

THE POTENTIAL OF MULTIMEDIA WITH MULTI REPRESENTATION CONCEPT TO ENHANCE CRITICAL THINKING SKILLS IN PHYSICS LEARNING

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ABSTRACT

Recent research indicates that multimedia with a multi-representation concept can effectively enhance critical thinking skills among students, particularly in physics learning. Literature analysis reveals a rising number of studies in this field over the past five years. Most of the research focus lies in the realm of students' issues and media integration. The images extracted from the analysis exhibit the interconnection between research fields related to the use of multimedia with multi-representation concepts and critical thinking skills in physics learning. Prior studies have identified particular challenges in employing multimedia with multi-representation ideas to enhance students' critical thinking skills in physics learning. Several areas need further investigation, such as the most effective types of multimedia and their integration into physics learning. Therefore, this research aims to examine the potential of multimedia with multi-representation concepts to improve students' critical thinking skills in physics learning. The study will be executed in two stages. The Preparation stage involves formulating research objectives, determining the research population and sample, and validating media and materials through questionnaires. The Development stage includes creating a draft of the instructional media, collecting validation data and utility feedback from students. The outcomes of this research are anticipated to contribute to the utilization of multimedia with multi-representation concepts in physics learning.

Keywords: Multimedia, Multirepresentation concept, Critical thinking skills, Physics learning

1. INTRODUCTION

Traditional teaching methods often need help to cater to students' diverse learning preferences and needs. As technology advances, the application of AI and multimedia in education presents an exciting opportunity to address these challenges [1]-[3]. This literature review delves into the growing use of ChatGPT and Renderforest in educational settings to assess the effectiveness of this collaboration [4]. Traditional teaching methods have long been criticized for their one-size-fits-all approach, often failing to accommodate students' diverse learning preferences and needs. Technological advancements have opened up new possibilities for transforming the education landscape in recent years. Integrating artificial intelligence (AI) and multimedia has emerged as a promising avenue to address the limitations of traditional approaches [5]. This literature review examines the growing use of ChatGPT and Renderforest in educational settings, exploring the effectiveness of this collaboration in enhancing student engagement, knowledge retention, and overall learning outcomes [6]-[8].

The literature acknowledges the significance of AI and multimedia technology in revolutionizing education. AI-powered tools, such as ChatGPT, have shown remarkable capabilities in generating human-like responses, making them valuable aids in tutoring, personalized learning, and content creation [8]. Similarly, multimedia has been identified as an effective means to facilitate active learning, providing visual, auditory, and interactive elements that cater to various learning styles [9],[10]. Scholarly works highlight the diverse applications of ChatGPT in education. ChatGPT can serve as an AI tutor as a language model, answering students' questions, providing explanations, and offering assignment feedback. Its adaptive learning capabilities enable it to adjust content delivery based on individual progress and performance. Studies report positive impacts on student motivation, confidence, and self-directed learning when ChatGPT is integrated into the educational process.

The integration of ChatGPT and Renderforest represents a unique collaboration that harnesses both technologies' strengths. Educators can use ChatGPT-generated responses to customize and enrich multimedia content, creating interactive and personalized learning experiences. This combination has shown potential in addressing the challenge of catering to individual learning preferences and increasing student engagement. Interactive multimedia content, empowered by AI-generated responses, captures students' attention and encourages active involvement.

2. METHOD

The participants in this study consisted of students from a particular junior high school in Lampung, Indonesia, who were enrolled in the science class. The total number of participants was 21 students. The study utilized learning media created using ChatGPT and Renderforest (See Figure 1 for the procedure).

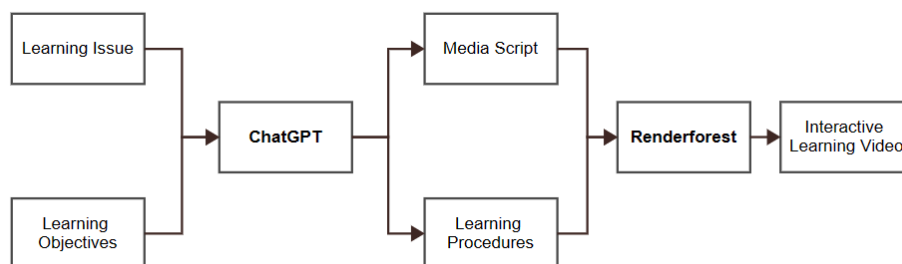


Figure 1. Learning Object Material Development Procedure

The students' responses were collected using a questionnaire (USE questionnaire) designed to evaluate their experience and perception of the learning media product (video). The questionnaire utilized a 5-point Likert scale, ranging from 1 (Strongly Disagree/ SD) to 5 (Strongly Agree/ SA), with a neutral score of 3 removed from the analysis. The collected questionnaire responses were analyzed using statistical software. The neutral score of 3 was removed from the study to prevent ambiguity. The total score for each participant was calculated by summing the remaining scores. The total scores obtained from the USE questionnaire were used to evaluate the students' perception of the learning media product. Ethical considerations were taken into account throughout the research process. Informed consent was obtained from the participating students and their parents/guardians. The students were assured of confidentiality, and their identities were anonymized during data analysis and reporting. The method employed in this study aimed to assess the student's responses to the AI-integrated learning media product and provide valuable insights into the effectiveness and

usability of such technology in science education. The study's results are presented and discussed in the subsequent sections of this article.

