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INNOVATION OF CREATED SOUVENIRS FROM DAN KWIAN POTTERY WISDOM TO ACKNOWLEDGE THE LOCAL YOUTH

Kriangkrai Duangkhachon

Nakhon Ratchasima Rajabhat University, Thailand

Corresponding author:
Kriangkrai Duangkhachon
kriangkrai.d@nrru.ac.th

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ABSTRACT

This research aimed to apply the knowledge from the original wisdom to the innovation and technology to develop community products to be contemporary. The objectives were to create the work from the history of Dan Kwian pottery clay and create souvenirs from the clay sculptures of Dan Kwian using the innovation of prototyping from 3D printing through the ceramics process along with packaging design. The research also aimed to convey the knowledge to the youth in community through the creation of souvenirs from clay sculptures for sale. The results of the research indicated that the clay sculpture of Dan Kwian pottery had many forms of various type of animals, including clay sculptures of realistic owl, fish flicking tail, eagles and turtles. The sculptor's productions were from various animal sculptures according to their expertise. The next processes were to take a snapshot by photographing the workaround; write it in 3D form using the Z-Brush computer program; and print it with 3D printer using PLA filament plastic lines to brief the prototype of the clay pottery souvenirs. Then, a plaster mold for slip casting of Dan Kwian was produced. The experiment of the clay body using raw materials including Dan Kwian clay, construction sand, and Kaolin was created a triangle table to find the ratio of all 36 formulas, and baked at 900 and 1,200 degrees Celsius. It was found that the clay body formula was 23 (60% of Dan Kwian clay, 20% of construction sand and Lampang Kaolin). It was casted quickly and could be removed as well. It was suitable to be chosen as a formula for creating souvenirs. The packaging design was a graphic design that relates to the product, and was inspired by color schemes related to pottery including clay, water, and fire to make the patterns interesting, attached with product information.

Keywords: Innovative; souvenirs; Dan Kwian pottery; local youth

1. INTRODUCTION

Handicrafts and craftsmanship in many fields are deeply rooted in the Thai spirit. In the past, many people viewed it as far-reaching overlooked to learn because it was difficult to find in-depth resources. Since traditional handicrafts are a culture of locality, the expertise in each area is different (Sappsri, 1996). This can be seen from "Dan Kwian Pottery" where household goods such as jars, tubs, mortars, and fish-preserving jars

have been made (Chantari, 1999). The shape of the workpiece is mainly created to meet the utility's needs, which is a simple and minimal decoration (Phuangphong, 1994). The molding will be formed by Phamon and further expanded into various shapes through decorated by applying geometric shapes to make the workpiece contemporary (Waewlaihong, 1996). The process is performed by scraping the pattern, stenciling, and molding to create a unique identity of the animal, such as owls, peacocks, turtles, and fish flicking tail. Through the application of the expertise and experience of the clay potter of Dan Kwian village, it is recognized and widely popular in the past with the unique form of molding and the color of the local clay (Khakpeng, 1995).

Nowadays, with the changing trend, Dan Kwian pottery is different from the past and has a variety of styles, patterns, as well as the decorating processes. The use of oil paints, watercolors and spray coatings in the decoration creates the unique characteristics of the Dan Kwian pottery to be different from the past.

For the above reasons, the researcher wishes to restore the unique handmade skills and knowledge of the Dan Kwian potters. The aim of this research is to create a small souvenir product by minimizing the Dan Kwian pottery prototype with the innovation of prototyping from 3D printing and ceramics. After that, the knowledge will be transferred to the youth in the community to see the creation and value of the current potteries, to inspire the local youth to bring the knowledge to be the next generation of potters. The creation of souvenir products from the prototype of 3D Printing as pottery and packaging design will convey stories of the potter (Thakhonson, 2004) and the source of souvenirs which provide value added for the product (Wanitchakorn, 2012).

2. MATERIALS AND METHODS

2.1 Study the history of the animal sculptures in Dan Kwian village, including the origin of the creation of the work as knowledge and the masterwork collecting

The first process is to study the context by using in-depth interviews to analyze the current Terracotta Sculpture Ceramics, the history of creative terracotta sculptures, animal forms, concepts, and creative techniques of each individual conveying uniqueness from the past to present and collecting the data in order to create souvenirs and packaging.

