

THE ROLE OF EDUCATIONAL ANIMATION IN INTERACTIVE LEARNING IN THE DIGITAL ERA

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Abstract: The development of digital technology has encouraged changes in the learning process, particularly in the use of more innovative and interactive learning media. One of the rapidly growing media is educational animation, as it is able to present learning materials in a visual, dynamic, and engaging manner. This article aims to examine the role of educational animation in supporting interactive learning in digital era through a literature review method based on various relevant journals and scientific sources. The result of the study indicate that educational animation can increase student's learning motivation, help them understand abstract concepts, and enhance student engagement in the learning process. In addition, educational animation also supports independent learning and accommodates various learning styles of student. Compared to conventional learning media, educational animation is considered more effective in improving conceptual understanding. Therefore, the development and utilization of educational animation need to be continuously improved to support more effective learning in the digital era.

Keywords: educational animation, interactive learning, educational technology, digital learning media.

Introduction

Technology is a tool used to simplify human activities through the application of science and innovation (Agustian & Salsabila, 2021). The rapid development of information and communication technology (ICT) in the digital era has penetrated various areas of life, including education. Technology 5.0 is the latest phase in technological development that unites the physical and digital worlds in a more integrated and efficient manner. In the world of education, the arrival of Technology 5.0 has had a significant impact, requiring adjustments to curricula and learning strategies to meet the demands of the 21st century (Subandowo, 2022).

Technology-based learning needs to be developed to address the dynamics of the times. Furthermore, educators are required to master the latest technological tools and be able to use them creatively to create adaptive, inclusive, and skills-oriented learning processes. Thus, education and real-world needs in society (Fricticarani et al., 2023)

The primary goal of implementing technology in education is to facilitate the teaching and learning process through the effective design and management of technological resources

(Agustian & Salsabila, 2021). Some examples of frequently used platforms include Zoom, Google Meet, Webex, WhatsApp, Google Docs, e-learning, Quora, and various other digital media (Mahmudati & Lestyanawati, 2022). The development of digital technology has driven a paradigm shift in education, moving from conventional, teacher-centered learning to more flexible, interactive, and student-centered digital learning. The use of information and communication technology has enabled learning processes to transcend the constraints of space and time and has opened up access to online and virtual learning (Subandowo, 2022).

Digital transformation has also impacted educational practices across the board, including teaching methods, classroom management, and the development of 21st-century skills. This demonstrates a shift from traditional system to more effective and participatory technology-based learning models. Thus, the modern learning paradigm emphasizes the use of digital technology to improve educational quality, expand access to learning, and encourage active student engagement in the learning process.

With the advancement of digital technology, educational animation has emerged as an innovative learning medium capable of presenting material visually, dynamically, and interactively. Animation enables the delivery of information through a combination of images, sound, and movement, making learning more engaging and easier for students to understand. The use of animation in learning has been proven to improve student learning activities and outcomes because the material is presented more clearly and engagingly than conventional media. Animation can also increase learning motivation and enrich the learning experience through the visualization of concepts that are difficult to grasp abstractly.

Educational animation media is also considered suitable for students with various learning styles. For students with a visual learning style, animation present information through images, color and movement, helping them understand concepts concretely. For those with an auditory learning style, animation is usually accompanied by narration, music, or sound effects that reinforce understanding through auditory stimulation. Meanwhile, for students with a kinesthetic learning style, interactive animation allows active engagement through clicking, exploration, or simulation, encouraging hands-on learning experiences. By combining visual elements, sound, and interaction, educational animation can accommodate diverse learning needs, making learning more inclusive and effective for all students. Thus, educational animation serves as an innovative learning medium that supports active learning, increases motivation, and helps deliver material more effectively and engagingly

DISCUSSION

A. Basic Concepts of Educational Animation

1. Understanding Educational Animation

Educational animation is a technology-based learning medium that presents material through a combination of moving visual elements, text, sound, and interaction to help students grasp concepts more clearly and engagingly. Animation in learning serves as a dynamic representation tool capable of visualizing abstract processes or concepts, thus facilitating understanding and increasing learning engagement.

