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Coloring Practice Learning Media Application In Early Childhood Using Live Coloring Technique

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Abstract: Rapid technological advancements have had several negative effects on young children, as the majority of children now prefer playing with gadgets to studying. Childhood, from 0 to 8 years old, is considered a time for educational services. Drawing and coloring are common activities for learning and are a part of children's lives. Therefore, it is necessary to develop a learning pattern for children that combines two things they enjoy: coloring and gadget technology so that children can play with gadgets and learn what they enjoy at the same time. In this study, a learning application for coloring 3D objects was created using the *Live Coloring Technique with Android* -based *Augmented Reality* technology. The reason is because *Android* is a very popular and widely used operating system, making it easier to install and use the application.

Keywords: Augmented Reality, Live Coloring, Android, Coloring, Early Childhood

Introduction

Rapid technological advancements have had several negative impacts on people's lives, including early childhood, a golden age for learning and understanding. However, the reality is that the majority of children today are more preoccupied with and prefer playing with gadgets than learning and understanding. With the current lifestyle, where life is surrounded by sophisticated technology, it is not surprising that children also really enjoy playing and exploring and cannot be separated from the world of gadgets. This can be dangerous for a child's thought development when they are exposed to content they shouldn't be viewing or accessing, whether due to parental oversight or minimal supervision. Early childhood education is crucial, given that a child's potential intelligence and behavioral foundations are formed during this age range. Childhood is considered the golden age of education. The period from 0 to 8 years old is considered a once-in-a-lifetime period, making it crucial to stimulate brain development through health care, adequate nutrition, and educational services. According to developmental psychology and neurological research on brain development, early childhood encompasses children aged 0 to 8 years (Maros & Juniar, 2016) . One of the most common learning activities, which later become a part of children's lives, is drawing and coloring. Drawing and coloring are not just activities to fill children's free time, but also forms of self-actualization in the fields of creativity and art, showcasing children's imagination and thinking, even though the

visualization of children's drawings is usually just scribbles. Generally, when children become more active, they begin to enjoy simple doodles. Tabrani (2005: 4) emphasizes that doodles are the initial stage of children's creativity. As they grow older, their doodles will begin to develop into more varied and clear images. Through drawing, children can express what they feel, think, and even describe their experiences (Putri & Trisakti, 2019) .

Developing creativity in children will encourage them not only in careers leading to the arts, but also in business, entrepreneurship, engineering, law, health, and so on (Rachmanto et al., 2022) . Practicing creativity is also important for effective problem-solving (Clabough, 2019). It can be concluded that cultivating creativity in children as early as possible can increase their intelligence, which will become the foundation for living their lives later. From the explanation above, it is clear that currently the world of children is surrounded by technology that makes them actively enjoy and play with it. On the other hand, children also enjoy activities such as doodling, drawing, and coloring, which can even train children's intelligence and creativity. Therefore, it is necessary to develop a pattern or method of learning for children that combines two things they enjoy: doodling or coloring and gadget technology. So that children can play with gadgets and learn things they enjoy while also being intelligent and practicing their creativity. In this way, children can learn from two things: learning to be creative and learning to use gadget technology in a positive direction. *Augmented Reality* is an effort to combine the real world with the virtual world through a computer so that the boundaries between the two are very thin (Yuhanto & Miyosa, 2022) . The way *Augmented Reality* works is by detecting *scanned* markers and then displaying a 3D shape shown as a representation of the detected marker. In addition, the use of technology in learning techniques for coloring exercises for children has its own advantages because in addition to being able to train children's imagination, creativity and intelligence, but also can help introduce the world of technology to children who are increasingly developing rapidly and utilizing technology in a more positive direction because it is used for learning. Based on this background, researchers plan to develop an application and conduct research with the research title "Learning Media Application for Coloring Exercises in Early Childhood Using Live Coloring Techniques". In this research, it is hoped that it can create a learning application for coloring 3D objects with the help of *Live Coloring Techniques* in *Augmented Reality technology* that can create new patterns in children's coloring learning that are more interesting and interactive because it combines two things that children like, namely gadget technology and coloring. The application built is also *Android -based* , which means this application can run on gadgets that have an *Android operating system* because *Android* is a very popular operating system and has been widely used so it makes it easier to install and use the application.

Methodology

Data collection methods are techniques used to obtain research data. Data is a crucial aspect in supporting the smooth running of a study. In this study, the data collection methods that will be used are:

1. Observation

   Observation is a data collection technique that involves direct observation. Observation is an accurate and specific method for gathering data and gathering

information about all activities being studied. In this study, the observation method was used to gather data related to children's learning, particularly in the area of coloring.

2. Literature review
   Literature study or *library research* is a method of collecting data by understanding and studying theories from various literature related to the research (Wahyudin, 2017) . In this research, the literature study technique is used to search for references or theories from various *literature* related to and supporting this research.

