

Educational Video Using the 3D Hologram Technique in Kindergarten Learning Methods

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ABSTRACT

Based on research observations when carrying out observation and interview activities at the Diponegoro Wangon Kindergarten with informants, based on the curriculum the reason for taking traditional transportation equipment material is because this material requires teaching aids that display real visuals besides that examples of traditional transportation equipment toys are increasingly rare it's even rare to get, because toy companies no longer produce traditional means of transportation anymore but instead produce new, more sophisticated toys. To avoid this, teachers can develop learning strategies by utilizing various media and learning resources. The design of 3D hologram visualization media for traditional and modern transportation material is considered appropriate, because with this media students have learning resources that can be used for independent study and display animation that is quite interesting to support the learning process. The system development method used is MDLC. This research begins with sequential stages such as pre-production, production and post-production. The results are in the form of 3D animation designing a visualization media for the introduction of traditional transportation using 3D holographic techniques in the form of mp4.

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INTRODUCTION

The current learning of school students makes it possible for individual learning to take place by fostering independence in the learning process, especially during Large-Scale Social Restrictions [1]. Learning activities with the aim of improving the quality of education are expected to utilize learning media [2]. One of the learning media that can help the teaching and learning process is animated videos [3]. Audio-visual media, which is expected to be an interesting, interactive learning medium, and increase student enthusiasm for learning so that it is hoped that there will be improvements in students' values and knowledge [4]. 3D animation used in learning media will have an impact on students' understanding of the subject matter presented. Thus, students' absorption of the material being taught will increase [5].

This 3D object animation in the form of a hologram is made with the concept of dividing the image into 4 sides, where in this case the animation that has been modeled and given an effect will be divided into 4 parts on each side of the front, left, right and back [6]. The author in this study uses the low polygon modeling technique, because the low polygon modeling technique can be used as a basic object [7]. This technique is relatively easy and effective. Low-poly modeling is the process of creating a 3D model with fewer polygons than the actual object model. The process begins with modeling with an emphasis on the visual artistic side, where the tendency is to produce a large number of polygons (high-poly) [8]. There are several basic modeling categories at the character modeling stage in 3D animated films.

Categories of 3D animation modeling include low poly and high poly. There are 2 types of 3D Modeling, namely 1) Hard surface or hard surface objects are artificial or construction objects. 2) Organic or organic models are subjects that naturally exist in nature [9]. This includes humans, animals, plants, trees, rocks, stones, clouds, and even lightning. In using the low poly technique it also helps in the rendering process because it doesn't take too long. The process of editing objects using low poly is also not too complicated compared to using high poly [10]. With this holographic 3D animated video as a learning medium, it is hoped that students will understand more easily than information made in other ways [11].

Based on some of the opinions above, it can be concluded that holography is an image recording technique (optically) that produces a three-dimensional image based on interference events recorded on a two-dimensional medium, in this medium it is called a hologram [12]. Transmission Hologram is a hologram formed by the collision of a Reference Beam and an Object Beam on a single holographic surface [13]. In general, the Transmission Hologram requires a uniform beam such as a laser beam as a light source in the formation of the reconstruction of an object [14].

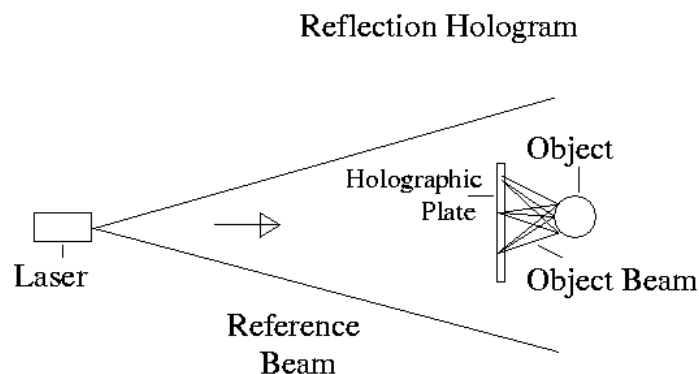


Figure 1, Illustration of the Working Principle of Transmission Hologram
Resource by Husaini (2015)

Seen in the picture above, the laser beam is divided into two by the Beam Splitter. This Beam Splitter is a glass that is half mirror and half lens [15]. The beam that is separated by the beam splitter is divided into two, namely the reference beam and the object beam. The reference beam is aimed directly at the holographic surface. Meanwhile, the other beam, namely the object beam, is directed at the object and reflected towards the surface of the hologram [16]. Mixing the reference beam and object beam on the holographic surface can produce a reconstructed image that can be viewed on the side of the hologram that is not exposed to the beam or the opposite side of the surface that is exposed to the beam.

