

Conference Paper

Augmented Reality Character Topeng Malang Dewi as an Effort to Improve the Quality of Student Learning Media

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Abstract

The preservation of the cultural and artistic heritage of our ancestors is important for us to persevere as a species. The purpose of this research was to introduce Indonesian culture, especially *Topeng Malang*, to the Indonesian society, particularly the teenagers, using 3D character media, implemented through augmented reality. The study followed the development research method of Borg WR and Gall MD. 3D characters were designed using the low poly subdivision surface technique, with a minimum number of poly but maintaining the detail of the character. Based on the results of the data analysis, the following essential points were obtained: (1) The character design of the *Topeng Malang* adopted the figures of *Dewi Sekartaji* and *Dewi Walangwati*. (2) The character design of the *Topeng Malang* character represented the posture, nature, and characteristics of the style. The result of this design was the implementation of 3-dimensional masks and character transformation in augmented reality media. Based on the results and the questionnaires used by the author to gather users' knowledge of the character shape of the augmented reality media of the mask, 49.3% of the responses were found to be very good and 46.4% good. These results certainly add to the positive values of utilizing the 3D character media as a medium to introduce *Wayang Topeng Malang*.

Keywords: *Topeng Malang*, 3D character model

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1. Introduction

Indonesia is a country consisting of various ethnic groups with its diverse culture. However, many cultural developments, especially traditional arts in Indonesia, are now threatened with extinction, with the increasing number of cultural values being abandoned, such as manners, being civilized, cultured, virtuous, and having a religious environment, fade with the development of the times (Handoyo, Kristiawan, Fadhly, Haq, Harijono, & Rakhmadani, 2010). As the name implies, Mask Dance or *Wayang Topeng*, is

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a performing art that uses masks as its main property. This *Wayang Topeng* is a drama dance telling the story of *Panji*. Javanese people often hear about the *Panji* story, even the *panji* story is well known to Southeast Asia, besides the Ramayana and Mahabharata stories (Manuaba, 2013). In addition, along with the times, technological developments develop rapidly. Especially in the development of the entertainment world. Today's filmmaking relies heavily on the use of CGI (Computer Generated Imagery). This is a technique used in the film industry to create fantasy scenes, such as in Marvel and DC superhero films. The technique they use here is to combine 3D modelling with video. Not only in the film industry, the game industry has experienced a significant increase in recent years. Improvements in computer performance and 3D modelling techniques and games in circulation today. Then, the development in AR (Augmented Reality) technology, where we can see 3D models in the real world using a cell phone camera. AR technology is commonly used in learning media and Mobile Games such as *Pokemon GO*.

Seeing the development of this technology, the need to preserve culture not to become extinct by times is a must. Therefore, renewal in the way we preserve culture is also needed, one of which is by digitizing the mask shape into a 3D model character. The creation of 3D characters from *Wayang Topeng Malangan* is to inform the millennial generation, who are closely related to the digital world and the internet, and have easy access or learn about their own culture, namely through this Digital Character.

To attract the interest of the millennial generation, deforming the *Wayang Topeng Malangan* into a human character is necessary. Deformation is a change in shape but does not leave the main element. Deformation of character forms can be an alternative in designing the shape of a character. The size of the large head, the size of the back and shoulders that are large and muscular, the size of the long hands, the neck, the short legs and many other deformations of character formation aimed at adding to the character's characteristic value (Didit, Denny and Nugrahardi, 2018). Deformation in this design is to embody the human character of *Wayang Topeng Malangan* in a 3D Model.

Later the augmented reality character *Topeng Malangan Dewi* will be used in AR applications. The use of mobile media in the visualization of Topeng Malang story is apt for education. This is accomplished through interactive media that produce movements by projecting a series of sequences of images drawn one by one to display motion actions on the screen (Müller & Seufert, 2018). The purpose of this design is to produce 3D Character model of *Dewi Sekartaji* and *Dewi Walangwati*. It is hoped that it can introduce more indigenous Indonesian cultures, especially the *Wayang Topeng Malangan*, to the Indonesian people, especially teenagers.

