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Augmented Reality Immersive Technology for Early Childhood Education (ECE) at Merah Delima ECE, East Kelapa Gading

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Abstract

Augmented Reality (AR) technology possesses significant potential in enhancing students' cognitive aspects and learning motivation through interactive three-dimensional visualizations. However, the implementation of this technology in Early Childhood Education (ECE) levels still requires deeper exploration, particularly concerning animal recognition materials. This community service activity aims to introduce Augmented Reality technology and analyze the importance of animal recognition through AR for young children at Merah Delima ECE. The method employed is a descriptive qualitative approach to observe children's interactions with AR-based learning media. The results indicate that AR is capable of transforming abstract concepts regarding animal habitats and behaviors into concrete experiences that are easily understood by children in the pre-operational developmental stage. The integration of AR into the ECE curriculum is proven to increase active engagement and memory retention compared to conventional methods such as static picture books. Furthermore, the use of AR supports kinesthetic learning, where children explore digital objects spatially. In conclusion, AR-based animal recognition is crucial for building early digital literacy while simultaneously creating an enjoyable learning environment.

Keywords*: Augmented Reality, Early Childhood Education, Animal Recognition, Learning Media, Digital Literacy*

1. INTRODUCTION

Augmented Reality technology, hereinafter referred to as AR, is a relatively new technology utilized in the field of education [1][2]. The rapid advancement of mobile devices has served as a catalyst for the growth of AR technology. Nevertheless, AR is still rarely implemented in the learning process. In this community service activity, an attempt was made to introduce AR technology for animal recognition to students at Merah Delima Early Childhood Education (ECE) in East Kelapa Gading, East Jakarta.

Previous research indicates that AR offers distinct advantages in the learning process, particularly for early childhood education. The implementation of Augmented Reality (AR) is easily understood by teachers due to its user-friendly applications and its effectiveness in engaging students' interests [3][4]. Furthermore, there is a significant increase in understanding and knowledge among teachers and ECE administrators regarding the use of AR-based learning media after conducting trials of its application within the curriculum [5][6].

The research conducted by Yilmaz et al. states that Augmented Reality (AR) technology contributes positively to language learning (specifically vocabulary) in preschool English classes. Furthermore, the use of this technology also has a positive impact on the students' attitudes and levels of enjoyment [7][8]. The use of Augmented Reality (AR) technology is proven to be effective as an interactive learning medium for introducing animal names in English to elementary school students and is capable of creating a more engaging, immersive, and enjoyable learning experience compared to conventional methods that tend to be monotonous [9][10].

2. METHODOLOGY

This community service activity employs a training approach (workshop) with a combination of interactive lectures, demonstrations, and hands-on practice. The evaluation

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design uses a one-group pre-test and post-test model (*one group pre-test–post-test design*) to measure the increase in participants' knowledge after participating in the training. The activity was carried out at Merah Delima ECE (Early Childhood Education), located in Kelapa Gading, East Jakarta. The participants consisted of 17 ECE teachers. The materials presented in this community service included:

a. Introduction to AR concepts: a brief history, definition, and how it works.
b. Developments and examples of AR applications in education.
c. Basic creation methods: introduction to tools.
d. Demonstrations and discussions.
e. Discussion on ethics and the role of teachers in the use of AI.
f. Demo AR application in class with student.

3. RESULT AND DISCUSSION

Community service is an effort to disseminate science, technology, and art to the community. These activities must be able to provide added value to the community, both in economic activities, policies, and behavioral changes (social). Describe that community service activities have been able to provide changes for individuals/communities and institutions in both the short and long term.

The analysis showed that participants pre-test knowledge scores were in the low moderate category, with most teachers unable to accurately explain the definition of AR and unfamiliar with AR terms such as marker and tool. After participating in the training series, post - test scores improved for almost all participants. Improvements were evident in participants' ability to explain the differences between AR and traditional method

Fig.1 Provision of AR modules

Fig.2 provision of teaching materials of AR

Fig.3 participants take part in activities

Fig. 4 giving souvenirs

4. CONCLUSION

The community service activity, which included training on introducing Augmented Reality (AR) for teachers at Merah Delima Early Childhood Education (PAUD Merah Delima), successfully improved their conceptual understanding of the topic and fostered a more positive attitude toward the use of immersive AR technology in the classroom. Teachers gained a concrete understanding of examples of AR applications in education through simple learning activities. Practically, this training resulted in several AR-based learning activity designs that can be implemented at the ECE center and further developed. This activity emphasized the importance of supporting ongoing teacher professional development in facing changes in the education ecosystem, which is increasingly influenced by massive digital technological advancements. Future community service programs are highly necessary, including mentoring for classroom implementation and developing a community of practice among teachers to share experiences and resources. Further research can also be conducted to evaluate the long-term impact of using AR on student learning outcomes and learning innovation in schools.

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