Global Education Journal
Vol. 3, 3 (September-December, 2025), pp. 173-178
EISSN: 2808-5094, DOI: 10.59525/gej.v3i3.1193

Development of AI-Assisted Animated Video Learning Media to Improve the Critical Thinking Skills of Grade IV Students in Elementary Schools

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ARTICLE INFO

Keywords:

Animated Videos;
Artificial Intelligence;
Critical Thinking;
Elementary School;
R&D

Article History:

Received 2025-10-18
Revised 2025-11-16
Accepted 2025-12-21

ABSTRACT

The advancement of digital technology today requires innovation in learning media, especially those that can help develop children's critical thinking skills at the elementary school level. Animated videos that utilize artificial intelligence or AI technology are one of the media alternatives that are quite promising. The purpose of this study is to create learning media in the form of AI-based animation videos that are indeed suitable for use in improving critical thinking skills in grade IV elementary school students. This research uses the R&D (Research and Development) method by conducting a literature review as the foundation. The data used came from journal articles both national and international in the last five years that discussed digital learning media, animated videos, AI technology, and critical thinking skills. From the results of the literature review conducted, it can be seen that animated video media can indeed improve students' critical thinking skills because the material is presented visually, contextually, and there are interactive elements. The use of AI in the creation of animated videos also makes the development process more efficient and the quality of the material presentation increases. From the results of this study, it can be concluded that AI-based animation video learning media has great potential to be applied in grade IV elementary school learning in order to support the development of students' critical thinking skills.

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1. INTRODUCTION

Given the demands of 21st century skills, critical thinking is an important skill that must be developed from the time children are in elementary school. Critical thinking includes the ability to analyze, evaluate information, and solve problems logically and reflexively (Browne & Keeley, 2015). Unfortunately, according to various international studies, such as the International Student Assessment Program (PISA), the critical thinking skills of Indonesian students are still relatively low (OECD, 2019).

One of the reasons why our students' critical thinking skills are lacking is because the learning media used by teachers is not very diverse and tends to be conventional. Most teachers still rely on print media and lecture methods, so students are less actively involved in the learning process (Fatahullah, 2016). However, the use of innovative digital learning media can actually create more interesting and meaningful learning for students (Batubara, 2021).

One of the digital learning media that is quite effective is animated videos. Why is it effective? Because these animated videos combine audio and visual elements, they make it easier for students to understand concepts that may be abstract (Munir, 2017). Research by Hasnah Fadiyah et al. (2024) shows that digital media, such as animated videos, have a positive impact on the critical thinking skills of elementary school students. Furthermore, integrating artificial intelligence (AI) technology into the process of creating animated videos can improve the quality of media through adaptive content presentation and a more efficient development process (Ratri & Janattaka, 2024).

Based on the background described above, this study aims to develop a learning media in the form of animated videos that utilize AI to improve the critical thinking skills of fourth grade elementary school students.

2. METHODS

In this study, the method used is Research and Development (R&D) with a literature review approach. There are several stages carried out in this study, namely: (1) conducting a needs analysis, (2) collecting and reviewing literature, (3) designing media products, and (4) conducting a conceptual evaluation.

For the data source, this study uses articles from national and international journals that have been published in the last five years and are of course relevant to the topic discussed. The data collection technique is carried out through documentation studies using databases such as Google Scholar, SINTA, and other reputable journals. Then the data analysis was carried out in a qualitative descriptive manner by synthesizing the results of previous research as a basis for developing learning media.

3. FINDINGS AND DISCUSSION

This section presents the results of a literature review that is used as a basis for the development of learning media in the form of artificial intelligence (AI)-based animation videos, as well as discussing its influence and implications on improving the critical thinking skills of grade IV elementary school students. The description of the discussion is structured by relating previous research findings, relevant theories, and learning conditions and needs in elementary schools in the digital era.

1. Analysis of Learning Media Needs for Critical Thinking

Based on the results of the literature review, it is known that the critical thinking skills of elementary school students are still relatively low and have not developed optimally. The learning process that takes place in the classroom generally still focuses on delivering material in one direction and emphasizing the memorization aspect, so that students do not get the opportunity to practice analysis, evaluation, and problem-solving skills independently. These findings are in line with the OECD report (2019) which shows that Indonesian students still face difficulties in solving problems that require a high level of reasoning and contextual problem-solving.

In addition, the learning media used in elementary schools is still dominated by textbooks and static visual media, such as simple presentation slides. The media is considered not to be able to encourage active student involvement in the learning process. In fact, learning that aims to develop critical thinking skills requires media that is able to present real problems, present material in an interesting way, and encourage students to explore and reflect. Therefore, learning media innovations that are relevant to these needs are needed, one of which is through the use of AI-based animation videos.

