prehistoric cave paintings in Arts and Culture learning at SMA Negeri 4 Bantimurung, Maros. The analysis focused on four dimensions in The Conceptual Framework, namely artist, artwork, world, and audience, and was strengthened by critical reflection analysis based on Cognitive Load Theory. To strengthen the quantitative findings, a simple statistical test was conducted using a paired sample t-test which showed a significant difference between pre-test and post-test scores ($p < 0.05$). In addition, the N-Gain value which was in the medium to high category and supported by the effect size in the medium-high category indicated that the use of animated video media had a substantial influence on improving students' critical thinking skills. The research results and discussion was described as follows:

Research result

a. Analysis Based on the Conceptual Framework

Table 1. Analysis Based on The Conceptual Framework (n = 20)

Dimensions	Analysis Indicators	Quantitative Data (Pre–Post)	N-Gain	Qualitative Findings	Interpretation
Artist	Empathy towards the creator of the work	58.0 → 83.5	0.60	Students understand paintings as an expression of the life experiences of prehistoric humans.	Internalization of meaning occurs through the creator's perspective.
Artwork	Symbol and visual analysis	60.5 → 85.0	0.62	Students interpret symbols (handprints, fauna) as visual language.	Shift from descriptive to interpretive
World (World/Era)	Understanding historical context	55.2 → 82.4	0.59	Students relate works to social life, rituals, and history.	Historical-cultural awareness is formed
Audience	Emotional & cognitive engagement	70% → 86%	+16%	Students actively discuss, showing high interest	Animation increases engagement and participation
Integrative	Analytical writing skills	60.7 → 82.3	0.61	The writing develops into argumentative and contextual	Indications of the development of critical thinking

The analysis results show a consistent increase across all dimensions. In the artist dimension, increased empathy for the creator (N-Gain = 0.60) indicates that students not only understand the work visually, but begin to internalize meaning through the creator's perspective. In the artwork dimension, the ability to analyze visual symbols increased (N-Gain = 0.62), which is marked by a shift in thinking from descriptive to interpretive. The world dimension shows a growing understanding of historical and cultural context (N-Gain = 0.59), where students are able to relate the work to social and historical realities. Meanwhile, in the audience dimension, there was an increase in students' emotional and cognitive involvement, as reflected in active participation in discussions and improved analytical writing skills (N-Gain = 0.61).

Interpretatively, these findings indicate that the use of animated videos based on local cultural heritage not only improves learning outcomes quantitatively but also transforms students' thinking in interpreting works of art. Animation media acts as a bridge that integrates visual, narrative, and contextual aspects, thus encouraging students to think more critically, reflectively, and contextually. Thus, learning is no longer limited to aesthetic aspects but develops into a deeper process of cultural interpretation.

This study has several limitations. First, the limited sample size (n = 20) and the sample size from only one school, thus limiting the generalizability of the findings. Second, the case study design does not allow for the rigorous control of variables as in experimental research. Third, the relatively short duration of the intervention does not fully represent the long-term development of critical thinking. Therefore, future research is recommended to involve a larger sample size, a longer duration, and the development of a more comprehensive mixed-methods design.

b. Analysis Based on The Four Frames

Table 2. Analysis Based on The Four Frames (n = 20)

Frame	Analysis Indicators	Quantitative Data (Pre– Post)	Gain (%)	Qualitative Findings	Interpretation
Subjectivity	Personal & emotional responses	62.0 → 84.5	+36%	Students write personal reflections and empathy towards prehistoric humans.	Learning triggers affective engagement
Cultural	Understanding the meaning of culture	58.5 → 83.7	+43%	Students associate symbols with rituals and cultural identity.	Cultural literacy is formed
Structural	Formal visual analysis	60.0 → 85.3	+42%	Students understand composition, color, and shape systematically.	Strengthening analytical-logical thinking
Postmodernism (Postmodern)	Critical interpretation & plurality of meanings	57.2 → 81.5	+42%	Students generate new interpretations and relate them to modern contexts.	Encouraging deconstruction and critical thinking

The analysis results showed a significant increase across all frames. In the subjective frame, a 36% increase indicates that students not only responded emotionally but were also able to express deeper personal reflections on the artwork. This indicates that animation media is effective in triggering students' affective engagement as part of the meaning-making process.

In the cultural frame, the highest increase (+43%) indicated that students were able to relate visual symbols to the ritual context, values, and cultural identity of prehistoric societies. This finding confirms that the use of local heritage-based content contributes to the development of students' contextual cultural literacy.

In the structural frame, a 42% increase reflects students' ability to analyze visual elements such as composition, shape, and color more systematically. This demonstrates that animation not only aids understanding of context but also strengthens formal analysis skills, which are the foundation of analytical thinking in art.