Mr. Mian Sing-Talay, a real owl sculptor who makes beautiful and lifelike animal, began as a potter since elementary school around 1975 with the molding of households such as jars, basins, and developed into home and garden decorations by expanding the shape of objects molded with a handwheel. The products look like a jar was molded, decorated and added the face to shape an owl. Then, it was transformed into an owl-lamp in a realistic style which has beautiful style, proportional face and shape, as well as unique details as shown in Figure 1 and Figure 2.

Figure 1: A Real Owl Terracotta Sculpture

Figure 2: Mr. Mian Sing-Talay, Artist

Mr. Man Singh-Talay, a sculptor of the fish with its flicking tail, began to create works from Phamon or the handwheel throwing to make household items such as jars, pots, and vases. Later, it has developed into various animal sculptures by studying from the senior sculptor named Sam-ruay as a model. It will develop from the shape of a jar or a vase to mold to create a fish shape, focusing on details like real fish with a style that moves to the tail-flick fish that is similar to carp. Therefore, it is a unique work of Baan-Pla shop as in Figure 3 and Figure 4.

Figure 3: The Fish with a Tail-Flick Terracotta Sculpture

Figure 4: Mr. Man Singh-Talay, Artist

Mr. Chaluai Plok-Kratok, Eagle Terracotta Sculpture Artist, became a potter since an elementary school. He gained experience from sitting in pottery, which was located on the banks of the Moon River, also known as Kud, which was the source of clay, water, and kiln obtained from local digging. This process is conducted by making the sculpture into works that emphasizes on usability such as field lamps, pots, lotus basins or the work that the customer desires with the skills and expertise that have been holding for over 36 years as in Figure 5 and Figure 6.

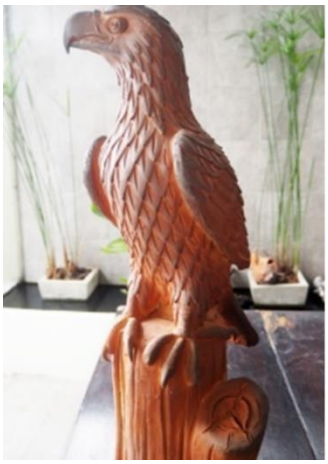

Figure 5: Eagle Terracotta Sculpture Artist

Figure 6: Mr. Chaluai Plok-Kratok, Artist

Mr. Fak Thang-Krathok, a turtle sculpture artist, started making pottery for about 20 years. He inherited the pattern from a family that had been a terracotta profession since childhood. The pattern of molding works will be observed from nature and makes the mold unique. The techniques are performed by using your ideas, thinking about what you think, molding it like that; and studying from various things that have been seen and applied as in Figure 7 and Figure 8.

Figure 7: A Turtle Terracotta Sculpture

Figure 8: Mr. Fak Thang-Krathok, Artist

Mr. Samai Rodklang and Mrs. Anong Rodklang created a sleepy owl sculpture. The sculpture of a unique owl sculpture began with the shape of a basket and the imagination of the lamp. The artists drew it onto paper before making the actual work. It started as an owl with its unique name “sleepy owl eyes” in 1989, in which at 3-4 drafts and patterns was created according to the satisfaction of customers. The product has been in this form continuously as in Figure 9 and Figure 10.

Figure 9: A Sleepy Owl of Terracotta Sculpture

Figure 10: Mr. Samai Rodklang and Mrs. Anong Rodklang, Artists

2.2 Create souvenirs from miniature sculptures of animal sculptures from Dan Kwian pottery with model innovation from 3D printing and ceramics processes.

The second process is taking pictures of the whole sculptures and write into a 3D image by the Z-Brush computer program. It is a digital sculpture program using the principles of creating three-dimensional models, creating textures, drawing digital images using "Pixol" technology and saving the data as an OBJ file. It is a standard 3D image format that can be exported and accessed by various 3D image editing programs. The picture shows the creation of a prototype of a clay sculpture with a computer program as shown in Figure 11.

Then the product is converted from the 3D file into a G-code file using CURA Software. The G-code file is derived from the word "Geometric Code". It is the language for commanding the machine to move to the desired location. It is the language that is used with the 3D printer. As the picture shows, the process is to convert obj files to G-code files with the CURA program to be printed in the 3D Printer as shown in Figure 12-13.

