



Designing a 3D Model of Batu Night Spectacular as an Asset, Animation Video, Learning Media, and Tourism Promotion

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ABSTRAK

Persaingan bisnis sektor pariwisata sangat bergantung pada kapasitas promosi kepada para calon wisatawan baik lokal maupun mancanegara. Penelitian ini bertujuan untuk mengembangkan rancangan 3D objek wisata Batu Night Spectacular (BNS) sebagai media promosi sekaligus media belajar. Penelitian ini menggunakan metode pengembangan dari Borg and Gall dengan modifikasi menjadi tiga tahap utama yakni pra-produksi, produksi, dan pascaproduksi. Proses pengembangannya meliputi observasi dan pengumpulan data, membuat sketsa unit dan pemodelan sketsa 3D, setting topologi 3D, material and texturing, detailing, polishing, item merger, lighting, composition, rendering dan uji coba produk dalam bentuk survei pengguna. Hasil penelitian ini berupa beberapa asset 3D yang telah dinilai layak standar mutu dan hasil survei pengguna yang menunjukkan kepuasan atau kelayakan yang tinggi. Dapat disimpulkan bahwa objek 3D BNS dapat digunakan sebagai media promosi objek wisata sekaligus media belajar bagi para siswa.

ABSTRACT

Business competition in the tourism sector depends on the capacity of promotion to potential local and foreign tourists. This study aims to develop a 3D design of the Batu Night Spectacular (BNS) tourist attraction as a promotional media and a learning medium. This research uses the development method from Borg and Gall with modifications into three main stages: pre-production, production, and post-production. The development processes involved observation and data collection, unit sketching and 3D sketch modeling, 3D topology settings, materials and texturing, detailing, polishing, item mergers, lighting, composition, rendering, and product testing in the form of user surveys. The results of this study are in the form of several 3D assets that were assessed worthy of quality standards and the consequences of user surveys that showed high satisfaction or feasibility. It can be concluded that the BNS 3D object can be used as promotional media for tourism objects and learning media for students.

INTRODUCTION

The COVID-19 pandemic has affected global and domestic supply chains, tax markets, and stable demand, adversely affecting key sectors such as shipping and travel. The impact of the COVID-19 pandemic strongly affects the travel price chain, small and medium-sized businesses in the travel sector, such as theme parks, and the inventive economy. After the outbreak caused a decrease in theme park visitors, three things happened because Indonesia was affected by the COVID-19 outbreak, especially the travel, swap, and investment sectors. Reducing the activities of the commonwealth to break the chain of the spread of pathogens causes considerable commercial casualties nationwide (Pakpahan, 2020). Therefore, advertising media is indispensable for better commercial stability in various sectors, according to which when publicity is an element of achievement in a friendly merchandising program, and a growing framework is needed to create efficient tactics to bypass the objectives.

Advertising media has a very prominent part in the lifespan of an educational tour. News advertising can be seen as a whole means or attempt to show a message or other information to be communicated through speakers, whether through print, computerized, or outdoor media, whose goal is to increase one's own knowledge and which is then foreseen into a behavioral shift towards the affirmative. Currently, there are various role models and ways of advertising media that can also be used for different benefits and uses, such as 2-dimensional animation, moving comics, droid-based 2D drama, 2D play, 2D animation as a supporting medium for health information education, learning activities, limited face-to-face, and travel capabilities (Berliansyah et al., 2021; Dayu et al., 2021; Qonita et al., 2022; Rahmatullah et al., 2020; Thifala et al., 2021) and it was used to simplify the delivery of information in times of pandemic.

Not only one and two spatial as previously researched, nowadays the use of 3D forms is widely used in various fields, one of which is the keyboard of the shape of objects on earth as well as the preservation of art. We ourselves must also have ways to maintain civilization, one of which is through the form of keyboarding into 3D model characters. As in the exploration related to 3D forms and it is an attempt at computerization of art that entered Indonesia (Eriza et al., 2021). Other additional explorations on the creation of 3D characters for the preservation of shadow puppets in the Anoman Obong story and the preservation of traditional melodic equipment (Rohman et al., 2022) such as bamboo melodic equipment in North Sulawesi which can take advantage of the 3D live cinema Bamboo Music Studio (Nari et al., 2014) which is foreseen as the first step is to support the younger generation to love and participate in maintaining Indonesia's artistic heritage along with the development of high technology.

