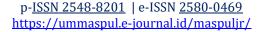# Development Of 3D Digital-Based Teachinga Materials With Augmented Reality Technology In Improving Early Childhood Literacy Skills

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Abstract

The urgency of this research is the need to improve the literacy skills of early childhood which are increasingly decreasing, because literacy is very important for children, namely as a means of developing language and communication. Furthermore, literacy allows children to access and understand knowledge from various sources. The development of children's literacy skills should develop along with the times, this encourages the use of technology as an open material to improve the literacy skills of early childhood. Teachers as educators play an important role in the technology-integrated learning process. Teachers must have competence in integrating technology in the learning process. Therefore, researchers provide a solution to all teachers by developing 3D Digital-based teaching materials with Augmented Reality (AR) technology. The aim of this research is to increase children's literacy interest. The method in this research uses a four-D plan, in this plan there are four stages, namely: (1). Defining stage, (2). Design Stage (3). Developing stage (4). Socialization stage. The research results obtained with technology will make learning more optimal and creative so that it can stimulate the development of power, creativity and language.

Keywords: Augmented Realty, Literacy, Early Childhood

Introduction

Teaching materials are a basic thing that must be owned by every educational unit. Every educator is required to have teaching materials as a reference in teaching. The availability of teaching materials in each educational unit is regulated in the content standards and educational process standards (Nuryasana & Desiningrum, 2020). Integrating technology, computers and the internet into the learning process is an effective step to improve the success of the teaching and learning process (Lemeshchenko-Lagoda et al., 2020). Technology is integrated into learning to facilitate the optimal arrival of information (Zulfadhilah et al., 2022).

One of the topics that is currently being talked about is literacy. The many studies on literacy illustrate how important literacy skills are. Therefore, literacy needs to be developed from an early age, because early childhood is an individual who is experiencing a process of rapid development and is fundamental for the next life (Khadijah, 2016).

So, literacy is one of the tasks of child development that must be stimulated from an early age (Rizki & Firmawati, 2023). Literacy skills in early childhood are closely related to language and communication skills (Basyiroh, 2017). The problem is that Indonesia is currently in a literacy culture crisis (Nirmala, 2022). The results of the BPS survey in 2012 showed that only 17.66% of Indonesia children have an interest in reading (Rahman, 2017). Furthermore, data on community literacy activities in Aceh province obtained an index value of 34.37 in the low category (Kemendikbud, 2019).

The development of children's literacy skills should develop along with the times, this encourages the need to use technology as a

teaching material to improve early childhood literacy skills. The solution to the success of literacy learning can be influenced by the integration of technology as teaching materials. The learning process by involving children directly in the environment can provide a more meaningful understanding because children are directly involved in real life (Ardianti et al., 2021).

However, being directly involved does not mean that you have to jump in directly, because now many technologies can describe objects like real forms by showing the real world context in the virtual world, namely Augmented Reality (Vivianti & Ratnawati, 2021). Augmented Reality (AR) is a computer-made technology that integrates 2 or 3-dimensional objects along with the time that is taking place around the user in real life (Ismayani, 2020). AR is one of the technologies that develops the fastest and is visible in our daily lives (Alyousify & Mustafa, 2022).

Early literacy does not mean being taught to read directly but making children love reading and building a foundation for reading first (Florida et al., 2012). Activities that can be done such as telling stories, seeing letter symbols and words, as well as through questioning activities, letter tree games (Khusaini & Sari, 2021). As well as with illustrated story activities (Nurhadijah et al., 2021). So in this study, the researcher designed teaching materials based on Augmented Reality technology in accordance with literacy materials for early childhood that are more fun and interesting. The formulation of the problem to be researched is how to Develop 3D Digital-Based Teaching Materials with Augmented Reality Technology.

Method

The research method used is following Thiagarajan's design, namely Four-D (Define, Design, Develop, Dessemination). In this plan, there are four stages, namely:

a. The define stage is designed to analyze teachers' abilities in the context of teaching materials to the extent that teachers understand digital-based teaching materials. The analysis was carried out through the needs analysis process at Jeumpa Ban Kemang State Kindergarten for teachers and students.
b. The Design stage is to design digital-based learning media software, namely 3D

teaching materials with Augmented Reality (AR) technology, researchers will construct literacy materials in the design of digital teaching materials that are in accordance with literacy materials for early childhood
c. The develop stage is a stage that includes expert validation tests and feasibility tests on the initial design of teaching materials and then develops teaching materials in accordance with the directions of the expert validation test and feasibility test.
d. The dissemination stage is the stage to disseminate and implement teaching material products.