2. Literature Review

The design that will be carried out will later take from several relevant and related studies to be used as references and considerations in designing the mask. Some of the studies that will be used as reference material and design considerations are discussed in the following section.

Research on the semiotics of the *Malangan* Mask Puppet form conducted by Astrini, Amiuza & Handajani (2013). The research explains the relationship between the visual dimension and the function of visual works in forming the language of signs and meanings. The results are then expected to be generalized for similar works of art to serve as the basis for methods of transforming designs with local characteristics.

Next, the design of Prasetyanto & Hidayat (2014) entitled Analysis and Design of 3D Character Modelling and Game Background The Hero of *Majapahit* Using Subdivision Modelling & Digital Sculpting Method. In this design, they applied two methods, they are: Subdivision Modelling & Digital Sculpting in making 3D modelling of “The Hero of *Majapahit* Character and Background Game” which produces detailed and life-like characters.

There is also a design on AR by Pramono (2013) on Supporting Media for Learning Indonesian Traditional Houses Using Augmented Reality. This design provides an overview of how AR applications can help in learning. The design seeks to present an alternative application in visualizing traditional houses in the form of augmented reality (AR). The result of this research is the formation of an application as a supporting media for learning Indonesian traditional houses using augmented reality. From the literature above, it becomes the basis for making 3D characters from the Malang mask puppet, both in terms of its 3D character creation techniques, function, and meaning of the mask shape.

3. Method

This research is conducted following the model offered by Borg WR & Gall MD based on certain stages as described below.

Data collection is the first step in carrying out this development research. This stage is the collection of data from the *Wayang Topeng Malangan* character, as the basis for making the 3D character concept that the authors design in the augmented reality character mask of *Malang Dewl*. The data gathering was started by looking for references starting from books, journals, and news on the internet. Then a field review

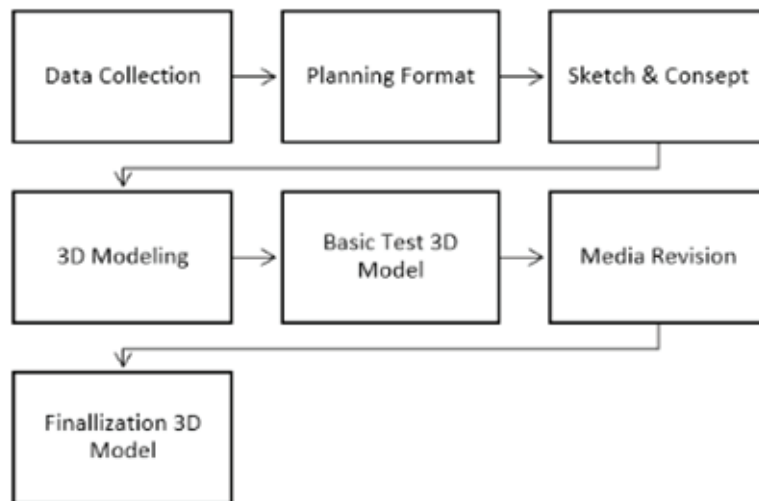


Figure 1: Research model.

is carried out to find data about the characters to be created. The things that are done in the field review include interviews and observations at the *Sanggar Seni Topeng Malang “Asmorobangun”*.

Format Planning phase is intended to establish media model development: planning the 3D character, filling out forms, and model selection. Sketch & concept phases concern with the stage of making a sketch and concept of the selected *Malangan Wayang Topeng* character. The designs of the characters take into account the culture and dress styles of the people at the time of the story with the consideration of the appropriateness of the current style of dress. This 3D Modelling stage is the process of making a 3D Model from Character *Dewi* from *Wayang Topeng Malang*. Basic Test 3D Model phase for this design include converting the three-dimensional model format, and the implementation of the model placement in the application. media Revision, an implementation of the design has been made. In the Revision Media, we evaluate the test results and make improvements. The finalization deals with mask character and design module.