It begins from creating a prototype and dividing the mold on each side, then blocking the mold and pouring the plaster to make the mold on each side until covering the workpiece, with the required drainage holes for pouring clay slip as shown in Figure 14-15.

2.3 The process of clay preparation of Dan Kwian slip casting by experimenting with the ingredients by using 36 formulas according to the triangle table.

The experiment of slip casting content by using local raw materials, Dan Kwian clay, construction sand, and Kaolin clay was carried out by using a triangle table to find the proportion of slip casting and firing at 900°C and 1,200°C to get the ratio of 36 formulas as in Figure 16.

All 36 samples were tested for clay shrinkage and moldability. Was carried out to see the color of the clay materials after firing at both temperatures as shown in Figure 17 and Figure 18.

Slip casting is a liquidized slip that is viscous and well flowing (Engsiriwat, 1998), prepared from Dan Kwian clay, construction sand, and Kaolin clay by stirring with water and chemicals (deflocculant: to help the clay to spread well). Blender agitator at high speed with an electric drill until the clay is mixed with homogeneous water into a muddy water with good flowing fluidity and density of slip as specified. Once the mold has been obtained, taken it to dry, then, it will be used by pouring clay slip into a plaster mold. With the property of plaster, the clay will absorb water causing layer which will gradually dry up as shown in Figure 19. When the desired thickness of the workpiece is obtained, the clay slip will be poured out and then the mold will be overturned to prevent the formation of water droplets. By this method, the work is left to air dry. Then, it will be flipped back up to remove the mold to get the desired product. This will get the finished product that is similar to the desired image as in Figure 20. Finally, the work is hardened and finished decorating before imported into a gas-fired kiln at 900°C as shown in Figure 21.

Figure 11: The Creation of a Prototype of a Clay Sculpture with a Computer Program

Figure 12-13: Miniature Prototype of Animal Sculpture, Dan Kwian Pottery by 3D Printer with PLA Filament

Figure 14-15: The Process of Making a Plaster Mold from a Miniature Prototype of a Clay Sculpture with a 3D Printer

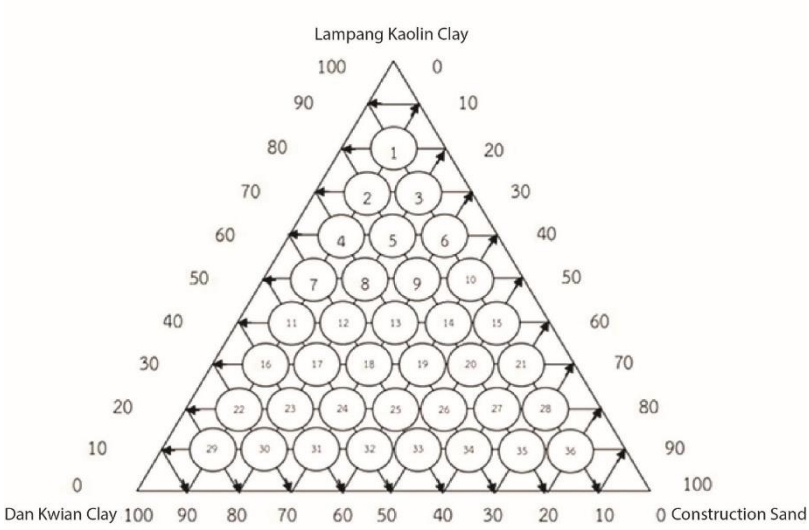

Figure 16: Triangle Table to Find the Proportion of 36 Clay Formulas with Raw Materials in the Experiment Consisting of Dan Kwian Clay, Construction Sand, and Lampang Kaolin Clay

Figure 17: All 36 Specimens Tested After Firing at 900°C

Figure 18: All 36 Specimens Tested after Firing at 1,200°C

Figure 19: Pouring Slurry into Cast Plaster Molds in the Form of a Souvenir Molded

Figure 20: The Process of Removing the Casting Clay from the Plaster Mold Before Getting the Souvenir Product as Desired

Figure 21: Finishing the Workpiece Before Firing in a Gas Kiln at 900°C

3. RESULTS AND DISCUSSION

The experiment focuses on using local raw materials, Dan Kwian clay, construction sand, and Kaolin.