System Design Model

The system design model that will be used in this study is the *incremental model* . According to (Arsia Rini, 2016) the incremental model is a method where a product is designed, implemented, and tested in stages (each module will be added gradually) until the product is complete. This model is used because it is able to minimize inconsistencies in software development (Kaafi et al., 2020) . In addition, the incremental model is also considered suitable for system design with small-scale projects. This model contains four stages: Analysis is used to analyze system requirements, Design is the design stage, Coding is the stage of writing commands in the form of a programming language so that the system can understand and execute commands from *the user* , while the final stage is testing or testing the system that has been created. The following are the stages of the *incremental model* :

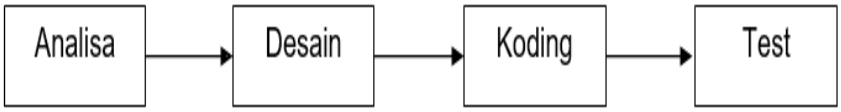

Figure 1 Incremental Model

Results and Discussion

Result

The current computer network is only used when there are exams, by developing the current computer network into a Mikrotik-based hotspot network using the user manager authentication method at SMK N 4 Bengkulu Selatan, so that the network will be more useful in helping learning and teaching activities at SMK N 4 Bengkulu Selatan.

Discussion

The following are the results of the process of creating a learning media application for coloring exercises for early childhood using the live coloring technique.

***Splash screen* page**

The *splash screen* is the first page displayed after opening the application, before the system displays the application's main menu. Here's what *the splash screen looks like* :

Figure 2. Splash Screen Page

Main Menu Page

The main menu page is a page that contains menus for operating the application. This page contains four menus: start, instructions, about, and exit. The main menu in the application is shown below:

Figure 3. Main Menu Page

StartAR Page

This page is the page where the AR camera is activated to scan *markers.* When the camera is directed at *the marker* , the system detects *the marker* and then displays the 3D shape of the detected *marker* . Here's what the StartAR page looks like.

Figure 4. StartAR Page

When the camera is directed at *the marker* and detected, the system will display a 3D form as below:

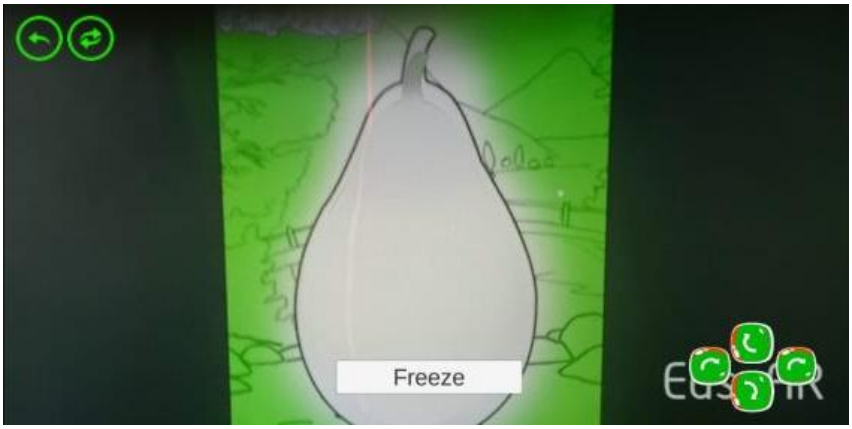

Figure 5. Shows 3D

Figure 5 shows that the object is displayed and is still white, matching the color of its *marke* . However, once the marker is colored, the displayed object will also be colored according to *the marker* color, as shown in Figure 4.8 below.

Figure 6. Object after the marker is colored

Instructions Page

The instructions page is a page that contains instructions for using the application. The following is a display of the instructions page in the application.

Figure 7. Instructions Page

About Page

The about page is a page that contains information about the application. Here is a look at the application.

Figure 8. About Page

Exit Page

The last page in the application is the exit page. This page displays a warning or reconfirmation whether *the user* is really sure to log out or not. Here is the exit page view.

Figure 9. Exit Page

Application Testing

The testing method used in this study is the *black box method* . *Black box* testing This is a test that focuses on functionality. It examines whether the resulting application meets expectations based on the previous design or whether improvements are needed. In this test, three different *Android smartphones were used,* as shown in the table below :

Table 1 Smartphones for testing

Device Name	Redmi 9C	Redmi 4a	Samsung A10s
Android OS Version	v10 Android Quince Tart	6.0.1 Marshmallow	Android 9 (Pie)
Processor	Octa-core Max 2.30GHz	Quad-core Max 1.40GHz	Octa-core 2.0 GHz
Screen Size	6.53″	5″	6.2″
Ram	4GB	2GB	2GB
Rear Camera	13MP	13MP	13MP

Conclusion

Conclusion Based on the results of the discussion and testing in this study, the following conclusions can be drawn:

1. Research has been able to produce a coloring learning application for children by utilizing *augmented reality technology.*
2. *live coloring* technique can be applied to *augmented reality technology* and the coloring applied to *the marker* can be detected and applied to 3D objects well.
3. Based on the test results, the application produced in this study can run well on *smartphones* with a RAM capacity of 2GB or more.

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