

Augmented reality: as a guidance and counseling tool for early childhood

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Abstract: Learning in early childhood education institutions uses the method of playing while learning. Likewise in carrying out the guidance and counseling process, early childhood must be in a pleasant atmosphere. Augmented reality is one of the media that can be used as a play tool by children to achieve the goals of guidance and counseling carried out by the teacher. This study aims to design an augmented reality application that can be used by early childhood to describe real conditions for children to recover from trauma or excessive anxiety about an object. The research methodology used is development research with research stages namely need assessment, preparation of an augmented reality information system, conceptual and operational trials in three PAUDs in Pekanbaru, Riau, Indonesia. this research methodology describes the stages of the methodology applied in conducting research with reference to the software development cycle in the form of a waterfall model. The result is an augmented reality application that supports the guidance and counseling process in early childhood education institutions.

Keywords: augmented reality, guidance and counseling, early childhood

INTRODUCTION

Based on preliminary studies at early childhood education institutions in Rumbai sub-district, Pekanbaru city, it was found that the learning materials used in PAUD were giving assignments, lectures, demonstrations (using props), and storytelling. In delivering the material, the teacher is assisted by books and display pictures. Based on research results (Oranç & Küntay, 2019) it was found that 87% of children felt bored in learning using books and modules as media. Based on the results of this research, it is necessary to develop digital-based learning media, especially in early childhood education institutions.

Learning in early childhood education institutions that use a scientific curriculum with a thematic approach is of course very much supported by augmented reality. Because the process of working visually allows children to understand the concepts introduced in each learning sub-theme which is visualized with three-dimensional technology, (Leão et al., 2011; Zhang, 2020). In addition, the application of augmented reality technology which is very rare in early childhood education will make children interested in learning, because basically early childhood is always interested in new things (Nainggolan et al., 2018; Radu & Antle, 2017 ; Radu & MacIntyre, 2012). I Dewa (Dewa, 2015) uses Augmented Reality to introduce animals to kindergarten students. Animal markers printed on paper are made to be attractive to kindergarten students. When the application is directed above the marker, the three-dimensional image of the animal will automatically seem to come out of the image, which is accompanied by an animation of the movement of the animal. Through this learning media, it is hoped that kindergarten students will be more enthusiastic in learning about various animals. Apart from introducing animals to students (Ati et al., 2018), this media also indirectly teaches students to be able to use technology that is currently being developed.

Guidance and counseling in early childhood is carried out by the teacher. In cognitive development, children need to be stimulated in their problem-solving abilities. By using augmented reality media, it is hoped that children can understand concepts more realistically. The guidance and counseling media will later display features from two-dimensional images to three-dimensional shapes with guidance from companions such as teachers or parents in their use. With the existence of learning facilities through Augmented Reality, it is hoped that the learning process that students go through will increase

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enthusiasm so that the potential that exists in these students can be explored (R. Azuma et al., 2001; Cassidy et al., 2015)(R. T. Azuma , 1997). In accordance with the background and formulation of the problem, this study has a specific objective, namely to test the effectiveness of Augmented Reality-based learning models in the curriculum of early childhood education institutions.

METHOD

In this research methodology describes the stages of the methodology applied in conducting research with reference to the software development cycle in the form of a waterfall model:

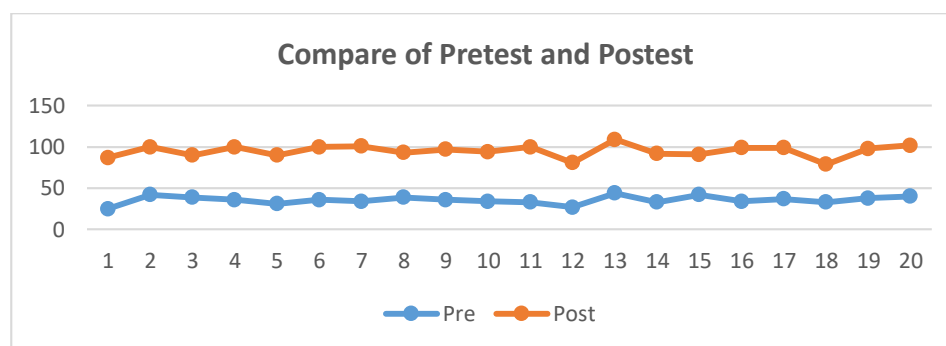
1. Requirements Analysis: All software requirements are obtained in this phase, including the expected use of the software by the user and the limitations of the software. This information can usually be obtained through interviews, surveys or discussions.
2. System Design: This stage is carried out before carrying out the coding system stage. This stage aims to provide an overview of what the system will be made of and how the interface is for each of its activities. This stage helps in specifying hardware and system requirements and defining the overall system architecture.
3. Implementation: At this stage the programming stage is carried out. Making software is broken down into small modules which will later be combined in the next stage. In addition, at this stage an examination is also carried out on the module that is made, whether it has fulfilled the desired function or not.
4. Integration & Testing: At this stage, the modules that have been made are combined and tested to find out whether the software is appropriate or not according to the design.
5. Operations & Maintenance: This is the last stage in the waterfall model. The finished software is run and maintained. Maintenance includes fixing errors that were not found in the previous step.