Meanwhile, in the postmodern framework, a 42% increase indicates students' ability to produce more open, critical, and diverse interpretations. Students are beginning to be able to connect the meaning of the work to the contemporary context, indicating an active process of deconstruction and reconstruction of meaning.

Overall, these findings indicate that the use of animated videos based on prehistoric cave paintings not only enhances students' cognitive understanding but also encourages affective engagement, strengthens cultural literacy, fosters formal analysis skills, and fosters critical interpretation. Thus, animation-based art learning has been shown to holistically integrate various dimensions of meaning and foster the development of higher-order thinking skills in the context of art education.

c. Critical Reflection and Cognitive Retention based on Cognitive Load Theory

Table 3. Critical Reflection and Cognitive Retention Based on Cognitive Load Theory (n = 20)

Cognitive Components	Indicator	Quantitative Data	Percentage	Qualitative Findings	Interpretation
Critical Reflection	Culture-based arguments	57.0 → 81.0	+42%	Student essays include analysis, cultural context, and inferences.	Critical thinking has developed significantly

Cognitive Retention	Conceptual memory	16/20 students	80%	Students are able to remember symbols and meanings after learning	Long-term memory is formed
Intrinsic Load	Complexity of the material	62 → 84	+35%	Animation simplifies abstract concepts	Managed intrinsic cognitive load
Extraneous Load	Information disruption	Low	-	There are no significant distractions	Effective and focused media
German Load	Scheme formation	59 → 83	+40%	Students connect symbols to cultural contexts	Meaningful learning
Creativity	Production of new ideas	65 → 85	+30%	Students produce new visual interpretations	Creativity increases

The analysis showed that animated video-based learning consistently improved students' critical reflection skills and cognitive retention. The increase in critical reflection (+42%) was evident in students' ability to construct arguments based on cultural context and develop deeper inferences in essays. This demonstrates that students not only understand information but are able to process it into more complex and contextual thinking.

In terms of cognitive retention, the 80% achievement indicates that most students were able to recall and re-understand key concepts after learning. This finding indicates that visual representations in animations help strengthen long-term memory through more structured and meaningful information processing.

From a cognitive load perspective, findings indicate that animation plays a role in managing intrinsic load by simplifying abstract concepts (+35%), while also reducing extraneous load through focused visual presentation and minimal distractions. Furthermore, the increase in Germanic load (+40%) is reflected in students' ability to construct knowledge schemas by connecting visual symbols and cultural contexts in a more integrated manner.

Interestingly, the increase in creativity (+30%) indicates that learning does not stop at understanding, but progresses to the stage of producing new ideas and interpretations. Overall, these findings indicate that animation media is not only effective in enhancing comprehension and retention but also encourages critical thinking, the formation of cognitive schemas, and deeper exploration of ideas. Thus, animation-based learning can create a learning experience that is both cognitively efficient and conceptually meaningful.

Discussion

a. The Conceptual Framework: Transforming Understanding through the Dimensions of Artist, Artwork, World, and Audience

The results of this study indicate that the use of animated video media can simultaneously activate the four main dimensions in The Conceptual Framework: artist, artwork, world, and audience. This finding confirms that art learning cannot be reduced solely to technical or aesthetic aspects, but must be understood as a complex, multidimensional, and meaning-based interpretive process. (Salam et al., 2017) This is in line with the view in visual arts education that emphasizes the importance of integration between artistic practice, interpretation, and socio-cultural context in developing students' visual literacy and critical thinking.

However, there is debate in the literature regarding the implementation of a conceptual framework-based approach in formal education. Some previous studies have argued that this approach tends to be too abstract for secondary school students, requiring intensive guidance from teachers due to students' limited cognitive capacity to simultaneously understand the relationship between artists, works, and cultural contexts. However, the results of this study show a different finding. The support of visual and narrative animation media has been proven to be able to bridge the complexity of these concepts, allowing students to internalize the relationships between dimensions in a more concrete and meaningful way. (Wang et al., 2022; W. Zhang & Li, 2024; X. Zhang, 2020).

In the artist dimension, students no longer view works merely as visual objects, but as representations of prehistoric human experiences. This demonstrates the development of aesthetic empathy and historical awareness, indicating that students are able to enter the realm of the creator's creative experience. In the artwork dimension, there is a significant shift from a descriptive to an interpretive approach. Students begin to develop semiotic skills in reading symbols and meanings, demonstrating an integration between formalistic (visual elements) and contextual (cultural meaning) approaches. This integration aligns with the framework of contemporary art education, which combines visual analysis with the construction of meaning as part of visual literacy. (Sri Wahyuni Asti et al., 2025).

