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Building Creative Digital Literacy through Augmented Reality Documentary Videos: A Systematic Review of the Integration of the Sustainable Living Concept in Education

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ABSTRACT
This research aims to examine the integration of augmented reality (AR) technology and documentary video in building creative digital literacy and environmental awareness based on the concept of sustainable living. Through a systematic literature review (SLR) approach, this study identifies publication trends, thematic clusters, and pedagogical potential of interactive digital media in environmental education. The results of bibliometric analysis of 28 articles show that STEAM approaches, documentary media, and AR technology form a mutually supportive conceptual ecosystem. AR acts as an interactive learning medium that is able to simulate environmental issues contextually, while documentaries build empathy and ecological awareness. The integration of the two encourages active participation of students in sustainability practices and the development of technology-based educational content. These findings provide a theoretical basis for the development of innovative learning models that are relevant to the challenges of the 21st century.

Keywords: *Video documenter, augmented reality, digital literacy, sustainable living*

INTRODUCTION
Technological advancements have brought about the latest developments in information and communication technology. These developments have brought significant changes, even in the world of education. The Industrial Revolution 5.0 era has penetrated all aspects of life, requiring educational institutions to adapt to technological developments. According to Cahyadi (2019), the role of technology in education is crucial because its application in the learning process leads to problem-solving. One way to achieve this is by creating a conducive and enjoyable learning process and providing opportunities for students to actively participate in the learning process, thereby developing quality human resources.

The development of digital technology in Indonesia has driven significant changes in the world of education, particularly in terms of innovation in learning media and increasing the interactivity of the learning process for students (Rinaldi, Fahmi, & Masyitah, 2024). In the current digital era, conventional one-way approaches are starting to be replaced by more participatory and technology-based methods or approaches, such as the use of augmented reality (AR), virtual reality (VR), and gamification of learning (game-based learning) (Muti, 2024). The digital era also demands that students develop critical thinking skills as part of technology-based learning that is relevant to the various challenges of the 21st century (Salisa & Iskandar, 2025). In addition, students' critical thinking skills and digital literacy also need to be improved through educational strategies integrated with digital media in the era of Society 5.0 (Maftuhah, 2024).

Augmented Reality (AR) is a concept that combines virtual reality with real-world reality, so that two-dimensional (2D) and three-dimensional (3D) virtual objects appear real and unified. In AR media, users can see the real world around them with the addition of virtual objects generated by a computer (Mustika et al., 2015). Augmented Reality (AR) was first used in 1957-1962 by an artist named Norton Heilig who was given the name sensorama (Amrulloh, 2017). Augmented Reality (AR) can be implemented on various devices, so its application does not require special additional devices that

generally require a lot of time for the installation process. The learning process can utilize the advantages of AR to help visualize the abstract Ethno-STEAM concept more intuitively, thereby improving students' understanding in describing an object.

Education in the digital era demands a learning approach that is not only oriented toward mastery of technology, but also toward developing students' character and environmental awareness (Ministry of Education and Culture, 2022). Creating a conducive and enjoyable learning process is inseparable from the role of educators and educational institutions that are able to utilize technology to create innovative learning media. Educators and educational institutions play a crucial role in improving the quality of learning, creating engaging and interactive learning experiences, addressing educational gaps, and providing education that is relevant to current developments (Nurhasanah et al., 2025). Therefore, educators can also develop learning media that is innovative, varied, engaging, contextual, and tailored to students' needs.

Sustainable lifestyle emphasizes a balance between meeting human needs and preserving the environment for future generations. A sustainable lifestyle can encourage students to adopt habits such as reducing waste, reusing renewable energy, and supporting environmentally friendly local products (BPS, 2024). The development of augmented reality technology enables teachers to convey sustainable values such as energy efficiency, waste reduction, waste management, and a wise and responsible consumer lifestyle (Casio et al., 2023). Augmented reality can be used to simulate the impact of various sustainable lifestyle choices, such as the use of environmentally friendly transportation or sustainable consumption patterns, thereby encouraging reflection and changes in environmentally friendly behavior. The concept of sustainable living must be supported by inclusive and community-based pedagogy (Ladykova et al., 2024).