Animation which comes from the basic word to anime in the Indonesian-English dictionary means to animate. In general, animation is an animating activity, moving inanimate objects [5]. An inanimate object is given the drive, strength, passion and emotion to come alive or just seem alive. Actually, since ancient times, humans have tried to animate the motion of their animal images, as discovered by archaeologists in the Lascaux cave in Northern Spain, which is more than two hundred thousand years old [16]. They tried to capture the fast running movements of animals, such as wild boars, bison or horses, depicted with eight legs in different positions and stacked together.

METHOD

The system development method is a method used to develop a system, namely a standard process that is followed to carry out all the steps needed to analyze various processes. The multimedia development method used is the Multimedia Development Life Cycle method that has been developed. In the development of this system there are three stages, namely Pre Production, Production, Post Production. The selection of this system development method is in accordance with the needs of researchers.

In collecting data, there are 2 techniques, namely observation and interviews as research to observe, collect data to find problems in kindergarten. Researchers look for reference materials using literature study methods and documentation.

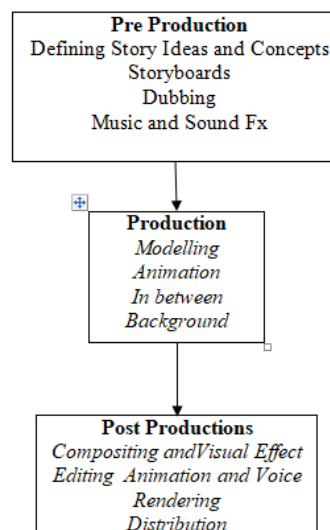


Figure 2, MDLC Model

The pre-production stage is the first stage that must be taken before entering the production process. This stage serves as the main foundation or guideline in making animation where the storyline is determined from this stage.

The following elements are in the pre-production stage:

- 1) Determine Story Ideas and Concepts
This element is the process of finding ideas and concepts to make videos with holographic techniques and 3D animation that will be made. Ideas must have features, advantages and uniqueness.
- 2) Storyboards
Storyboard is a series of sketches made in rectangular shape which depicts a sequence (storyline) of elements proposed for multimedia applications.
- 3) Dubbing
Voice over the characters in the animated video using Adobe Audition CS6.
- 4) Music and Sound Fx
In this stage the writer makes a sound recording that will be used as a voice actor in the animation. In this step the author uses Adobe Audition to get clear and quality sound recordings. Then the recorded file will be saved using the .mp3 file format to facilitate the next process.

Is the stage where the process of making this animation begins. The essence of making an animated video is at the production stage. In this stage there is some work that is done regularly. There are several stages of the production process, namely as follows.

- 1) Modeling
In this stage the author makes object modeling such as puppets and artifacts using the Autodesk 3DsMax 2014 application.
- 2) Animations
Animation is the process of making animation for models, animation can be in the form of movement, whether it's object/model movement or camera movement to create animation.
- 3) In between
In Between is a process in which an image connects the main image to another core image.
- 4) Coloring
The coloring process is made as attractive as possible so that the audience doesn't get bored with what they see.

The post-production stage is the final stage in making animation in the form of compositing, editing, rendering and testing processes.

- 1) Compositing and visual effects
This stage is the process of combining visual elements from different sources into a single unit, such as giving an illusion effect. Compositing is a video merging that has been rendered in the Adobe Premiere software.
- 2) Editing Animation and Voice
Editing, is the process of editing finished videos. Videos that consist of various video clips, in this process the videos are edited according to a predetermined storyboard, and then combined into one. Adjustments between videos and so that it is better and perfect.

3) Rendering

This process combines all the moving images from the last image frame, resulting in the appearance of all movements in the form of a video.

4) Distributions

Distribution is a process of distributing goods or services from producers to consumers, when and where the goods or services are needed. In an effort to achieve company goals and objectives in the field of marketing, each company carries out distribution activities. Distribution is the activity of delivering the product to the hands of the user or consumer at the right time. The distribution channel is a series of organizational participants that perform all the functions needed to convey the product of the research results to the institution under study.