From the diagram it is illustrated that the implementation of research starts from a needs study or exploratory study in the field through interviews and observations, carrying out data collection, changing data in the form of expected system modeling, system analysis and design, writing trial coding and system implementation, so as to create a system augmented reality information. This research was carried out in the 2022/2023 academic year at Lancang Kuning University. With the target of object-oriented research. According to Sholiq (2006), object oriented or object oriented, namely viewing the system as a collection of discrete objects that interact with each other. What is meant by object-oriented is that organizes the software as a collection of discrete objects that work together between the information or data structure and the behavior (behavior) that governs it.

RESULT AND DISCUSSION

The trial of the augmented reality-based curriculum model at Madani Cendekia Kindergarten with the trial participants was a team of researchers, managers of early childhood education institutions and educators. Before the researchers together with the managers and teachers implemented the training model that had been prepared, the teacher was observed regarding the teacher's understanding of augmented reality-based learning, the teacher in implementing augmented reality-based learning. Then implemented learning based on augmented reality using the RPPH that has been designed. when the trial took place, researchers conducted observations and monitoring to obtain data that could be used to improve the curriculum.

After carrying out the conceptual test, the teacher was interviewed again to measure their understanding after participating in the lesson. Things that are observed and monitored include: the ability of managers and teachers to implement augmented reality-based learning, the activities of managers and teachers during trials of augmented reality-based learning models, the responses of managers and teachers to the implementation of the results of trials of augmented reality-based learning models and the ease and difficulties faced by managers and teachers during trials of augmented reality-based learning.



From the results of data analysis, it was concluded that there was a significant change and increase in teacher understanding before and after implementing the model. Based on the graph above, all learning indicators/materials increased from before giving treatment to after implementing augmented reality-based learning in early childhood.

The following are the results of statistical trials to see the differences in pretest and posttest.

Tabel 1. Paired Samples Correlations

		Mean	N	Std. Deviation	Correlation
Pair 1	Pretest	23.17	9	2.281	0.628
	Posttest	30.17	9	3.124	0.943

The Paired Samples Statistics table shows the descriptive value of each variable in the paired samples. The Preliminary Test has an average value (mean) of 23.17 from 9 data. The data distribution (Std. Deviation) obtained is 2.281 with a standard error of 0.628. The Final Test has an average value (mean) of 30.17 from 9 data. The data distribution (Std.Deviation) obtained is 3.124 with a standard error of 0.943. This shows that the final test on the data is higher than the initial test. However, the distribution range of the final test data has also become wider and with a higher standard error. Based on data processing using SPSS 20.00, it can be concluded that there was a significant increase in teacher knowledge between before and after following the augmented reality-based curriculum model. This shows that the implementation of augmented reality is very easy for teachers to understand because it is user-friendly and attracts children's interest.

Learning media is very important in influencing the achievement of learning. Education for children is something that is very important, but the most important thing is the method and media used in the process of learning and instilling a concept in children. According to the results of research (Mustaqim, 2016) learning media that are suitable for children's absorption, the concepts that will be instilled can be easily understood by children. In early childhood education, the learning media that attracts interest in learning and makes it easier to instill concepts in children is using augmented reality. Augmented Reality can be an alternative learning media. Besides being interactive, Augmented Reality can visualize objects in real time (Furht, 2011). So that it can make the teaching and learning atmosphere more lively and interactive between teachers and students. Therefore, this research will be arranged on each theme in one year using Augmented Reality technology.

Augmented Reality is a technology that combines two-dimensional or three-dimensional virtual objects and then projects these virtual objects in real time. Augmented Reality is defined as a technology that combines the real world with the virtual world, is interactive in real time, and is in the form of three-dimensional animation (RT Azuma, 1997). Thus Augmented Reality (AR) can be defined as a technology capable of incorporating virtual objects in two dimensions or three dimensions into a real environment then displaying or projecting them in real time (Ati et al., 2018). AR is a concept of combining the virtual world with the real world to produce information from data taken from a system on a designated real object so that the boundary between the two becomes thinner (Radu & MacIntyre, 2012), (Cassidy et al., 2015). AR can create interactions between the real world and the virtual world, all information can be added so that the information is

displayed in real time as if the information is interactive and real. The AR concept itself was first introduced by Thomas P. Caudell in 1990 in The Term 'Augmented Reality'.

Basically, the working principle of Augmented Reality is tracking and reconstruction. At first the marker is detected using a camera. Detection methods can involve various algorithms, for example edge detection, or other image processing algorithms (Yilmaz, 2016). The data obtained from the tracking process is used in the reconstruction of the coordinate system in the real world. Besides adding objects into the real environment, Augmented Reality can also remove real objects in virtual form. By covering the real object with a graphic design according to its environment, the real object will be hidden from the user (R. Azuma et al., 2001). This makes it easier to understand the concept of the theme that has been determined in the curriculum.

CONCLUSION

The implementation of augmented reality is very easy for teachers to understand because it is user-friendly and attracts children's interest. This is shown by the results of research which show that there is a significant increase in the initial understanding of teachers and administrators with understanding after applying augmented reality in the early childhood education curriculum. The Preliminary Test has an average value (mean) of 23.17 from 9 data. The data distribution (Std. Deviation) obtained is 2.281 with a standard error of 0.628. The Final Test has an average value (mean) of 30.17 from 9 data.

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