The use of augmented reality-based documentary videos in the learning process not only helps improve students' understanding of environmental issues but also fosters creative digital literacy skills, a crucial competency in the 21st century. Creative digital literacy encompasses students' ability to access, evaluate, and produce meaningful and socially impactful digital content. In an educational context, creative digital literacy enables students to design environmental campaigns, produce educational content, and communicate innovative ideas through digital technology. Therefore, integrating AR-based documentary video technology into learning is a potential strategy to improve the quality of education that is contextual, relevant, and sustainable (Kusumawardi, 2023).

To address these challenges and based on the description above, innovative technology-based learning approaches such as documentary videos and augmented reality (AR) are strategic alternatives for improving students' environmental literacy. These media not only convey information related to environmental issues visually and interactively but also build empathy and critical awareness of ecological or environmental issues (Nugroho, 2024). The integration of technology in environmental education also aligns with global demands for adaptive and competency-based 21st-century education. Therefore, the development of contextual and technology-based learning media is crucial for strengthening environmental education in Indonesia, particularly in encouraging active student participation in sustainable practices.

METHOD

This research uses a qualitative descriptive approach to systematically describe and explain an event, phenomenon, and social situation being studied. Qualitative research according to Bogdan and Taylor in (Nugrahani, 2008) is defined as a procedure in a study that produces descriptive data in the form of written or spoken words from people and behavior observed by researchers. The definition of qualitative research according to Creswell in (Murdiyanto, 2020) defines it as the process of investigating a social phenomenon and human problems. Qualitative research is also defined as a strategy for searching for meaning, understanding, concepts, characteristics, symptoms, symbols, and descriptions related to a phenomenon, focus, and multi-method, which is natural and holistic, qualitative research prioritizes quality, and uses several methods, and is presented narratively in scientific research (Waruwu, 2023). Referring to the definition of qualitative research experts is a technique or method that uses narratives or words to explain and describe the meaning of each phenomenon, event, symptom, and certain social conditions.

This study is a systematic literature review (SLR) that aims to identify, evaluate, and interpret research findings relevant to a specific research statement, topic area, or phenomenon of interest (Watajdid et al., 2021). A systematic literature review (SLR) was used in this study to identify, evaluate,

and synthesize literature from research relevant to creative digital literacy, augmented reality-based documentary videos, sustainable living concepts, and environmental management materials in an educational context. A systematic literature review (SLR) was chosen in this study because it can provide and assist in a comprehensive mapping of the developments, approaches, and results of previous research systematically.

Literature Search Strategy This study was designed to identify and collect relevant scientific publications related to the integration of augmented reality (AR) technology, documentary videos, creative digital literacy, and environmental education based on the concept of sustainable living. The literature search process in this study was carried out systematically through academic databases, with access to Google Scholar, ScienceDirect, Web of Science, Scopus, SpringerLink, and DOAJ. In this study, the researcher used a combination of keywords such as: ("Augmented Reality" or "AR") AND ("Documentary Video" or "digital storytelling") AND ("environmental education" or "sustainable living") AND ("digital literacy" or "creative literacy"). This combination aims to capture and understand the development of the main themes discussed, namely related to technological developments and pedagogical approaches in recent years. The literature selected and used includes articles or research in English and Indonesian. This strategy aims to obtain a comprehensive and representative coverage of the literature, thus enabling the researcher to conduct an in-depth thematic analysis of the potential and challenges of integrating innovative digital media in environmental education.

