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Improving Economic Learning Outcomes Through Problem-Based Learning Using Augmented Reality Media

Dhea Aulia Rahman[1], Prakoso Dwi Prasetyo[2], Endang Herawan[3], Dian Permana Putri[4]
[1,2,3,4] *Universitas Swadaya Gunung Jati, Cirebon, Indonesia*

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ABSTRACT

This study discusses the improvement of economic learning outcomes through a problem-based learning approach using Augmented Reality (AR) media. With a focus on the application of innovative concepts in education, this study explores how the combination of an effective problem-based learning approach and engaging AR technology can improve students' understanding of economic concepts. The results show that the use of AR in economics learning can significantly improve student engagement, concept understanding, and learning outcomes. In addition, the problem-based learning approach also proved effective in improving students' critical thinking and problem-solving skills. Despite challenges related to technology availability and teacher training, the conclusions of this study emphasize the importance of integrating AR technology and innovative learning approaches in creating a more engaging and effective learning environment in the context of economics education. Further research is needed to optimize the use of this technology and evaluate its effectiveness in various educational contexts.

Keywords *Problem Based Learning (PBL), Augmented Reality (AR), Learning Outcomes*

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Corresponding Author prakosodwiprasetyo554@gmail.com

INTRODUCTION

The development of education today is strongly influenced by innovation and technology. Innovation in education is needed to improve the quality of education in accordance with the demands of the times and the rapid development of technology. (Mubarokah et al., 2021). In this context, the use of globalization information technology today has an unavoidable impact on the world of education. (Yustian, 2021). Educational innovation must be implemented in such a way that education can always adapt to changes and developments from time to time and there is no gap between reality and ideals. (Amelia & Rostika, 2022). In addition, educational innovation is also needed to

create a good quality of education that allows learning without the limits of time and space. (Zahra Rosyiddin et al., 2022). Educational innovation must be based on educational goals to improve the quality of education and educate the nation's life. With innovation, it is expected that education can continue to develop and have a positive impact on society. The development of education today cannot be separated from innovation and technology that continues to grow. Educational innovation is the key to ensuring that education can meet the demands of the times and provide optimal benefits for students and society at large.

Economic learning is an important aspect of the education curriculum. Various studies have shown that the application of problem-based learning models can improve students' economic learning outcomes. In addition, integration with augment reality media is also the focus of research in an effort to improve learning outcomes. Some studies show that the application of problem-based learning models has successfully improved students' economic learning outcomes. (Banyal, 2021)(L. H. K. Dewi, 2021). Problem-based learning PBL is a curriculum approach that emphasizes active assistance in solving problems that occur in real life. This method is proven to improve critical thinking skills (Sulaiman & Azizah, 2020). In addition, PBL curriculum facilitates success in problem solving group work communication and interpersonal skills better than other approaches. (Haryanto & Indarto, 2021; Nur, 2022). A well-designed and engaging curriculum such as PBL problem-based learning can effectively showcase learners' academic skills (Hikmasari et al., 2020). Problem-based learning not only helps develop collaboration skills, initiative independence and critical thinking but also aligns with the implementation of certain curricula such as the independent curriculum and the 2013 curriculum. This is in line with the steps of the PBL model according to the 2013 curriculum which includes conveying the basic concepts of defining the problem of self-learning knowledge exchange and assessment. (Putri, 2019). In the context of education, PBL is part of a competency-based curriculum strategy utilizing real-world problems as a foundation for student learning, which aims to foster critical thinking, problem-solving skills, and essential knowledge and concepts. Developing innovative teaching models such as PBL is essential to support the implementation of an aligned curriculum. PBL problem-based learning is a valuable educational approach that not only enhances critical thinking and problem-solving skills but also aligns with various curricula to improve learning outcomes and effective learner competencies.