Table 1: Mixing Ratio and Experimental Results of Dan Kwian Slip, Slip Casting Test, Firing Shrinkage and Color After Fired at Temperature 900 and 1,200°C

Formula	Ratio between Dan Kwian clay: Kaolin clay: sand	Slip casting test	Firing shrinkage		Colors	
			900	1,200	900	1,200
1	10:80:10	Appropriate / Can be molded, Unbreakable, Mold removable	3%	12%	White	Cream
2	20:70:10	Appropriate / Can be molded, Unbreakable, Mold removable	5%	11%	White	Cream
3	10:70:20	Appropriate / Can be molded, Unbreakable, Mold removable	5%	15%	White	Cream
4	30:60:10	Appropriate / Can be molded, Unbreakable, Mold removable	5%	15%	White	Cream
5	20:60:20	Appropriate / Can be molded, Unbreakable, Mold removable	5%	11%	White	Cream
6	10:60:30	Appropriate / Can be molded, Unbreakable, Mold removable	2%	9%	White	Cream
7	40:50:10	Inappropriate/There was a crack	8%	15%	Cream	Orange
8	30:50:20	Appropriate / Can be molded, Unbreakable, Mold removable	7%	13%	Cream	Light orange
9	20:50:30	Appropriate / Can be molded, Unbreakable, Mold removable	3%	10%	Cream	Light orange
10	10:50:40	Appropriate / Can be molded, Unbreakable, Mold removable	4%	10%	Cream	Orange
11	50:40:10	Appropriate / Can be molded, Unbreakable, Mold removable	10%	16%	Cream	auburn
12	40:40:20	Appropriate / Can be molded, Unbreakable, Mold removable	7%	15%	Cream	auburn
13	30:40:30	Appropriate / Can be molded, Unbreakable, Mold removable	6%	10%	Cream	Dark orange
14	20:40:40	Appropriate / Can be molded, Unbreakable, Mold removable	2%	5%	Cream	Light orange
15	10:40:50	Inappropriate / A lot of sand, Cannot remove the mold	4%	7%	Cream	Light orange
16	60:30:10	Appropriate / Can be molded, Unbreakable, Mold removable	12%	20%	Light orange	Dark brown
17	50:30:10	Appropriate / Can be molded, Unbreakable, Mold removable	7%	14%	Light orange	Dark orange
18	40:30:30	Appropriate / Can be molded, Unbreakable, Mold removable	6%	10%	Light orange	Dark orange
19	30:30:40	Appropriate / Can be molded, Unbreakable, Mold removable	6%	7%	Cream	Orange
20	20:30:50	Inappropriate / A lot of sand, Cannot remove the mold	3%	4%	Cream	Orange
21	10:30:60	Inappropriate / A lot of sand, Cannot remove the mold	0%	0%	Cream	Cream
22	70:20:10	Appropriate / Can be molded, Unbreakable, Mold removable	11%	15%	Orange	Dark brown
23	60:20:20	Appropriate / Can be molded, Unbreakable, Mold removable	11%	15%	Orange	Dark brown
24	50:20:30	Appropriate / Can be molded, Unbreakable, Mold removable	8%	12%	Orange	Dark brown
25	40:20:40	Appropriate / Can be molded, Unbreakable, Mold removable	5%	9%	Orange	Dark brown
26	30:20:50	Appropriate / Can be molded, Unbreakable, Mold removable	5%	5%	Light orange	auburn
27	20:20:60	Appropriate / Can be molded, Unbreakable, Mold removable	2%	4%	Light orange	auburn
28	10:20:70	Appropriate / Can be molded, Unbreakable, Mold removable	0%	1%	Light orange	auburn
29	80:10:10	Appropriate / Can be molded, Unbreakable, Mold removable	11%	13%	Dark orange	Dark brown
30	70:10:20	Appropriate / Can be molded, Unbreakable, Mold removable	11%	15%	Dark orange	Dark brown
31	60:10:30	Inappropriate / There was a crack from the inside	10%	12%	Dark orange	Dark brown
32	50:10:40	Appropriate / Can be molded, Unbreakable, Mold removable	10%	10%	Dark orange	Dark brown