4. Findings and Discussion

There are 76 kinds of Malang mask puppets which are then grouped into 2 categories, namely antagonists and protagonists. From the *Dewi* characters, 2 samples were taken. The two among them were *Dewi Sekartaji* and *Dewi Walangwati*. From the *Topeng Malang* data of the *Dewi* characters, as shown in Figure 2, the type of characters can be seen from the form of the characters' eyes, eyebrows, nose, mouth, mask colour,

and hat shape. The results of the data collection and character analysis stage of Topeng Malang are shown in table 1.

TABLE 1: The characters' analyses.

Character name	Characteristics of masks	Characteristics and traits
<i>Dewi Sekartaji</i>	Eye: <i>Liyepan</i> Nose: <i>Pangotan</i> Eyebrows: <i>Nanggal Sepisan</i> Mouth: <i>Jambe Sigar Setangkep</i>	Protagonist Characteristics: graceful, loyal, helpful, steadfast
<i>Dewi Walangwati</i>	Eye: <i>Liyepan</i> Nose: <i>Pangotan</i> Eyebrows: <i>Nanggal Sepisan</i> Mouth: <i>Jambe Sigar Setangkep</i>	Protagonist Characteristics: cheerful, helpful, kind

Based on the data collection, the shape of the mask does not necessarily represent the face shape of the Malang mask puppet character, but rather shows the characteristics of the character because that is why character deformation is needed in its manifestation into 3D characters. Deformation in this design is to embody the human character of *Wayang Topeng Malangan* in a 3D Model.



Figure 2: Topeng Malangan data.

At the 3D Modelling stage, the three dimension-model of Topeng Malang was carried out. The three-dimensional Topeng Malang design was based on the Topeng Malang data; 3-dimension modelling was done using the *Zbrush / blender* application. The process of three-dimensional models with shapes, colours, and textures was undertaken as carefully as possible, based on the available data.

The 3D modelling stage is the process of making a 3D Model of the *Wayang Topeng Malangan character*, which was first made in this process, namely Low Poly and Subdivision Surface. In this process, the first thing that is created is the Base Mesh or the main shape of the character to be created. UV Layout is the stage of sorting the

parts of the character's body so that they can be given texture later. High Poly Modelling aims to make details of the characters such as curves and wrinkles in the face shape that cannot be made during low poly modelling. Later the final High Poly model is used to create a normal map from the base mesh. This normal map is a texture containing the details of the High Poly model. Texturing is the process of giving texture to 3D objects. This process is also used to give the impression of the material of the accessories and clothes being worn.



Figure 3

5. Testing and Evaluation

This last stage is to combine all the textures and the base mesh that have been made into one character, which later this character can be used for AR visualization. Then the authors make a questionnaire that the authors distribute to the target audience, namely 15-24 years and people with the age range 25-51 years. This questionnaire will be used to find out what the public thinks about the 3D characters that the author has created and their views on this 3d character media. The targets in this questionnaire were between 30 and 50 participants.

The questionnaire that the author distributes uses the linear scale technique or commonly called the *Likert* scale. The *Likert* scale is a technique that is usually used to understand people's opinions/perceptions regarding the subject under study. by using a questionnaire or questionnaire to measure the phenomenon or research subject (Joshi et al., 2015). In the questionnaire that the author created, participants would be given a number 1-5 to choose from as the value of the suitability of the characters that the author made. In the questionnaire, there will be an image of the final 3D character result, and the process of how the 3D character is created.



Figure 4: Feedback results.

Based on the questionnaire that the author distributed, to about 50 people, about the 3D character of the *Topeng Malangan* that the author made, showed positive results. This questionnaire is used to find out how the public thinks about the 3D characters that the author has created and their views on this 3D character media. This questionnaire was distributed to people with an age range of 18 - 51 years, with an average of 55.6% of the latest education is D3 or S1, which then the rest are SMA, SMK, S2 and S3. The results of the feedback can be seen in Figure 4.

6. Conclusion and Suggestion

The results of research on the augmented reality character of *Topeng Malangan Dewi* have produced the visualization products conducted since the stage of analysis, concept, and implementation to the initial test phase. In these results it can be seen that 49.3% chose number 5 which is very good, then number 4, 46.4% and the remaining number 3, 4.3%. Based on these results, the author's 3d character design has received a positive response from the public.

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