RESULT & DISCUSSION

This hologram is a 3D animation video media for students with the aim of overcoming the problem of the teacher's difficulties in conveying material on the basic computer components, the school needs visualization media to explain material about basic computer components so that learning material is more effective. In addition, the existing learning media does not use today's information technology, only learning media in the form of paper containing written names of computer components, explanations and pictures. This is what makes the media tend to make students bored because the information written is too long so that the media is less effective and less innovative. Besides that, in the school practice room, the school does not yet have a computer that is in accordance with the material presented, so that it makes it difficult for students to remember the shapes and objects of abstract computer components.

1. Pre Production.

The concept of animation in the form of ideas from research becomes the basis for visualization. Ideas are ideas or thoughts that underlie the formation of the story in the video. This research is to make an animated video using the 3D hologram technique as an information medium.

In this stage the writer makes a sound recording that will be used as a voice actor in the animation. In this step the author uses adobe audition to get the sound recording results clear and good quality. Then the recorded file will be saved using the mp3 file format to facilitate the next process.



Figure 3. Sound capture and editing process

In figure 3 is the sound editing or dubbing process that will be applied to video editing in Adobe Premiere CS6.

2. Production.

In the process of modeling the objects created apply the polygonal modeling technique. Character modeling using low poly. In figure 4 modeling the body with the tools convert, namely by right-clicking on the object and then selecting convert to select convert to editable poly. The editable poly menu consists of vertex, edge, border, polygon, element. On the menu are polygon objects, a group of polygons with a minimum of three points or vertices of each polygon.

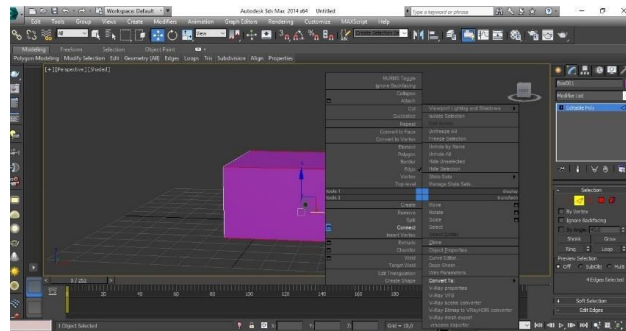


Figure 4, Modeling with polygonal technique.

After doing editable poly, then applying the polygonal modeling technique with edge tools, edges are links between vertex points to other vertex points. Click connect to determine how many edges are needed. Vertex processing results, the box has an edge between the vertices. Then the tool box applies polygonal modeling techniques with polygon tools that function to determine between a series of vertices, edges and faces.

Object modeling In Figure 5 below is the result of the formation of an object which was started by using a box. Forming the character using lowpoly. after duplicating parts of the wall to the roof of the carriage to the sides until they are aligned then combine them by using object groups. Then add the bottom of the carriage by providing a wide box as the back and providing storage barrels behind the carriage.

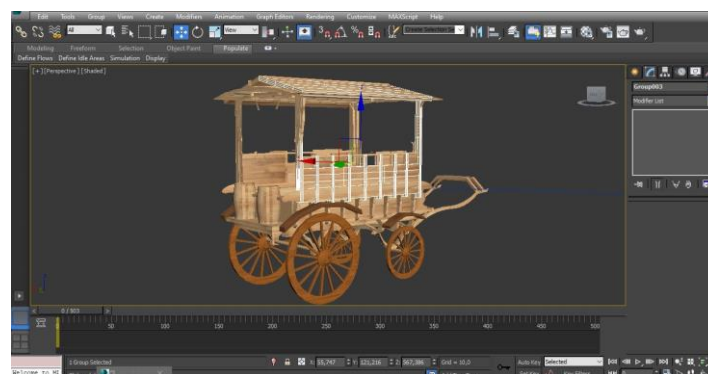


Figure 5, Result of Object Modeling

In this next stage, the three-dimensional model that has been created will be animated. Animation can be in the form of movement from object models or from the camera. The animation process is carried out according to the storyboard that has been made. Next is the process of moving the character which is called animation by selecting the auto key and setting the frame to save the movement when changing arms, legs, body, head and others.