The achievement indicator in this study is that there is an increase in children's literacy skills through Augmented Realty. The research can be declared successful if the percentage of the average score of children's literacy skills included in the good criteria has reached 80%. This can be seen from the learning results that have been stated and arranged in the activity observation sheet. The success of each action can be determined by comparing the results of activities before and after the application of Augmented Realty teaching materials carried out in learning activities.

Result and Discussion

The results of the study show that the use of Augmented Realty-based teaching materials is very helpful in improving early childhood literacy skills. This can be seen from the enthusiasm and learning outcomes of children who have experienced significant changes. At the beginning of the meeting, the child still has difficulty naming some letters and is not able to distinguish the letters "b, d, p, q" with the help of Augmented Realty, the child is more able to mention and distinguish letters. In addition, children increase the number of vocabulary, because when displaying AR teaching materials, children can immediately see the image like the real thing so that children immediately remember the name of the object.

Furthermore, the results of the study showed that there was a significant relationship between before and after being treated with a percentage value of 80% which showed that there was a positive relationship between before and after being given action. So it can be concluded that the difference in early childhood

literacy skills before and after the act of using augmented reality media is significantly increased. In other words, there is strong evidence to confirm that the use of augmented reality media has had a positive impact on improving children's literacy skills.

Based on the needs analysis carried out, teachers have the view that teaching materials have an important role in the learning process and are needed to support all activities in the classroom. The use of teaching materials as learning aids is essentially an integral part of early childhood learning management planning. This emphasizes that media as a tool and support for learning cannot be separated from the teaching and learning process.

The development of children's literacy skills should develop along with the times, this encourages the need to use technology as a teaching material to improve early childhood literacy skills, one of which is by using Augmented Realty (AR). Augmented Reality (AR) Augmented Reality technology was first implemented by Ivan Sutherland in 1962. The implementation of AR also does not require special enhancements which generally take a lot of money and time for the purchase and installation process. Based on the two reasons that have been described, AR technology is widely developed by developers on mobile platforms such as Android or Ios (Magdalena & Kahfi, 2016).

Augmented Reality is a technology that combines two-dimensional and/or three-dimensional virtual objects into a three-dimensional real environment, then projects these virtual objects in real-time. Augmented Reality combines digital information with the real world where users can perceive it as a whole. The main advantage of Augmented Reality over

virtual reality is that it is easier and cheaper to develop, This combination of virtual world and real world is expected to bring a more effective and efficient learning process. from the Institute of Software Technology and Interactive Systems Vienna University of Technology Austria supports this in its paper entitled "Collaborative Augmented Reality in Education". The paper reveals: "Due to advances in the development of pedagogical concepts, applications and technologies, and the decline in hardware costs, the small-scale use of technology.

Augmented Reality for educational institutions has become very possible in this decade However, the potential of this technology requires careful attention in order to really be harnessed to improve educational success (Magdalena & Kahfi, 2016). Augmented Reality is an innovation of computer graphics that can present visualization and animation of an object model. Researchers are using this field as one of the new ways to improve learning and increase knowledge. As contained in Augmented Reality in Education, various potentials and advantages of applying Augmented Reality technology to education, one of which is having the power to attract students in ways that were previously not possible and providing freedom for students to carry out the discovery process in their own way (Alkhattabi, 2017).

Conclusion

Based on the results of the needs analysis carried out, teachers realize that teaching materials have an important role in the learning process and are needed to support all activities in the classroom. The results of the study show that the use of augmented reality-based teaching materials to improve early childhood literacy skills is effective to be used in improving early childhood literacy skills.

References

Alkhattabi, M. (2017). Augmented reality as e-learning tool in primary schools' education: Barriers to teachers' adoption. *Int. J. Emerg. Technol. Learn*, *12*(2), 91–100.