The use of augmented reality in learning has been proven effective in improving learning outcomes and learner interest. Various studies have shown that the application of Augmented Reality in economic learning media can make a positive contribution. (Saputra, 2022). Augmented reality (AR) has gained significant attention in education due to its potential to enhance the learning experience. Research has shown that the application of AR in educational environments can bring a range of benefits (Agustika, 2021). And research shows that AR can improve students' understanding of abstract concepts by providing a more tangible visualization. In addition, AR is proven to increase students' motivation interest and learning outcomes. (Marlina et al., 2023) (Nurjannah et al., 2021). In the field of economic education the incorporation of AR can create a more captivating and interactive learning environment by combining real-world economic scenarios with virtual elements. Students can engage in a more immersive experience that fosters a deeper understanding of economic principles Augmented Reality can be used to develop simulations of economic models of market dynamics and financial trends thus allowing students to interact with these concepts more directly. In addition, the utilization of AR in education has been associated with increased learning effectiveness. These positives suggest that integrating AR into economics education can result in superior learning outcomes and student experience by offering a more interactive and immersive learning experience. Augmented reality can improve motivation understanding and overall academic performance in learning economics.

The use of augmented reality (AR) in economics education is proven to significantly improve student interest and learning outcomes. Increased learning achievement in Economics subjects can be achieved through various innovative learning methods. One approach that has proven effective is Problem Based Learning (PBL). Learning media also plays an important role in improving learning achievement. Improving learning achievement is the main goal in the world of education. Increasing learning activities, the application of problem-based learning models integrated with augment reality media can increase student learning activities, because a more interesting and interactive learning experience can motivate students to be actively involved in the learning process. (Www.kemkes.go.id, 2020). Various studies have been conducted to explore methods and factors that can improve student learning achievement. In addition to learning methods, other factors such as the character of education and parents' economic conditions as well as parental involvement are also important in improving student learning achievement. (Zulparis et al., 2021) (Education et al., 2021). Emphasizing that parental

involvement can increase students' motivation and willingness to learn, which in turn has an impact on improving learning achievement. (Zulparis et al., 2021). Other factors that play a role in student achievement are learning motivation, teacher teaching style, and student self-efficacy. (Aulia & Susanti, 2022) (Student et al., 2021). Thus, to achieve optimal learning achievement, a holistic approach involving various factors such as innovative learning methods, parental involvement, teacher teaching performance and teacher discipline needs to be considered together.

The research objective of improving economic learning outcomes through problem-based learning using augment reality media is to improve understanding of economic concepts. This research aims to improve students' understanding of basic economic concepts. Improving learning activities, the application of problem-based learning models integrated with augment reality media can increase student learning activities, because more interesting and interactive learning experiences can motivate students to be actively involved in the learning process. (Www.kemkes.go.id, 2020)(Nurjannah et al., 2021). Develop student character, such as critical thinking skills, creativity, and the ability to work together in solving problems. Improve practical skills, through the use of augment reality media, students can more easily relate economic concepts to real-world situations, so as to develop practical skills needed in everyday life. Measuring learning outcomes, especially in economic types of material, such as daily test scores. Improve economic learning outcomes through problem-based learning using Augmented reality media. This title was chosen because it is relevant to offering an innovative learning approach that utilizes Augmented Reality technology. and a combination of learning approaches and technology, where problem-based learning approaches that have been proven effective in improving concept understanding, and the use of attractive AR technology to enrich students' learning experience. This combination attracts attention for its potential to create a more engaging and effective learning environment.

Based on the research title "Improving Economic Learning Outcomes Through Problem-Based Learning Using Augmented Reality Media", the problem formulation can be formulated as follows: 1). How does the application of a problem-based learning approach affect student learning achievement in economic subjects? 2). What is the impact of using Augmented Reality media in learning economics on students' concept understanding? 3). How does the interaction between problem-based learning approaches and Augmented Reality media affect student engagement in the economic learning process? 4). To what extent can the implementation of a combination of

problem-based learning approaches and Augmented Reality media increase students' learning motivation in studying economics? 5). How do teachers and students perceive the effectiveness of using problem-based learning approaches and Augmented Reality media in improving economic learning achievement? The formulation of this problem will help researchers in directing the focus of research and formulating hypotheses which will then be tested in the study.

RESEARCH METHODE

The literature method is one of the research methods used to collect and analyze data from written sources related to the problem or research objectives. This literature method is usually used in qualitative research and is also referred to as literature study, library study, or library research. The researcher collects and manages various literature related to the problem under study, makes observations and analyzes data from these sources, and records important and relevant parts of the research problem. The data obtained is usually secondary, which means that the researcher gets the material from the second hand and not the original data from the first hand in the field. The literature method has a ready-made nature, which means that researchers will not go anywhere, except to deal directly with the sources available in the library. In addition, researchers also use various literatures that are relevant to the problem under study. Data collection techniques in the literature method include primary data and secondary data, with primary data in the form of observation data and secondary data in the form of data from library sources.

