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Artificial Intelligence and Canva-assisted Modeling the Way Methods to Improve the Multi-Representation Ability of Islamic Education Students

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Abstract. This study investigates applying the 'Modeling the Way' method, enhanced by artificial intelligence (AI) and Canva, to improve the multi-representation skills of students in the Islamic Education Studies Program (PAI) at Maulana Malik Ibrahim Malang UIN. Generation Z has unique learning characteristics and requires a more visual and interactive approach to education. This method uses AI to personalize learning experiences and Canva to facilitate the visualization of complex concepts. The study used an experimental design with a quantitative approach through pre-tests and post-tests to measure the verbal, mathematical, graphical, and symbolic representation skills of 58 students. The results showed a significant improvement in student multi-representation skills after the intervention, with an average increase of 31 points, from 49.75 in pre-tests to 80.75 in post-tests. Inferential statistical analysis suggests that this method has a significant positive impact on student abilities, marking the effectiveness of this innovative approach in meeting the learning needs of Generation Z. This research contributes to the literature by showing that integrating AI and Canva in learning can create a more dynamic and adaptive learning environment, improving student motivation and academic outcomes. These findings significantly impact the development of curricula and more effective teaching methods in higher education. This research suggests the need for additional experiments to test the effectiveness of these methods in different educational contexts, as well as the potential integration of other technological tools to enhance the learning experience. The use of AI and Canva as learning aids underlines the importance of adopting modern technology in education, improving academic achievement, and preparing students to face the challenges of the ever-expanding digital world.
Keywords. Artificial Intelligence; Canva; Generation Z; Islamic Education; Multi-Representation

A. INTRODUCTION

Generation Z, born between the mid-1990s and early 2000s, has grown up in a digital world, profoundly shaping how they interact, learn, and process information (Primastio et al., 2023). Technology plays a crucial role in the education of Generation Z, aligning with their more visual and interactive learning style (Hendrastomo & Januarti, 2023). Using technological tools such as tablets, smartphones, and computers in education provides opportunities for more collaborative and flexible learning, in line with Generation Z's tendency to multitask and their familiarity with rapid access to information (Haryoto et al., 2022).

To address the characteristics of Generation Z, universities, as educational institutions, must strategically adapt their teaching and learning approaches. Universities need to consider implementing more dynamic and interactive learning methods that align with the preferences of Generation Z. However, a survey conducted by researchers in four classes of the PAI program at UIN Malang revealed that 40% of lecturers still used group paper methods throughout an entire semester without varying teaching methods. Consequently, 90% of students felt bored, uninterested, and unmotivated to learn (Arifa, 2023).

These survey results are surprising, considering the remarkable technological advancements, including the progress in Artificial Intelligence (AI). AI has entered various aspects of life, from personal digital assistants to recommendation systems on social media platforms and even education. With its ability to process large data sets and learn from experiences, AI has transformed how education is delivered and received, particularly in customizing learning experiences to meet individual student needs (Baidoo-Anu & Ansah, 2023).

The survey also highlighted that monotonous teaching methods prevent students from developing multi-representational abilities, essential for deep conceptual understanding and applying knowledge across different contexts. Multi-representation refers to the ability to understand, represent, and express concepts or information in various forms, such as text, graphics, diagrams, physical models, and mathematical representations. This approach is vital as it allows students to view concepts from multiple perspectives, facilitating a more profound and flexible understanding. Students proficient in multi-representation can integrate various forms of knowledge and apply them to complex problem-solving, a critical skill in many disciplines (Fatmawati, 2022).

Traditional teaching methods used in lectures, as reflected in the survey of the PAI program at UIN Malang, fail to meet this generation's dynamic and diverse learning needs. Generation Z students require more visual, interactive, and technology-based stimuli to stay engaged and motivated, especially in overcoming misconceptions and the need for multi-representation to develop a deep conceptual understanding.

As an innovative solution, AI offers an approach that aligns better with the needs and characteristics of Generation Z. AI can tailor learning experiences to individual student needs. Therefore, this study aims to develop AI-based learning using Canva to enhance students' multi-representation abilities. The teaching method employed in this study is the "modeling the way" method, which involves demonstrating or showcasing a process, situation, or object being studied, either actual or simulated, often accompanied by verbal explanations (Madeamin & Rimang, 2023). This method aims to provide concrete examples for students to follow, making it easier for them to understand concepts and apply knowledge in real-life situations (Rambe & Umar, 2024).

This method can be implemented in AI-assisted learning and Canva by leveraging the technology's visualization and personalization advantages. AI can tailor learning content to individual student needs, while Canva provides tools for creating engaging and easily understandable visualizations (Sunarso & Herdianto, 2024). The choice of Canva in this study as a learning medium is based on various studies showing its effectiveness in improving multi-representation skills in learning (Fifiana et al., 2024; Kocaarslan & Eryaman, 2024; Senja et al., 2024).