The advertising item model in the form of an attractive, unique, and futuristic 3D model or asset design will be able to improve the quality and the final result of a (Pramono, 2019) third spatial work is a form of providing interesting information. 3D items can be viewed in several ways so that in the tourism business, visitors can understand information visually. It becomes even more interesting because the combination of text and 3D role models provides more information. Through animation and 3D shapes, it is hoped that end users who see advertising media are more familiar with the attractiveness of the fields in it. 3D shaping is a combination of shaping and vision procedures. The visualization style generates data that can be realized better by paying attention to information technology (Puspasari et al., 2021). The 3D model is too foreseen to make the end user who sees it better understand what is being interpreted or displayed. This is as revealed by Pratama et al. (2020) in their exploration, especially the Development of Bali Island tourism animation as a medium for tourist publicity which then is applied as an advertising medium for the tourism sector that displays information of various tourist attractions in Bali in a duration of 3 minutes 20 seconds (Pratama et al., 2020).

The development of industry in Indonesia has been very wide until now, which can be seen from the variety of products made by the company, but the obstacle is the level of competition will increase, therefore one of the elements that stands out is merchandising or vice versa the sales department, especially to run a direct sales system, many companies run a sales system through show events to increase their trade products. Therefore, the exploration led to helping design a 3D Night Spectacular (BNS) model of Batu as a travel and advertising property (Blessilla et al., 2021).

Advertising campaigns with visual 3D hi tech items can be more interesting and innovative thus making WOM communication (oral communication) that promotes clients to provide client satisfaction experiences to provide advice for Batu Night Spectacular (BNS) amusement park to their colleagues. The main advantage of 3D is that the visualization of items sounds more actual and closer to its initial form (Patria & Pramono, 2022). 3D Shaping (3D) is the experiment of creating a 3D representation of any background or item by managing pentagons, edges, and apexes in a 3D simulated space. 3D shaping can be done manually with an amazing 3D device that allows architects to create by searching for real-world items in a series of data points that can be used to digitally describe items. Based on the results of the analysis of the previous research, it can be explained that this research contributes to developing BNS 3D objects as a promotional medium for the digital era as well as an alternative to student learning media. Thus, the purpose of this study is to produce 3D BNS media as objects and assets of promotional media and learning resources for students.

METHOD

According to Borg & Gall (1989), the procedure to develop products in research and development (R&D) is two, namely: (1) developing the product and (2) testing its effectiveness. The development model refers to a guide of stages systematically arranged that functions as a reference for the researcher to undergo a study to make the designed product feasible. In this case, it is a reference to the product development procedure. In learning technology, there are considerable descriptions of the procedures and steps of such development research (Borg & Gall, 1989). This study adapted the model by Borg & Gall (1989), which is elaborated as follows. Data collection (pre-production) is the first step in carrying out research on the design of this 3D Batu Night Spectacular model. This stage is carried out by collecting data through the search for design references through websites, articles and so on (Novica & Hidayat, 2018). Then, continuing the 3D sketching process was the design stage in the form of blocking 3D objects based on reference plans designed to make it easier for us to adjust the scale and proportions of buildings that can be modeled. Product design in the research of designing a 3D Batu Night Spectacular model as an asset, animation video, learning media and tourism promotion at Batu night Spectacular (BNS) located on Jl. Raya Oro-Oro Ombo, Batu District, Malang Regency, East Java, Indonesia.

After sketching the 3D design of BNS, modeling each object with no texture was carried out. Modeling (production) was done using software with low-poly modeling techniques that seem simple and not detailed. Then, the stage that was carried out was adjusting the topology of the object. Topology refers to the structure or arrangement of polygons on a surface. Topology accuracy greatly affects the ease of texture with UV maps. The next step was coloring the objects based on the original color reference of each object in detail to make it look realistic. When performing the detailing and polishing steps, it is necessary to pay attention to every detail of each object from BNS that made the 3D product look alive and real such as the shape, texture, and size of the object. The next step was the collection of elements of the object, arranging the model, texture, shadows, dimensions, and effects to produce an integrated visual image (Wardhana, 2013).