RESULT AND DISCUSSION

RESULT

To improve economic learning outcomes through Problem-Based Learning (PBL) using augmented reality (AR) media, several key elements can be synthesized from available references. PBL has been recognized as an effective method to improve learning outcomes by fostering an active learning environment. The implementation of thematic learning based on PBL strategy has shown positive results in improving learning outcomes and students' confidence. (Khasanah et al., 2021). In addition, the integration of AR as a media tool is proven to significantly improve student interest and learning outcomes in various subjects, such as science and social studies. (Fauziah, 2022). Specifically focusing on economics, the use of PBL in online systems supported by platforms such as Google Classroom and Zoom has shown improved learning outcomes and student (Rindrayani, 2021). Furthermore, the application of PBL models is associated with the development of critical thinking skills in

students. The urgency of AR as an innovative learning tool has been highlighted, emphasizing its role in cultural preservation and interactive learning experiences (K. Dewi & Sahrina, 2021).

Augmented reality (AR) is increasingly being used in various educational environments to enhance the learning experience. Research has shown that AR can have a positive impact on student performance and engagement across a range of disciplines. Studies have shown that AR can lead to improved test scores in subjects such as anatomy and physiology (Moro et al., 2021)(Chen & Lai, 2021). In addition, the use of AR in education has been shown to increase learning motivation among students (Chen & Lai, 2021). In the field of professional training, AR has been recognized as a valuable tool to enhance teachers' skills and improve the quality of education delivery (Mena et al., 2023). Moreover, AR has been applied at various stages of education, from primary school (Hidayat et al., 2021) to higher education, demonstrating its versatility and potential impact at different levels of learning. In addition, the usefulness of AR in open and distance learning systems has been explored, emphasizing its potential to enrich learning experiences in non-traditional educational environments (Altınpulluk et al., 2019). The literature also suggests that AR can be effectively integrated into physics practicum models to facilitate practical learning experiences (Widiasih et al., 2021). Although the benefits of AR in education are clear, challenges such as barriers in the adoption of AR tools by teachers have been identified. Overcoming these barriers is essential to fully utilize the benefits of AR technology in the educational environment.

Research also shows that the effectiveness of AR-based learning media has a positive impact on students' knowledge competencies, such as understanding Indonesian traditional clothing in social studies (Faiza et al., 2022). In addition, the successful development and implementation of AR-based learning tools for environmental themes seems to greatly support the learning process (Mahendra et al., 2021). The utilization of AR in teaching topics such as animal classification based on habitat has increased student motivation and concentration (Nurhasanah & Putri, 2020). In addition(Arrum & Fuada, 2021) explored the use of interactive AR in improving distance learning in elementary schools. Based on the results of the study, researchers concluded that the development of Augmented Reality-based Microsoft Power Point learning media in integrated social studies subjects at SMP Negeri 1 Hiliduho in the 2022/2023 school year succeeded in improving student learning outcomes. The Research and Development development method consisting of several stages succeeded in producing innovative learning media and getting positive responses from material experts, media experts, and students. This learning

media can be used as a reference for teachers of subjects other than social studies and can be used in other schools. This research is expected to improve the quality of education in Indonesia (Laoli & Harefa, 2023). Meanwhile, (Khozin et al., 2020) The use of AR Technology can increase student engagement, deepen concept understanding, and encourage the development of analytical skills. This creates a more enjoyable, interactive and contextualized learning experience. Based on research, the use of augmented reality (AR) in learning mechanics, especially in understanding torque, shows the potential to improve student understanding and learning outcomes. Some studies show that the use of AR applications can improve students' test results and their understanding of torque. However, some studies also highlight the importance of larger sample sizes to confirm the effectiveness of AR in improving learning. In addition, studies also emphasized the importance of time and prior knowledge in improving students' understanding. Further research is needed to explore the potential of AR in education and thoroughly understand its impact (Hedenqvist et al., 2023). Other research says AR has great potential in improving the learning experience in education. In the context of the COVID-19 crisis, the use of AR can help educators and students access specialized materials more innovatively and effectively (Vuță, 2020). In addition, augmented reality (AR) has great potential in delivering immersive experiences and strengthening people's empathy towards past cultures in the field of archaeology. AR enables immersive experiences with artifacts, while also enhancing understanding of historical sites and documents. Despite challenges such as technical expertise and resource requirements for creating AR projects, the technology offers an innovative way to engage the public in archaeology (Ellenberger, 2017).