RESULT AND DISCUSSION

Result

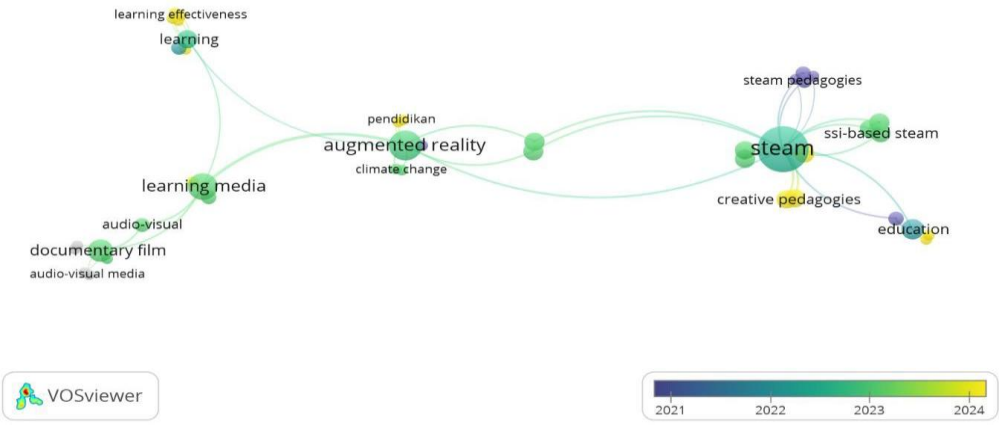

Figure 1. Distribution of Publications by Keywords

The results of this study are the distribution of publications from 2021 to 2024, which demonstrate the novelty of research related to the research topics. From 2023 to 2024, the new research topics were: documentary films, audiovisuals, steam, and augmented reality. Figure 1 shows the research team's innovations in recent years. The green and yellow Vosviewer identification results indicate the novelty of the latest topics, while the purplish-blue color indicates previous research topics. Keywords that are rarely associated with other keywords indicate the novelty of the research topic.

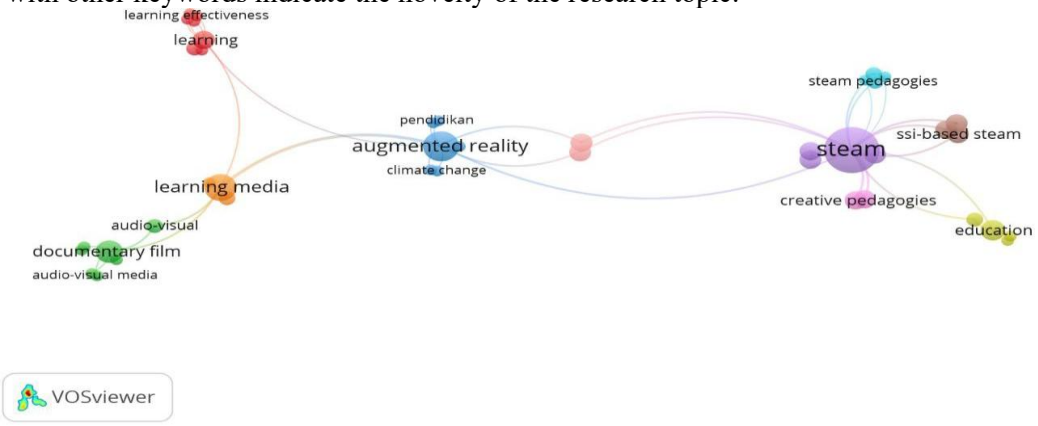

Figure 2. Keywords

Bibliometric analysis using VOSviewer identified as many as 28 scientific articles relevant to the integration of augmented reality (AR) technology, documentary video media, learning media, steam, and digital literacy. This analysis yielded five main clusters based on keyword interconnectedness, with a color distribution showing the average year of publication in 2021 (purple) to 2024 (yellow).