3. RESULTS

The synergy between ChatGPT and Renderforest offers educators a powerful tool to create interactive and dynamic multimedia content that enhances personalized learning experiences and adapts to individual learning paces. See Figure 2 for the screenshot of the particular scene.

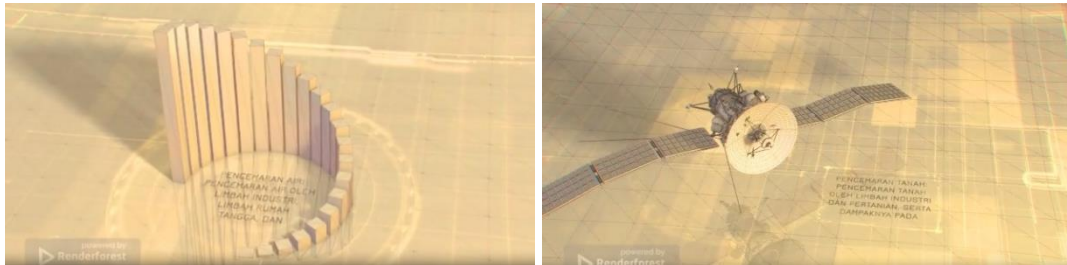


Figure 2. Part of the video was created using ChatGPT and Renderforest

The provided data and analysis present an evaluation of an application used for science learning, which integrates ChatGPT and Renderforest technologies. The study assesses user responses through a questionnaire with four aspects: Usefulness, Ease to use, Ease of learning, and Satisfaction. The data is represented graphically in Figure 3.

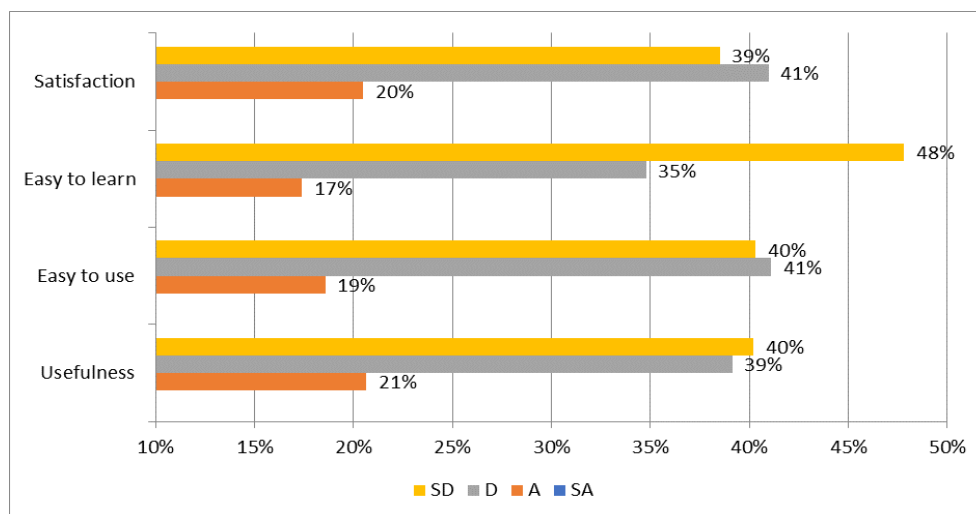


Figure 3. Student Response to the Learning Object Material

The overall assessment of the application is positive, as most users agreed (A) or strong agreement (SA) with its performance. No users strongly disagreed (SD) with any aspect of the application. However, a small percentage of users had reservations (D) about its usefulness, ease of use, ease of learning, and satisfaction. The dominant responses were from users who were satisfied with the application. It indicates that most users found the application beneficial and user-friendly, supporting their learning process effectively. The average scores for each aspect were as follows: Usefulness (3.20), Easy to use (3.22), Easy to learn (3.30), and Satisfaction (3.12). The overall average score across all categories was 3.21, indicating that the application is generally considered suitable for use by the users.

4. DISCUSSION

The data analysis results indicate that most students have positively received the integration of ChatGPT and Renderforest in science learning. The application has been perceived as useful, easy to use, easy to learn, and satisfying, contributing significantly to the student's overall learning experience. The findings show that most students have agreed or strongly agreed with the performance and benefits of the AI-integrated learning media product. The positive feedback from these users highlights the effectiveness of the application in enhancing science education. Similar results in other fields also indicate that ChatGPT has the potential to be used in education and can promote critical thinking skills [11]-[13].

The analysis also revealed that a small percentage of users have reservations regarding certain application aspects. It indicates that there is still room for improvement to address the concerns of these users and further enhance the application's overall performance and usability. Similar findings have been reported in other research studies investigating the use of AI in education [14]-[16]. The integration of AI technologies like ChatGPT and Renderforest holds possibilities for creating an engaging learning environment, promoting a better understanding of scientific concepts, and fostering higher levels of satisfaction among students. The positive impact of AI integration in education has been demonstrated in various studies, and the application's success in enhancing the learning experience suggests promising prospects for the future implementation of AI in education.

5. CONCLUSION

The synergy between ChatGPT and Renderforest offers educators a powerful tool to create interactive and dynamic multimedia content that enhances personalized learning experiences, adapts to individual learning paces, and provides real-time assistance. The positive impact on student motivation, knowledge acquisition, and critical thinking skills highlights the potential benefits of using this collaboration in education. As AI and multimedia technologies continue to advance, further research and exploration are essential to unlock the full potential of this partnership in fostering effective and engaging educational experiences.

6. ACKNOWLEDGMENT

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