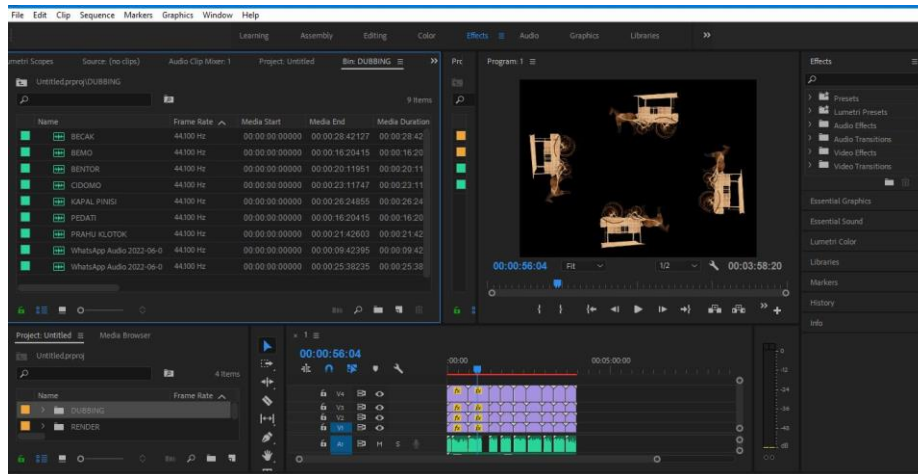


Figure 6, Progress in Between

3. Post Production.

This process is making an opening which will display the name, title and logo which will beautify the appearance of the animation.

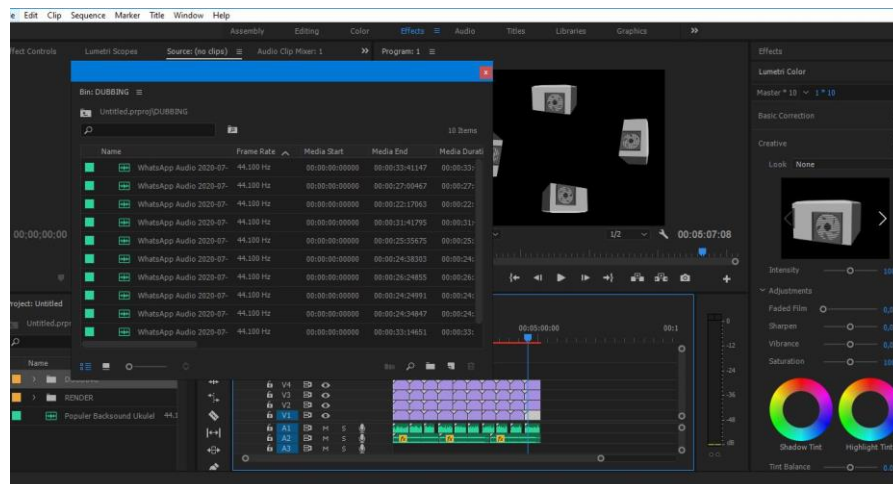


Figure 7. Compositing and Visual Effects Opening Process.

In figure 7 is the process of merging between the rendering results from 3Ds Max and the effects given in Adobe Premiere Cs6. At this stage, the final process is carried out, namely the unification of the entire making of 3D animation videos as a

spatial learning medium. In this process, video, audio and compositing will be combined into a complete animated video.

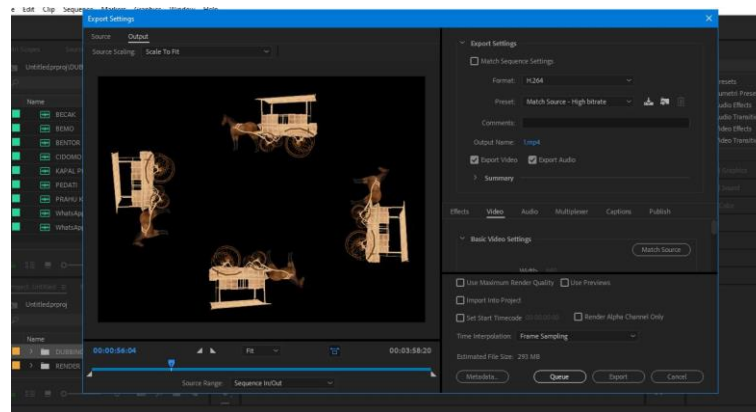


Figure 7. Rendering Process. In

Figure 7, namely the preview and final process which is the merging of all assets into a video in mp4 format.

CONCLUTIONS

Based on the discussion of the descriptions in the previous chapters, it can be concluded that, 1) It has succeeded in designing an Educational Video on Traditional Transportation Equipment for Diponegoro Wangon Kindergarten Students Using the 3D Hologram Technique which lasts 3 minutes 15 seconds. 2) Has helped make it easier for teachers to provide material about traditional means of transportation. The suggestions that the researcher wants to convey for the sustainable development stage are, 1) The use of visual media is suggested to use a black box and make a large acrylic size and use a 13 cm monitor screen so that the display results will be more magnificent and clearer. 2) In further research it is suggested to create or visualize modern means of transportation.

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