Alyousify, A. L., & Mustafa, R. J. (2022). AR-Assisted Children Book for Smart Teaching and Learning of Turkish Alphabets. *Virtual Reality and Intelligent Hardware*, *4*(3), 263–277.

Ardianti, Dwi, S., & Wanabuliandari, S. (2021). EthnoEdutainment Digital Module to Increase Students' Concept Understanding. *Journal of Physics: Conference Series*, *1823*(1), 1–5.

Basyiroh, I. (2017). Program Pengembangan Kemampuan Literasi Anak Usia Dini. *Jurnal Tunas Siliwangi*, *3*(2), 120–134.

Florida, N., López, C., & Pocomucha, V. (2012).

Proses Stimulasi Kemampuan Literasi Awal Anak Prasekolah oleh Guru PAUD di Sekolah. *Prosiding SEMNAS Penguatan Individu Di Era Revolusi Informasi*.

Ismayani, A. (2020). Membuat Sendiri Aplikasi Augmented Reality. In *PT. Elex Media Komputindo*.

Kemendikbud. (2019). Indeks Aktivitas Literasi Membaca 34. In Pusat Penelitian Kebijakan Pendidikan dan Kebudayaan, Badan Penelitian dan Pengembangan. *Kementerian Pendidikan Dan Kebudayaan*, 2.

Khadijah. (2016). *Pendidikan Prasekolah*. Perdana Publishing.

Khusaini, M., & Sari, R. (2021). Upaya Meningkatkan Kemampuan Mengenal Huruf Melalui Permainan Pohon Huruf. *Jurnal Pendidikan Guru Anak Usia Dini*, *3*(1), 9–11.

Lemeshchenko-Lagoda, V., Kryvonos, I., & Kolodii, O. (2020). Integration of Information and Communication Technologies Into the Process of Learning the Course of English for Specific Purposes as One of the Requirements for Sustainable Future Development. *E3S Web of Conferences*, 166, 1–9.

Magdalena, L., & Kahfi, M. (2016). Penerapan Teknologi Augmented Reality untuk Pengenalan Komponen Jaringan dan Cara Kerja TCP/IP berbasis Android. *Itej Information Technol. Eng. Journals*, *2*(1), 1–11.

Nirmala, S. D. (2022). Problematika Rendahnya Kemampuan Literasi Siswa di Sekolah Dasar. *Ptimary:Jurnal Pendidikan Guru Sekolah Dasar*, *11*(2), 393–402.

Nurhadijah, N., Rahma, R., & Salpina, S. (2021). Upaya Meningkatkan Kemampuan Berbahasa Dalam Mengenal Kosa Kata Melalui Cerita Bergambar Pada Kelompok B (5-6 Tahun). *Jurnal Pendidikan Guru Anak Usia Dini*, *2*(2),

59–64. http://www.journal.umuslim.ac.id/index.php/jpg/article/view/1156

Nuryasana, E., & Desiningrum, N. (2020). Pengembangan bahan ajar strategi belajar mengajar untuk meningkatkan motivasi belajar mahasiswa. *Inovasi Penelitian*, *1*(5), 967–974.

Rahman. (2017). *Kecakapan Literasi di sekolah dasar*.

Rizki, S., & Firmawati, F. (2023). Penggunaan Media Kartu Huruf Bergambar dalam Upaya Meningkatkan Kemampuan Membaca Permulaan Pada Kelompok B di TK Ihksanul Kamil. *Journal on Education*, *5*(2), 4041–4050.

Vivianti, & Ratnawati, D. (2021). GAME EDUKASI MOBILE "AKU SUKA SAYUR" BERBASIS AUGMENTED REALITY UNTUK ANAK USIA DINI. *Refleksi Edukatika: Jurnal Ilmiah Kependidikan*, *11*(3), 127–134.

Zulfadhilah, M., Mambang, M., Prastya, E. S., Cipta, P. S., Rahmini, R., Syafi'i, M. R., Akbar, M. K., Renaldi, A. R., Yenitia, A., & Arrasyid, S Salsabila, T., Aulia, H., Hardianti, S. G., & Febriani, W. (2022). Pemanfaatan Teknologi Digital pada Proses Pembelajaran dengan Pendekatan Computational Thinking. *Selaparang: Jurnal Pengabdian Masyarakat Berkemajuan*, *6*(3), 1134–1137.

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