Furthermore, in the world and audience dimensions, students demonstrated the ability to connect artworks to their social and cultural contexts and respond to them actively and reflectively. This reinforces the argument that art learning based on experience, context, and emotional engagement is more effective than technical and fragmented approaches. Furthermore, this active engagement also reflects the development of students' critical awareness and reflective abilities, as emphasized in the conceptual framework of arts education, which focuses on meaning-making and social engagement.

b. The Four Frames: Deepening Interpretation through Subjectivity, Culturalism, Structuralism, and Postmodernism

The Four Frames approach provides a more critical perspective in understanding how students interpret artworks. In the art education literature, there is considerable debate regarding the use of this framework, particularly in relation to the postmodern frame. (K. Maras, 2018; KE Maras, 2018) However, the results of this study indicate that these concerns are not entirely justified. In fact, within the postmodern framework, students are able to produce more critical and reflective interpretations without losing cultural context. They do not simply passively accept meanings but are able to question them and relate them to contemporary realities. This demonstrates that plurality of meanings does not necessarily lead to relativism but can instead provide a space for the development of critical thinking.

In the subjective frame, the increase in students' emotional involvement shows that personal experience has an important role in the art learning process. (Makawi, 2022b) This aligns with the constructivist approach, which emphasizes that knowledge is built through individual experience. However, in several studies, the subjective approach is often criticized for being too personal and lacking objectivity. Furthermore, in the cultural frame, students showed improvement in understanding cultural values and context. This supports the argument that arts education should serve as a means of cultural preservation. However, in the context of globalization, there is debate about whether a focus on local culture can limit students' insights. Meanwhile, the structural frame shows that formal analysis still plays an important role in arts learning. This emphasizes that the postmodern approach does not replace structural analysis, but rather complements it. Thus, the four frames in The Four Frames are not contradictory, but rather complement each other in forming a comprehensive understanding. (Freeman & Sanger, 1995).

c. Critical Reflection and Cognitive Retention: A Cognitive Load Theory Perspective in Animation-Based Learning

From a cognitive perspective, the results of this study indicate that animation-based learning can significantly improve critical reflection and cognitive retention. This finding aligns with Cognitive Load theory, which states that learning will be more effective if cognitive load is optimally managed. (Kirschner et al., 2018; Schnotz & Kürschner, 2007; Van Merriënboer, nd) However, in the literature there is debate regarding the effectiveness of multimedia media, including animation.

Some studies argue that the use of animation can increase extraneous load, especially if the design is too complex or excessive. In this view, animation can actually distract students and reduce learning effectiveness. However, the results of this study show that when animations are designed in

a structured and relevant manner, extraneous load can be minimized, allowing students to focus more on the main information.

The intrinsic load associated with the complexity of the material was successfully simplified through narrative visualization, making it easier for students to grasp abstract concepts. This demonstrates that animation can function as an effective cognitive mediation tool. Furthermore, the increase in Germane load indicates that students were able to construct deeper knowledge schemas, which form the basis for meaningful learning. (Makawi, 2023).

CONCLUSION

This study shows that the use of animated video media of prehistoric cave paintings significantly improves students' critical thinking skills, engagement, and understanding of cultural context in Arts and Culture learning. Based on analysis through The Conceptual Framework, students experience comprehensive development in the dimensions of the artist, artwork, world, and audience, which is reflected in their ability to understand the work not only visually, but also symbolically and contextually. This shows that animation-based learning is able to integrate cognitive, affective, and cultural aspects simultaneously. Furthermore, through The Four Frames approach, it was found that students were able to develop deeper and more critical interpretations, from subjective, cultural, structural, and postmodern perspectives. Students not only understood the meaning of the work as a single work but were also able to view it from various perspectives and relate it to the context of contemporary life. This confirms that animation-based learning can encourage reflective, deconstructive, and creative thinking in arts education.

From a Cognitive Load Theory perspective, the study's findings demonstrate that animated media effectively manages students' cognitive load, significantly enhancing critical reflection and cognitive retention. Structured visualizations help simplify abstract concepts, minimize information clutter, and strengthen the formation of meaningful knowledge schemas. High retention rates demonstrate that learning impacts not only short-term understanding but also long-term learning. Overall, this research confirms that animation-based learning serves not only as an aid, but also as a pedagogical approach capable of transforming arts learning to be more critical, contextual, and relevant. The integration of technology, conceptual frameworks, and cultural approaches makes arts learning a process that not only develops skills but also shapes students' cultural awareness and identity amidst global dynamics.

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