The last stage of the production section in designing this BNS 3D animation video was *the camera movement in blender*. Video camera movement techniques are actually useful for creating theatrical effects in videos/moving images. For theatrical effects, the movement of the camera causes the video more dynamic, but it can also be used to focus the crowd's attention on a specific item. The simple steps of the *camera movement in blender* are elaborated as follows. The first step to moving a regular video camera is to make use of *zooming*. The next step is *Dolly (Track)*. This step makes it possible to shoot near or out of the subject by advancing the video camera on a tripod or *dolly*. Then, in order to get the effect of turning left and right on BNS 3D videos, the next step is *Panning*. The next step, *crabbing*, allows the video camera to move sideways or vice versa, rolling parallel to the moving subject. The next steps used were *Arc* and *Follow*. *Arc* is the movement of a rotating video camera against an object from left to right or vice versa, while *Follow* is the movement of a video camera that tracks a shifting object which can be *pan*, *tilt*,

ped, or others. After the texture was created, it needed a little final touch, namely the rendering stage, then the preparation of some image rendering results to be previewed. Then, the basic testing stage of the 3D model for this design was conducted including the conversion of 3D model formats, 3D animated mini clips and the implementation of model placement on posters, media revisions, and implementation of the design that has been made. In the revision media, researchers evaluated the test results and made improvements. The finalization included the overall 3D model of BNS. Overall processes of the design flow are visualized at Figure 1.

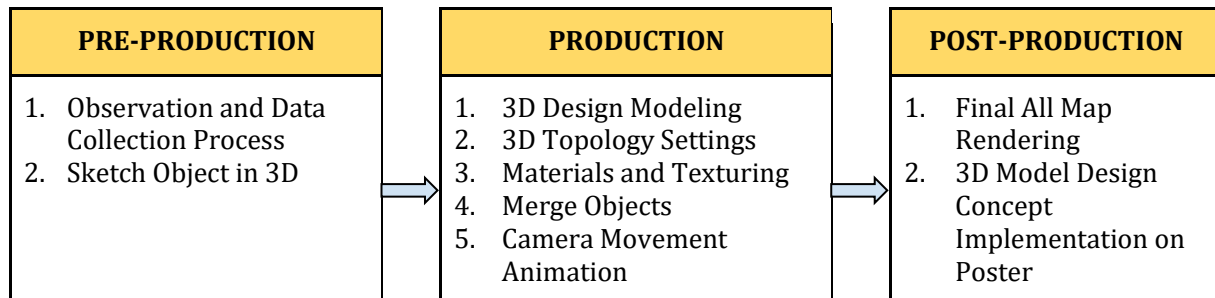


Figure 1. Batu night spectacular 3D object design flow

The researchers conducted tests after the final rendering of all maps on 100 randomly selected respondents during a visit to Batu Night Spectacular (BNS). Then, the researchers distributed a questionnaire containing the indicators below online via google forms to the 100 respondents. Table 1 and Table 2 are the measured indicators and questionnaire processing scale with T = Total respondents who voted and Pn means Choice of Likert score numbers.

Table 1. Measured indicators

No	Indicators
1	Visually appealing 3D modelling
2	Original color selection of all rides and facilities at BNS
3	Interesting 3D modelling promotional video
4	3D modelling video enhances travellers' appeal to BNS

Table 2. Questionnaire processing

Answer Scale	T	Pn	Result (T x Pn)
STS	0	1	0
TS	0	2	0
CS	112	3	336
S	68	4	272
SS	220	5	1100