The problem-based learning approach using Augmented Reality media is the main foundation in this title. This method emphasizes the application of more practical learning concepts, where students are exposed to real-world situations to solve problems. In the context of economics, this approach allows students to link theory with practical applications in a real-life context. Augmented reality (AR) media provides a strong visual dimension in the learning process. In this study, the focus is on how AR technology can be an effective tool in visualizing complex economic concepts. Through AR, students can 'see' and 'interact' with these concepts in an environment that feels more real. The use of Augmented Reality in an educational context can provide significant benefits in enhancing students' learning experience and enriching traditional learning methods (Liono et al., 2021).

In the context of improving economic learning outcomes through problem-based learning using augment reality media, several studies have shown that this approach is effective in improving student learning outcomes. The application of problem-based learning models has also been proven effective in improving learning outcomes, as mentioned by (Khasanah et al., 2021). They found that the implementation of problem-based learning can improve learning outcomes and student confidence. In the context of economic learning, a study (Amperawanto, 2022) shows efforts to improve economic learning outcomes through student group work learning methods. Meanwhile, research (Rindrayani, 2021) highlighted the positive influence of problem-based learning on students' economic learning outcomes.

By utilizing the interactive and engaging nature of AR technology within a PBL framework, educators have the potential to create immersive learning experiences that stimulate critical thinking, improve knowledge retention, and increase student engagement in economic education. To improve students' learning outcomes in economics subjects, the integration of problem-based learning and AR media is expected to improve students' abilities in this regard, the impact of using AR media in problem-based economic learning, from increased student engagement to improved learning outcomes and knowledge transfer into real life, it is important to consider the positive implications that may result from the proposed learning method. In addition to the positive potential, there are challenges that may be faced in implementing AR media in economics learning. From technology availability to teacher training devising effective strategies to overcome these barriers is important for the successful use of this technology in the classroom.

DISCUSSION

The problem-based learning approach using Augmented Reality media is the main foundation in this title. This method emphasizes the application of more practical learning concepts, where students are exposed to real-world situations to solve problems. In the context of economics, this approach allows students to link theory with practical applications in a real-life context. Augmented reality (AR) media provides a strong visual dimension in the learning process. In this study, the focus is on how AR technology can be an effective tool in visualizing complex economic concepts. Through AR, students can 'see' and 'interact' with these concepts in an environment that feels more real.

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The conclusion of this study confirms that the use of Augmented Reality-based technology in learning is very beneficial. This is evident by the improvement of students' critical thinking and thought process, enabling them to solve everyday problems. The use of AR has been shown to increase student engagement in learning economics through interactive experiences and engaging visuals. AR media deepens the understanding of economic concepts through realistic visualization, supports the development of analytical skills, and facilitates the understanding of economic data patterns. The implementation of PBL has had a positive impact in improving students' learning outcomes, thinking skills and problem solving. The teacher acts as a facilitator in the PBL learning process, which helps students understand the material better and improve their thinking and problem-solving skills.

The advantage of Augmented Reality learning media also lies in its flexibility, where students can learn independently without having to depend on the presence of the teacher. This reflects students' ability to learn when and where they want, resulting in a continuous learning process. Compared to

traditional learning methods, Augmented Reality technology allows abstract concepts in education to be visualized more clearly, facilitating better understanding of the material and more real object models, thus increasing the effectiveness of learning media. The challenges are related to the availability of technology, teacher training, and effective strategies in implementing AR technology in the classroom. Although this study shows a positive impact, further research is needed to test the effectiveness of this learning model on other materials and in various school contexts.

Thus, the conclusions of this study emphasize the importance of AR technology and problem-based learning models in improving student engagement, material understanding, analytical skills, and attitudes towards learning, but also highlight the challenges and need for further research to optimize the use of these technologies in the context of economics education.

CONCLUSION

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