Table 1: Mixing Ratio and Experimental Results of Dan Kwian Slip, Slip Casting Test, Firing Shrinkage and Color After Fired at Temperature 900 and 1,200°C (Continued)

Formula	Ratio between Dan Kwian clay: Kaolin clay: sand	Slip casting test	Firing shrinkage		Colors	
			900	1,200	900	1,200
33	40:10:50	Appropriate / Can be molded, Unbreakable, Mold removable	5%	6%	Dark orange	Brown
34	30:10:60	Inappropriate / A lot of sand causes breakage	4%	4%	Light orange	Brown
35	20:10:70	Inappropriate / A lot of sand causes breakage	0%	0%	Light orange	Orange
36	10:10:80	Inappropriate / A lot of sand causes breakage	0%	0%	Light orange	Orange

The development of slip casting by using Dan Kwian clay for making souvenirs products that have the method of testing properties of the casting clay with the ratio of mixture of Dan Kwian clay together with Lampang Kaolin and sand. The results of all 36 formulas from Table 1 found that formula 23 is suitable for the ratio of raw materials that will focus on Dan Kwian clay as the main raw material in the amount of 60% and construction sand that is generally easy to find and cheap at the amount of 20% and Lampang Kaolin clay in the amount of 20%. This is a formula that can be casted quickly, with the appropriate firing shrinkage of 11% and removed from the mold as well. After that, the sample is fired at 900°C to get the souvenir product from Dan Kwian potter's wisdom. Then, the packaging design also conveys the story of the sculptor and souvenir sources to make the packaging and distribution and increase value-added to the product as shown in Figure 22.

Figure 22: Finishing the Workpiece after Firing in a Gas Kiln at 900°C

The process has been collected from the potters' history throughout the process of creation and production to be a souvenir product that expresses themselves through packaging design. Storing the researcher's data and broadcasts it as video clips to tell the story of the creation of the potter's work by providing a QR code will be attached to the packaging of souvenir products. Next, the QR code will be scanned via mobile phone using LINE application and linked to video on YouTube to tell the story showing the value of the creation of Dan Kwian pottery as shown in Figure 23.

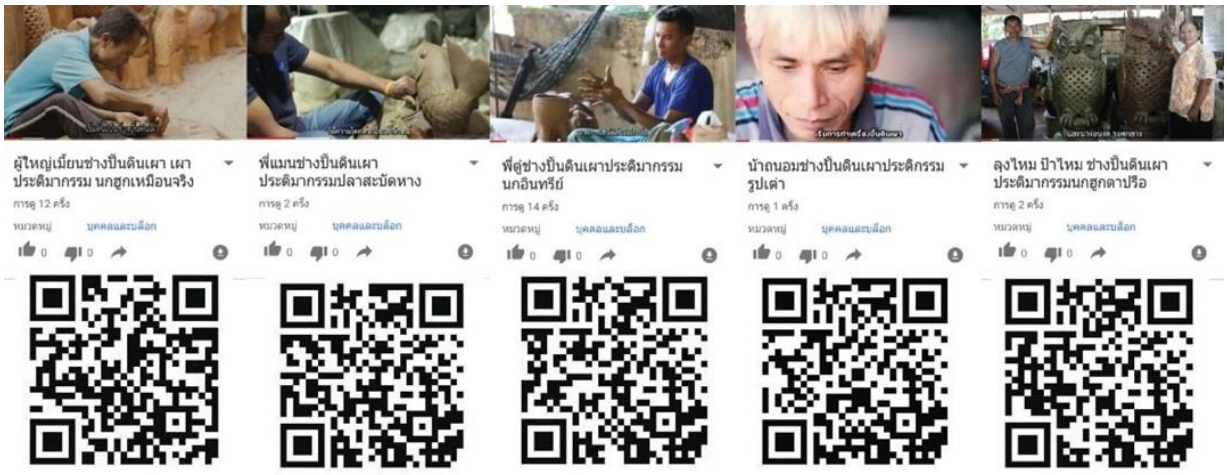

Figure 23: QR Codes for Scanning via Mobile Phone with the LINE Program

Then packaging structures are designed by experimenting suitable structures and forms from the products that are pottery souvenirs (Somdee, 2009). The design problem is to show the work and the appropriate a structure that can lock the product. Having a perfect fit with the box will help in reducing damage to the workpiece. Therefore, it is necessary to make a box pattern that is made from the size of the workpiece that fit and present the work as needed. Before being used to design patterns, colors and artwork on the box are an example of the pattern box design, as shown in Figure 24.