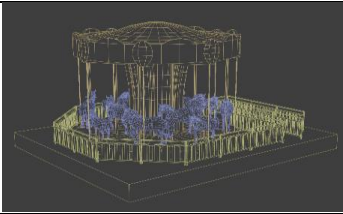

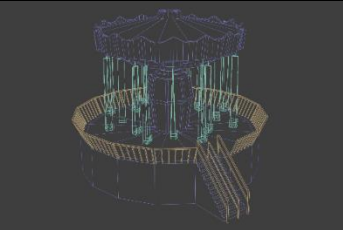

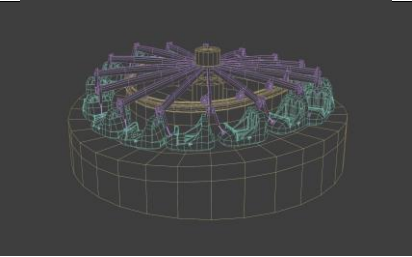
RESULT

There were 28 types of *3D Batu Night Spectacular* (BNS) models that have been created and then grouped into 3 categories, namely rides, environment, and building. The results of the data collection stage and the 3D sketch model BNS are shown in Table 3. At the stage of 3D modeling, a three-dimensional model of BNS was designed. It was based on the BNS data. The 3-dimensional modeling was performed using the application of a blender. All the process was carefully performed by looking at the available data, including the creation of the shapes, colors, and textures. Figure 2 are the results of BNS's 3D modeling design. The 3D modeling stage refers to the process of making 3D models of BNS which were first made in this process, namely low poly and subdivision surface. In this process, the first step was creating the base mesh of the main shape of the character to create. UV Layout is the stage of sorting the parts of the character so that later they can be textured. High poly modeling was used to create character details such as indentations and other details on BNS 3-dimensional objects that could not be created during low poly modeling. Then, high poly was also used to create a normal map from the base mesh. Normal map is a texture that contains the details of a high poly model.

As the name suggests, texturing is the process of texturing a 3-dimensional object. This process was also used to give the original object a real and natural impression on each type of BNS 3-dimensional model. The texture function of the blender is to provide detail to each object in the blender application. Texture itself is a surface of objects, such as the surface of the ground, brick walls, and the like. However, the plain surface of 3D objects makes 3D products tend to be less attractive and rigid. To make objects more vivid, a texture mapping is needed. Mapping is a form of activity to color or map geometric surfaces on 3D objects. Meanwhile, giving color to every 3D object is called a material. Materials are basically shaders or surface characteristics of objects, be it slippery, rough, transparent, perverted, and so on (Figure 3 and Figure 4).

Lighting is the process of creating and applying light to a 3D model so that a realistic visual impression is obtained because there is a sense of depth of field and shadow of the object. Without lighting, this BNS 3D object becomes unattractive and unrealistic. Therefore, the lighting and compositing stages were carried out to provide a *sunlight (directional light)* effect such as sunlight. The way this lamp gives light to all objects is from one direction only and the distribution of light depends on the rotation of the lamp alone; its position does not affect the direction of the light. Here are the results of the *lighting* and *compositing* (see Figure 5).

Table 3. 3D modeling of batu night spectacular (BNS) sketch

No	Reference	Sketch	Asset Name	Information
1			Merry go round	Rides owned by BNS
2			Flying swinger	Rides owned by BNS
3			Matterhorn	Rides owned by BNS

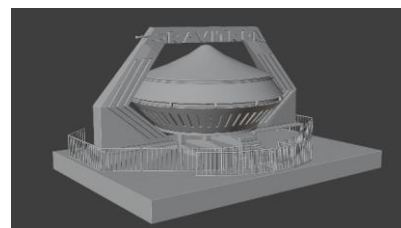
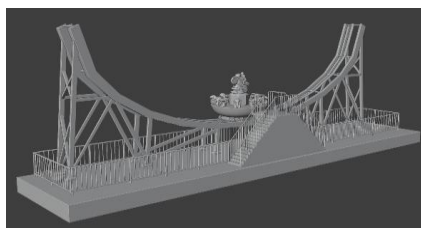


Figure 2. 3D Design modeling on bns rides on mega disco (left) and on gavatron (right)

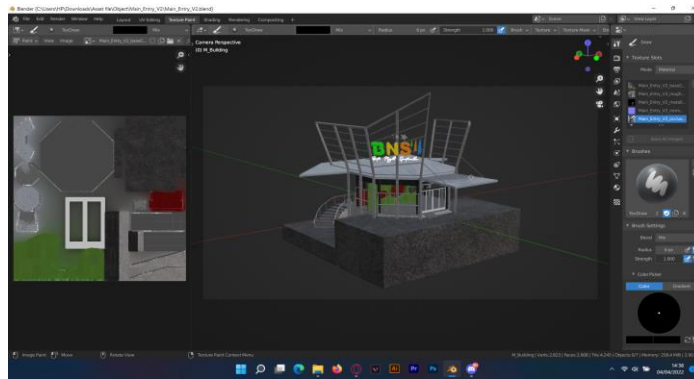


Figure 3. 3D model with material and texture

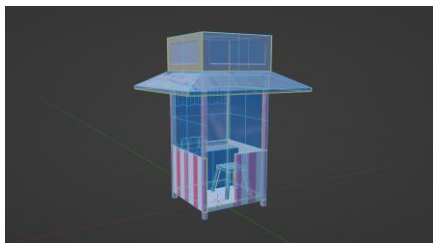


Figure 4. Detailing and polishing on a 3D model BNS ticket box

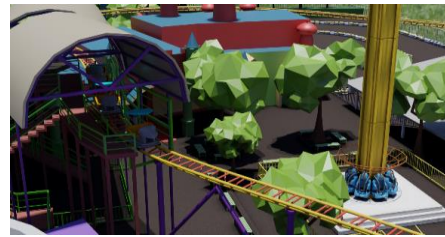


Figure 5. Lighting and compositing on BNS track rides (left) and on BNS train rides (right)