The results of this research are expected to provide insights into how technology, especially AI, can be effectively used in higher education to enhance multi-dimensional representation skills. It will also offer recommendations for educators and policymakers at universities to design and implement more effective teaching methods that meet the needs of Generation Z.

The novelty of this research lies in several key aspects that make it unique and significant in higher education, especially in addressing the challenges faced by Generation Z. This study introduces innovation by integrating AI with Canva to enhance the multi-dimensional representation skills of UIN Malang students. Its novelty lies in a holistic approach that combines technology and pedagogy, a specific focus on multi-dimensional representation, and the utilization of AI for learning.

B. METHODS

This research is an experimental study. The selection of this method is based on the theoretical foundation that experimental research is the only method capable of accurately testing hypotheses regarding causal (Fjermestad & Hiltz, 1998). The approach is quantitative, with a Group Pre-Test and Post-Test design. The sample comprises 58 students from the ICP class of 2022 and 2023 in the Islamic Education program at UIN Maulana Malik Ibrahim Malang.

The independent variable in this study is the "Modeling the Way" method assisted by AI and Canva, where lecturers provide sub-topic scenarios for students to create using AI through the Canva platform. The dependent variable is the students' multi-representation ability, measured through pre-tests and post-tests. The instrument is an adaptation of the multi-representation instrument developed by Alifah and Istiyono, which covers four skills: verbal representation, mathematical

representation, form representation, and symbolic representation (Alifah & Istiyono, 2023). The data collection technique involves pre-tests and post-tests, with scores ranging from 0 to 100. The category ranges are as follows: 0-20 for very poor, 21-40 for poor, 41-60 for adequate, 61-80 for good, and 81-100 for excellent. Descriptive and inferential statistical analyses were conducted to analyze the data obtained from the research results.

C. RESULT & DISCUSSION

1. Description of Students' Multi-Representation Ability

The pre-test was conducted to assess the initial multi-representation abilities of the students, including their verbal, mathematical, graphical, and symbolic skills. The pre-test involved 58 ICP students from the courses on learning evaluation and curriculum development. The results of the student's scores in this session are depicted in the following graph:

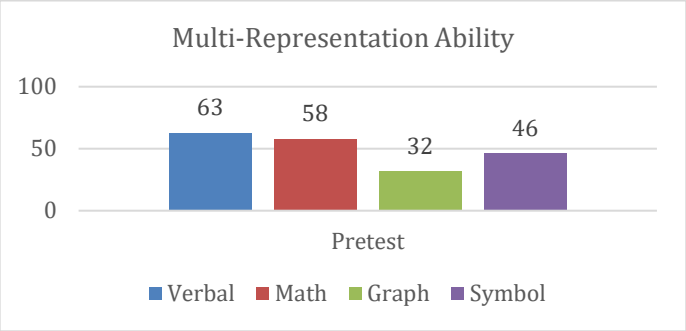

Figure I: Pre-Test Description of Students' Multi-Representation Ability

The pre-test results showed that the average score for verbal ability was 63 out of 100, mathematical ability was 58 out of 100, and graphical ability was 32 out of 100. Symbolic ability was 46 out of 100. The overall average score was 49.75, against an ideal score of 100. Thus, the pre-test results indicated that the initial multi-representation ability of the PAI students at UIN Malang was 49.75, categorized as "adequate."

During the post-test phase, the "Modeling the Way" method, assisted by AI with Canva, was employed for teaching. As with the pre-test, the verbal, mathematical, graphical, and symbolic abilities were measured. The students' scores in this phase are illustrated in the following graph:

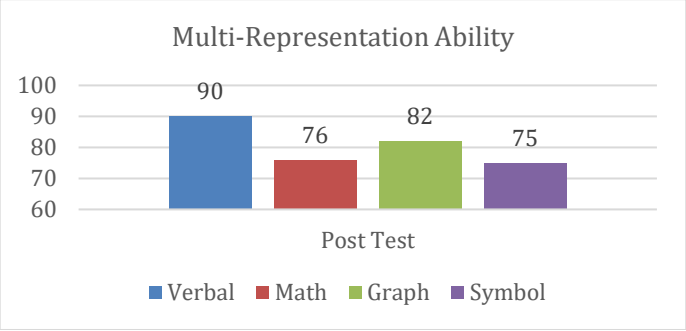

Figure II: Post-Test Description of Students' Multi-Representation Ability

The post-test results showed that the average score for verbal ability was 90 out of 100, mathematical ability was 76 out of 100, and graphical ability was 82 out of 100. Symbolic ability was 75 out of 100. The overall average score was 80.75, against an ideal score of 100. Therefore, the post-test results demonstrated that after implementing the "Modeling the Way" method assisted by AI and Canva, the multi-representation ability of PAI students at UIN Malang was 80.75, categorized as "excellent."