2. Characteristics of AI-Assisted Animated Videos

Animated videos have characteristics that are in accordance with the learning characteristics of elementary school students because they combine visual, audio, and narrative elements in an integrated manner. This media helps students understand abstract concepts through concrete visual presentations and easy-to-understand storylines. According to Munir (2017), digital learning media that combines moving images and sounds is able to increase students' attention, focus, and motivation to learn.

The use of artificial intelligence (AI) in the development of animated videos provides additional advantages. AI technology can be used at various stages, ranging from designing storylines, creating automatic animations, voice processing, to preparing adaptive evaluation questions. With the support of AI, the media development process becomes more efficient and the quality of material presentation can be improved. In addition, AI also allows the creation of more personalized learning, where materials and forms of evaluation can be adjusted to the needs and abilities of students.

Thus, AI-based animation videos not only function as a means of delivering material, but also act as an interactive learning medium that is able to increase student engagement and support the development of critical thinking skills.

3. Synthesis of Previous Research Results

The results of the study of various relevant studies show that there are similar findings related to the effectiveness of digital learning media, especially animated videos, in improving the critical thinking skills of elementary school students. The synthesis of the results of previous research is presented in Table 1.

Table 1. Synthesis of Previous Research on Digital Media and Critical Thinking

Researcher	Media Type	Method	Key Findings
Mamonto et al. (2024)	STEM-based Animation Videos	R&D	Bia improves critical thinking skills and learning independence of elementary school students
Ratri & Janattaka (2024)	AI-tabbed animated video	R&D	Media is considered very feasible and interesting for students
Fadiyah et al.	Interactive digital media	Literature review	Digital media is effective in increasing critical thinking in elementary schools

Based on the table, it can be concluded that various digital media, including STEM-based animation videos and AI-assisted animation videos, are considered suitable for use in the learning process and proven to be able to improve students' critical thinking skills. Research by Mamonto et al. (2024) shows that the use of STEM-based animation videos not only impacts the improvement of critical thinking, but also the independence of students' learning. Meanwhile, Ratri and Janattaka (2024)

emphasized that AI-assisted animation videos have a high level of feasibility and attract the interest of elementary school students.

These findings further strengthen the view that the use of digital technology-based animation video media has great potential in improving the quality of learning and developing students' critical thinking skills effectively.

4. Mechanisms to Improve Critical Thinking Skills through Animated Videos

AI-based animated videos are designed by presenting contextual problems that are close to students' daily lives. Learning materials are presented through storylines, moving illustrations, and dialogues that are able to arouse students' curiosity. In addition, this media is equipped with triggering questions that encourage students to observe, analyze, and draw conclusions independently.

The mechanism is in line with the indicators of critical thinking ability, which include: (1) the ability to identify problems, (2) formulate logical reasoning, (3) analyze information, and (4) make decisions. The support of interesting visualizations and structured narratives makes it easier for students to understand the problems presented and encourages them to think reflectively. Through this process, students are expected to become accustomed to not only receiving information, but also processing and evaluating it critically.

5. Implications of Learning Media Development

The results of the discussion show that the development of learning media in the form of AI-based animation videos has significant implications for learning in elementary schools. This media can be used as an innovative alternative to create active, creative, and student-oriented learning. In addition, the use of AI-based animated videos can assist teachers in conveying complex material in a simpler, engaging, and easy-to-understand way for students.

Furthermore, this media has the potential to improve the quality of learning in a sustainable manner by fostering the habit of critical thinking from an early age. The support of AI technology also makes it easier for teachers to develop learning media that is relevant to the needs of students and is in line with the demands of 21st century learning.

4. CONCLUSION

Based on the results of the literature review that has been conducted, it can be concluded that the development of learning media in the form of artificial intelligence (AI)-based animation videos has great potential in supporting the improvement of critical thinking skills of grade IV elementary school students. Animated video media allows the presentation of material visually, contextually, and interactively, so as to encourage active involvement of students in the process of observing, analyzing, and assessing the information obtained.

The application of AI technology in the development of learning media also provides advantages, especially in improving the efficiency of the development process, improving the quality of material presentation, and opening up opportunities for creating more adaptive learning according to the needs and characteristics of students. Thus, this research has achieved the set goal, which is to examine the potential and feasibility of AI-based animated videos as an alternative innovative learning media to develop critical thinking skills in elementary schools.

However, this research is still limited to literature review and conceptual development, so further research is recommended to conduct empirical testing through the application of direct media in the classroom to obtain quantitative data on its effectiveness. In addition, further research can be directed to the development of media prototypes and the assessment of their impact on other aspects, such as learning motivation, learning outcomes, and student independence, which are currently still in the development planning and initial trial stages.

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