Figure 6. Implementation of 3D model on BNS poster media

Figure 6 shows some of the results of the implementation of 3D Modeling on posters as supporting media that have been made. For the testing and evaluation stages, the researchers conducted surveys and interviews on random respondents. First, the researcher asked BNS: whether 3-dimensional poster media has ever been made, the source said it has not. After making the aforementioned 3-dimensional poster, the response from BNS was positive; they were incredibly happy and grateful because the 3-dimensional results made were quite good and interesting. In addition, the results of the study triggered a conversation with the people of Batu City and the results obtained were possible, the public knew that there was an advertising video for the *Batu Night Spectacular* (BNS) night amusement park which was packaged ineffectively and may not be exhibited in its entirety from the existing rides in a short time and the average video was wrong, so the people of Batu City faltered to see the video.

Table 4. Results of respondents' statements

No	Statement	STS	TS	CS	S	SS	Sum
1	Visually appealing 3D modelling	0	0	24	18	58	100
2	Original color selection of all rides and facilities at BNS	0	0	27	21	52	100
3	Interesting 3D modelling promotional video	0	0	25	19	56	100
4	3D modelling video enhances travellers' appeal to BNS	0	0	36	10	54	100
Total		0	0	112	68	220	400

Based on the [table 4](#), no respondents answered Strongly Disagree (STS) or Disapprove (TS). Then, respondents who answered Strongly Agree (CS) totaled 112, Agree (S) totaled 68, and Strongly Agree (SS) totaled 220. The total number of incoming answers was 400 out of 100 respondents. From the results of the questionnaire processing in Table 2, the total calculation is $0+0+336+272+1.100 = 1.708$.

$$\begin{aligned}
 \text{Rumus Index \%} &= \frac{\text{Total Skor}}{y} \times 100 & (1) \\
 &= \frac{1708}{2000} \times 100 \\
 &= 85,4\%
 \end{aligned}$$

This 3D Modelling survey was carried out only as a supporting material. The 3D shape investigation via google form taken by 100 respondents who were 15-55 years old inhabited the urban area of Batu and its surroundings resulted in the following data: 85.4% being on a very agree interval scale, which means that respondents agreed that the 3D video modeling was interesting in the color selection as well as video visuals and could be used as an effort to increase tourist attraction for Batu Night Spectacular (BNS) and could be used as a travel and publicity asset. Meanwhile, some respondents who were still in school watched examples of BNS 3D animation videos and thought that it would be nice if the 3D animation could be used as a learning medium to explain an event systematically or sequentially and in detail every time changes and made abstract or elusive learning materials more interesting and concrete. However, this application will depend on the ability of educators or teachers to create 3D animation media. Plus, this 3-dimensional design requires a fairly high budget.

DISCUSSION

In 3D shaping ad videos, 31% are excellent, while 58% are decent; in the application of 3D prints on plaques, 59% of respondents rate excellent, while 26% feasible. 3D shaping increases the interest of tourists of Batu Night Spectacular (BNS). 41% of respondents thought it was fine and 49% were friendly. Based on these results, it can be interpreted that the 3D shape of Batu Night Spectacular (BNS) received positive responses and was quite an effort to increase the interest of tourists of Batu Night Spectacular (BNS) and can be used as a travel and publicity asset. The use of computerized information in the creation of information dissemination media is possible to create 3D models of traveler attractions. The 3D model provides information to potential guests about the state of affairs as well as the facilities in the tourist attractions. The shape and state of the travel zone can be clearly seen in the 3D model. The information is useful for potential guests to prepare for the trip. Future guests who get the situation of the tourist attractions are persuaded to visit these tourist attractions. There were interesting things related to visual styles where children and adolescents prefer realist-imaginative drawing styles for visual characters and compositions (Sutrisno, 2021). This can be used as a comparison reference in making model designs in this study. The comparison to this design in the form of a 3D model used in the exploration is *Batu night Spectacular* (BNS) which is located on Jl. Raya Oro-Oro Ombo, Batu District, Malang Regency, Indonesia. The tourist attraction is under PT. Jatim Park Group and was built in such a way to become the most visited and certainly the grandest tourist attraction in Batu and its surroundings. There with a bell on go on many drives as well as different types of drives that can make tourists who visit happy to enjoy the whole pleasant offer.