2. Educational Animation as Interactive Learning Media

The use of animation as a learning medium has the advantage of conveying complex information visually and interactively (Ega Safitri & Titin, 2021, in Eka Melati, 2023). Animation can visualize difficult-to-understand concepts in a more digestible form, thereby creating a dynamic and interactive learning environment and enriching student's learning experiences.

3. Characteristics of Attractive Educational Animation

1) Clear and Attractive Visuals

Effective educational animations must clear, engaging visuals that are easy for students to understand. Engaging visuals can increase student's attention and motivation, allowing them to focus more on the learning material.

2) Combining Visual and Audio Elements

Effective educational animation combine images, text, narration, and sound in an intergrated manner. The combination of visual and audio elements can enhance student comprehension because it engages more than one sense in the learning process.

3) Aligned With Learning Objectives

Educational animations must be designed based on learning objectives and the material to be presented. Each animation element must support the delivery of learning concepts so as not to distract students.

4) Able to Visualize Abstract Concepts

One of the key characters of educational animation is its ability to visualize abstract or difficult-to-understand concepts. Animation allows processes or phenomena that cannot be directly seen to be visually displayed, making it easier

for students to understand the material.

5) Interactive and Easy to Understand

Effective educational animations must also be interactive, simple, and easy for students to understand. Interactivity can increase students engagement in the learning processes.

B. Differences between Educational Animation and Entertainment Animation

1. Educational Animation

Educational animation is animation specifically designed for learning purposes or the delivery of educational information. It is typically used as a learning tool to help students grasp difficult concepts through engaging and interactive visualizations. Using animation in learning can increase attention and motivation because the material is presented through a combination of images, sound, and movement, making it easier for students to understand.

Educational animation generally have the following characteristics:

- The primary goal is to convey knowledge or learning concepts
- The material is systematically structured according to the curriculum or learning objectives
- Contains educational values or moral messages
- Used in learning media, educational videos, or interactive multimedia

Examples of educational animations include science learning videos, scientific process animations, or animations that explain mathematical concepts.

2. Entertainment Animation

Entertainment animation is animation created with the primary goal of providing enjoyment, entertainment, or an emotional experience to the audience. This animation is typically presented in the form of animated films, cartoon series, or digital content that emphasizes story, characters, and dramatic elements. Entertainment animation often uses imaginative storytelling, humor, and engaging characters to entertain viewers. In the context of digital media, entertainment animation content is also commonly found on social media platforms and television.

Characteristics of entertainment animation include:

- Aims to entertain the audience
- Emphasizes storyline, characters, and dramatic elements

- Does not always focus on delivering learning material
- Widely used in animated films, cartoon series, and digital content

Examples of entertainment animation include animated films, television cartoon series, and animated comedies.

C. Interactive Learning in the Digital Era

1. Definition of Interactive Learning

Interactive learning is a learning process that emphasizes active student involvement in learning activities through interactions between students and teachers, students with other students, and students with learning media. Through these interactions, the learning process is not simply one-way, but rather two-way communication, enabling students to actively participate in understanding the material.

2. Characteristics of Digital-Based Interactive Learning

Some of the characteristics of digital-based interactive learning include the following.

1) Using Digital Technology

Digital-based interactive learning utilizes technological devices such as computers, the internet, learning applications, and digital platforms as media for delivering material.

2) Integrating Various Multimedia Elements

Interactive digital learning typically combines various multimedia elements such as text, images, audio, video, and animation into a single learning medium.

3) Direct Interaction between Users and Media

Students can respond directly to the material through features such as quizzes, simulations, or interactive navigation within digital media (Paramita, 2025).

4) Encouraging Active Student Participation

Interactive digital-based learning requires students to actively engage in the learning process, such as exploring material, engaging in discussions, and completing technology-based assignments.

5) Providing Immediate Feedback

Interactive digital learning media typically provide automated feedback features, such as quizzes or assessment results that students can access immediately.

6) Supports Independent and Flexible Learning

Digital learning allows students to access materials anytime and anywhere

according to their needs.