2. Analysis of the Impact of the "Modeling the Way" Method Assisted by AI and Canva on Students' Multi-Representation Ability

A comparison between pre-test and post-test results is illustrated in the following graph:

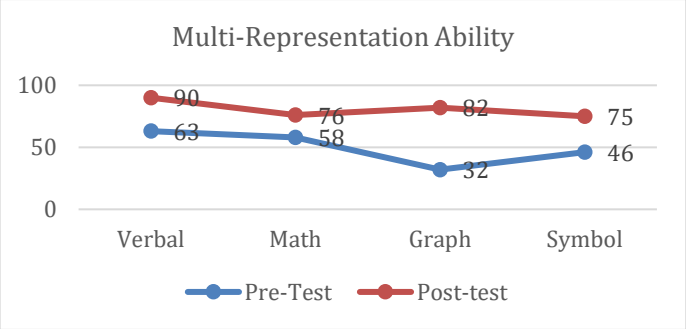

Figure III: Description of Students' Multi-Representation Ability

Descriptive analysis showed that verbal ability increased by +27, mathematical ability by +18, graphical ability by +50, and symbolic ability by +29. The average increase in abilities was +31, indicating a significant improvement in students' multi-representation ability following the intervention.

Further analysis using inferential statistics involved a t-test. The null hypothesis (H0) stated no significant difference in multi-representation ability before and after the intervention. In contrast, the alternative hypothesis (H1) stated a significant difference in multi-representation ability before and after the intervention. With a t-value of 12.29, a combined standard deviation of 0.1358307771, a significance level of 0.05, degrees of freedom of 114, and a p-value of <0.001, the t-test results showed a p-value less than 0.05. Thus, the study concludes that the "Modeling the Way" method assisted by AI and Canva effectively enhances the multi-representation ability of PAI students at UIN Malang.

3. Bridging Traditional and Modern Teaching Methods with Technology

The application of the "Modeling the Way" method, assisted by AI and Canva, significantly improved students' multi-representation abilities, particularly in graphical and symbolic skills. These findings address the research question regarding the effectiveness of this method in the context of multi-representational learning, indicating that technology integration can enrich the learning experience. These results are consistent with previous research showing that technology-based learning can enhance student engagement and learning outcomes (Anggraeni & Pentury, 2022). However, this study introduces a novel approach utilizing AI and Canva, adding a new dimension to the existing literature.

Scientifically, this improvement results from more interactive and visual learning, where students can more easily understand and relate to concepts through various forms of representation. This improvement aligns with earlier studies that show technology-based learning can improve student engagement and learning outcomes. Nonetheless, this research introduces a new approach, using AI and Canva, which adds to the existing literature.

Compared to others, the primary distinction of this research is the use of more modern and interactive technology, which not only enhances academic outcomes but also motivates students to learn. These findings have significant implications for future curriculum development and teaching methods and open opportunities for further research into technology integration in education.

Integrating AI and Canva in the "Modeling the Way" method utilizes modern educational technology to empower students in dynamic learning environments. Supporting previous research by Jian, AI tools can tailor learning experiences to individual needs (Jian, 2023), and offer customized feedback and adaptive learning paths, as proposed by Akavova et al. (Akavova et al., 2023). Meanwhile, Canva facilitates the creation of visually appealing and easily shareable content, helping students express complex ideas through images and symbols (Pedroso et al., 2023; Pinontoan et al., 2023; Yang & Xia, 2023) .

This integration enhances understanding and fosters creativity and critical thinking by encouraging students to explore concepts from various perspectives. Additionally, it aligns with constructivist learning theory, emphasizing the importance of active participation and contextual understanding in education. Educators can bridge traditional teaching methods with advanced

technology by implementing this innovative approach, making learning more relevant and practical for today's digital-savvy students. This paradigm shift is crucial in preparing students to adapt to a rapidly evolving world where digital literacy and flexible thinking are essential. These implications affect academic achievement and can influence educational practice and policy more broadly to embrace technology as a core component of modern pedagogy.

D. CONCLUSION

In this study, it has been demonstrated that applying the "Modeling the Way" method, assisted by AI and Canva, significantly improves the multi-representation abilities of PAI students at UIN Malang. This method enhances students' verbal, mathematical, graphical, and symbolic skills and provides a more adaptive and interactive learning approach. The study shows that integrating modern technologies such as AI and Canva into the learning process can create a more dynamic and efficient learning environment that supports the development of student's skills in understanding complex concepts. Inferential statistical analysis indicates that this method significantly positively impacts students' multi-representation abilities, surpassing traditional approaches previously used.

This research fills a gap in the literature regarding the effectiveness of integrating AI and Canva in education. It offers new insights into leveraging technology to advance higher education. This study offers potential applications for curriculum development and teaching methods across various disciplines by providing a more personalized learning approach that aligns with individual needs. Furthermore, this research can be expanded with additional experiments to test the effectiveness of this method in different educational contexts and to explore how other technological tools can be integrated to enhance the student learning experience further. Future research could focus on longitudinal analysis to assess the long-term impact of this approach on student learning outcomes and critical thinking skills.

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