The dissemination of information and knowledge can be done using social media, websites, and other internet media (Puspasari et al., 2019). All people are relatively familiar with social media on the internet and are very proficient in their application. This is in line with research in conveying information as a learning medium and promotion of BNS. Similarly, the research of Novica et al. conveyed the importance of improving the visualization of 3D models to increase knowledge and sense of interest by the next generation (Novica et al., 2020). This is the main capital in aligning goals with this research to make elements of learning and promotional media, especially of BNS.

The same exploration has been carried out by previous scientists such as Ananraytama et al. who utilized the 3D graphics feature in the *virtual round-trip* application as a medium to support the Qubu Resort trip (Ananraytama et al., 2018). The research used the MDLC (interactive media development wheel of life) interactive media application development method which consists of 6 stages, namely understanding, design, material collection, collection, inspection, and division. The virtual round trip involved in the study showed images of scenery with 360-degree dots compounded by 180 degrees, while the 3D construction was useful for illustrating the positional design of Qubu Resort. The difference between such exploration and the exploration that scientists might make is the possibility that this exploration concentrates on a virtual cruise application with 3D graphics features installed on the website. The downside is the possibility that when potential visitors access the Website on various desktop computers as well as mobile-based search engines, there is interference on the side consisting of a blueprint of 3D positions as well as a virtual journey when reached via mobile so that applications are possible to be improved in case that is achieved implementing a PC-based search engine. Meanwhile, the research carried out was a 3D model that can be used online or offline as it is not website-based and can be accessed or viewed by everyone through a shared link (Bintarto et al., 2020; Fadya & Sari, 2018; Putri et al., 2014; Tamara et al., 2022; Ulfa & Batoh, 2019).

Pirmansyah's (2021) reports the research survey on 3D statue model research includes several comparisons of the use of surveys so that it can analyze the specific surveys that exist, especially the topic and the number of different questions (Pirmansyah & Pramono, 2021). This allows us process several parts simultaneously together. The different outputs make several components of the survey also different from that of this study. The scope of this survey has a topic of discussion that is not the same as the author. Pramono (2021) reported research related to the puppet-shaped 3D model, several comparisons can also be made. In this study, surveys and trials were carried out, but in the author's research, it was only in the form of a survey. Related to this, because the shape of the 3D object is not the same, the survey components are different. Meanwhile, in this design, a survey of 100 people was also carried out which was obtained by distributing *google forms* to the wider community. In the survey process, the author provided them with a link. The link was in the form of a google form link and a link by the author. Furthermore, the data obtained were then analyzed by the author in order to get accurate results.

The researchers directly participated in the study and proposed that some limitations were evident to be taken into consideration by future researchers who share similar interests. They are but not limited to: (1) the number of respondents, which was only 100 people, which undoubtedly, is insufficient to describe the actual situation; (2) the challenge resulted from the respondents' attitude where at times when filling in the questionnaires, they did not show the honest opinion, of which cause were differences in thoughts, assumptions, and understandings of each respondent, as well as other factors such as honesty in filling out respondents' opinions in their questionnaires; and (3) the research objects made were not quite detailed and were only focused on 3D models as promotional assets and learning media.

CONCLUSION

The development of 3D forms Batu Night Spectacular (BNS), which was an effort to increase tourist's interest to visit and can function as a tourist attraction as well as advertisement, underwent pre-manufacturing, manufacturing, and post-manufacturing phases. The main media is in the form of 3D-shape plaques and 3D-shape animation videos with a duration of 01:21, which were then divided into 3-part videos of 30 minutes, 21 minutes, and 30 minutes. Furthermore,

each of them was then broadcasted through the BNS Instagram account. The production of the 3D forming BNS experienced several obstacles. First, as the manufacture was conducted independently and not in a team, the work produced has a limited level of quality. The second is the lack of insight into the components of the 3D form from other designers, which could have improved the result of the design of the work. For subsequent researchers, it is advisable to take more samples for a higher accuracy of the data and create another 3-dimensional model that has not been made yet in this study.

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