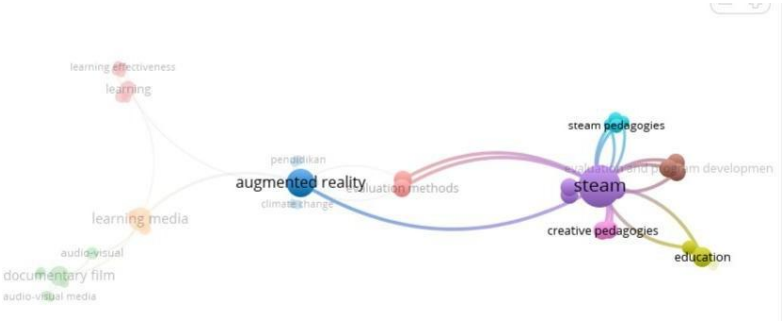

Figure 3. Central Cluster

The keyword "steam" in figure three is the most central and dominant research topic, suggesting that the STEAM approach is the main focus in the novelty of the research topic. The image above shows that the STEAM approach is closely related to "steam pedagogical", "creative pedagogis", and "steam-based", which shows that the STEAM approach is not only related to other topics, but is constantly undergoing new research. The STEAM approach will be seen if augmented reality is integrated into learning.

Figure 4. Technology Cluster

Figure four explains that in the second cluster, namely the technology cluster, "augmented reality" forms a separate cluster connected by the keywords "education", "climate change", "STEAM", and "interactive". This shows that AR is used as an interactive learning medium to convey environmental issues in a more contextual and immersive way. The yellow color on this node indicates that AR studies in environmental education have increased sharply in 2023–2024.

Figure 5. Media Cluster

Keywords such as *"documentary"*, *"audio-visual*", and *"learning media"* formed the previous cluster (2021–2022), in green to orange. This shows that documentary and audio-visual media have long been

used in education, especially to build awareness and deliver materials related to sustainable living. However, integration with interactive technologies such as AR has only begun to develop in the last two years.

Figure 6. Evaluation Cluster

The term *"learning effectiveness"* emerged as a keyword connected to *"learning"* and *"education"*, indicating that many studies are beginning to evaluate the impact of digital media use on learning outcomes. This is an important basis for measuring the success of technology integration in environmental education.

Discussion

Findings from bibliometric analysis using VOSviewer show the existence of complex and intersecting thematic structures or systems in the digital and environmental education literature. The dominant clusters formed show that the STEAM, augmented reality, and documentary media approaches are the main nodes in the keyword network. STEAM emerged as a conceptual center of gravity, which is closely connected to creative pedagogy and sustainability issues. This shows a paradigm shift in education from an instructional approach to a transdisciplinary approach that integrates science, technology, art, and social values. The linkage between STEAM and keywords such as "climate change" and "education" reinforces the position of this approach as a pedagogical framework that is adaptive to global challenges and locally relevant.

Meanwhile, on the other hand, augmented reality and documentaries form thematic clusters that complement each other. AR serves as an interactive learning medium that enriches the learning experience through contextual visualization and simulation, while documentaries act as visual narratives that can build empathy and ecological awareness. The connection between keywords such as "learning media," "audio-visual," and "education" shows that digital media is no longer positioned as a tool alone, but rather as a space for knowledge production that encourages creative digital literacy. The temporal distribution in the visualization also shows that these topics have intensified publication in the last two years, indicating the urgency and relevance of the study to the transformation of technology-based pedagogy and sustainability.

Overall, the network structure formed in this analysis reflects the dynamics of the literature moving towards the integration of technology, narratives, and sustainability values in education. The clusters that emerge do not stand alone, but form a mutually supportive conceptual ecosystem. These findings provide a strong theoretical foundation for the development of innovative learning models that combine interactive technologies, documentary media, and STEAM approaches in building creative digital literacy and transformative environmental awareness.

CONCLUSION

This study confirms that the integration of augmented reality and documentary videos in environmental education has great potential to enhance students' creative literacy and digital awareness. AR enables the subtle visualization of abstract concepts, while documentary films enhance the narrative and empathetic aspects of learning. The identified thematic clusters demonstrate that the STEAM approach, audiovisual media, and interactive technologies complement each other in forming a contextual and sustainable learning ecosystem. Educators and educational institutions need to develop technology-based learning strategies that are not only adaptive to current developments but also capable of shaping character and values of curiosity. Thus, AR-based learning media and documentary films can be alternative strategies in addressing the challenges of 21st-century education and encouraging more inclusive and transformative pedagogical transformation.

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