3. The Role of Technology in Learning

Some of the roles of technology in digital learning include the following.

- 1) The internet as a source of information and learning access
- 2) Gadgets as digital learning media
- 3) Learning platforms as a means of interaction and collaboration
- 4) Technology enhances learning interactivity
- 5) Technology supports distance learning

4. Challenges of Learning in the Digital Era

According to Dadang (2024), digital transformation in education brings various changes in the learning process, but also presents challenges such as gaps in technology access, limited digital skills, and the need to adapt to technology-based learning methods.

Some of the challenges of learning in the digital era include the following.

- 1) The digital divide
- 2) Low digital literacy
- 3) Teacher readiness and competence in using technology
- 4) Internet misuse and negative content
- 5) Decreased social interaction in learning
- 6) Adapting to rapid technological change

D. The Role of Education Animation in Interactive Learning

1. Increase Student Motivation and Interest in Learning

Educational animation are able to provide moving and interactive visual displays, thus making the learning process less monotonous and able to attract students' attention to focus more on the material being studied.

2. Facilitates Understanding of Abstract Concepts

According to Kurnia (2025), animation-based learning media can facilitate students' understanding of abstract concepts because animation can depict processes or phenomena that are difficult to observe directly.

3. Increases Students Engagement

Animated media allows students to interact with learning materials through various activities such as simulations, explorations, and digital media-based discussions.

4. Supports Independent Learning

Educational animation supports independent learning because students can access the material at any time through digital media. Students can study and review explanations they don't understand, and learn at their own pace.

5. Facilitates Various Learning Styles (Visual, Auditory, and Kinesthetic)

Educational animation can accommodate various student learning styles because it combines various multimedia elements such as images, sound, text, and movement.

E. Strengths and Weakness of Educational Animation

1. Excellence

1) Engaging and communicative visuals

Presenting material through moving images, color, and audio makes information easier to understand than text or lectures alone.

2) Easy digital access

Animated media can be accessed through various digital devices such as computers, laptops, tablets, and smartphones. This allows students to study learning materials anytime and anywhere through digital platforms.

3) Improve information retention

According to Kurnia, Adrias, and Suciana (2025), using animated video media in learning can improve conceptual understanding and help students remember the material better than conventional learning methods.

2. Weakness

1) Dependence on devices and the internet

If technological facilities are inadequate, animation-based learning processes will be difficult to implement optimally.

2) Risk of distraction in learning

Animation that is too engaging or excessive can cause students to focus more on the visual display than on the content of the learning material.

3) Varying content quality

Content quality that does not align with learning objectives can render the material less effective or even lead to conceptual misunderstandings among students.

F. Comparison of Educational Animation with Other Learning Media

1. Comparison of Educational Animation with Conventional Learning Methods

Conventional learning methods such as lectures or textbooks often make the learning process less engaging for students. Educational animation offers an alternative by presenting material visually and dynamically, thereby increasing student attention and understanding.

2. Comparison of Educational Animation with Presentation Media or Traditional Video

Presentation media such as PowerPoint slides or explanatory videos are often used in learning. However, educational animation has the advantage of displaying movement, simulating processes, and visualizing concepts that are difficult to explain through static images.

3. Comparison of Educational Animation with Other Digital Learning Media

According to Susilowati, Layla, and Sari (2025), digital learning media based on animation and multimedia have been proven to significantly increase students' interest and learning outcomes compared to conventional learning media. In their literature review of various studies, the use of animation in learning can improve student learning outcomes by around 25-45% compared to traditional learning methods.

CONCLUSION

Based on the various literature reviews discussed, educational animation shows great potential as a learning medium capable of improving the quality of the learning process in the digital era. Educational animation plays a crucial role in supporting interactive learning in the digital era because it presents material visually, dynamically, and easily understood by students. Compared to conventional learning media, educational animation is considered more effective in increasing learning motivation, helping students understand abstract concepts, and increasing student engagement in the learning process. Therefore, the use of educational animation is a crucial innovation in creating effective learning in the digital era.

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