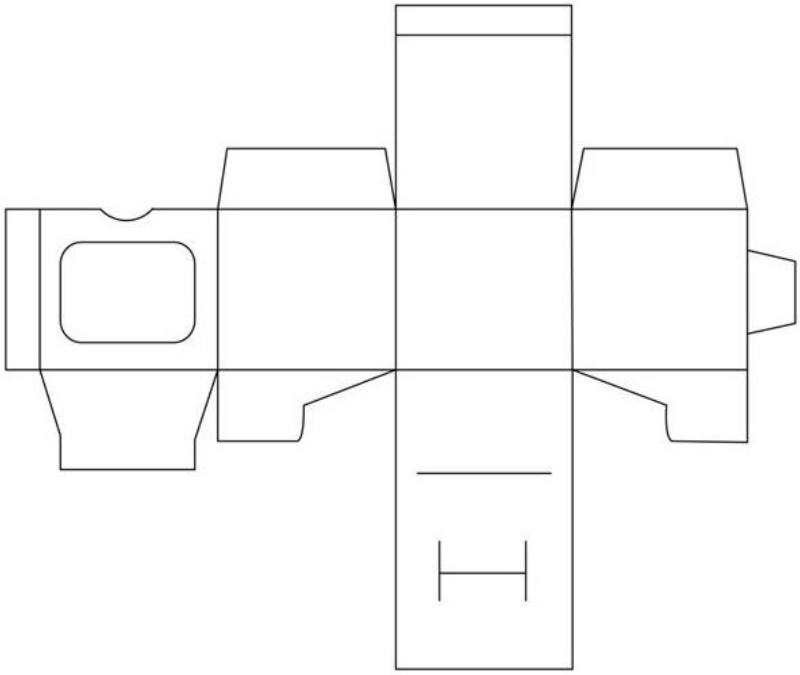

Figure 24: The Box Design Made from the Size of the Workpiece that will be Packed to Fit and Present the Work as Needed

The area for graphic design is managed so that it communicates to an inspiration of the product using pottery-related color schemes, such as clay, water and fire colors; and enhances the pattern and product information, both exterior and inside the packaging. The exterior of the packaging will consist of 1) general product information, size, date of manufacture, price, manufacturer's address and contact phone number, 2) biography and creative process of sculptors scanned via QR Code, 3) graphic pictures that represent the product, and 4) the hole that shows the product inside. Two-sided printing is required so that the boxes can be unpacked to display information inside the packaging that is assembled into the scene. The product will be placed containing the sculptor's information, such as the history, project objectives, and display stand. The images are molded 3D programs and the source for creating souvenir products as shown in Figures 25 and Figure 26.

Figure 25: The Exterior Design Features of the Package

Figure 26: The Interior Design Featuring the Packaging as a Backdrop for the Product

Prototype of souvenir packaging are printed in all 5 forms, including 1. Real owl. 2. Tail-flicking fish 3. Eagles 4. Terracotta tortoise and 5. Sleepy owl. Then, souvenir products are added with a packaging assembly that is prepared to offer the knowledge transferring to local youth as shown in Figure 27.

Figure 27: The Finished Product as a Souvenir from the Wisdom of Dan Kwian Clay Pottery with a Story to Create More Value for the Product

The package design is summarized by putting stories on the package which can be written as an essay, image, or supplementary lines (Thongroongroj, 2012). There are many types of stories such as the story of the product itself, the story of the manufacturer, the story of the local production, the story of the production process, or even the story of the raw materials for production that can be told to add value to the product. Identity and wisdom are an important content that bring product the cost from storytelling. Importance and make a difference by using the identity of the product that is uniqueness. Wisdom is the knowledge that is derived from inheritance or accumulated from ancestors with a history. This package will convey the history

of the potter and souvenirs that show the unique identity as well as the inherited wisdom as a work process, raw material preparation, molding, and firing. Information is combined into storytelling to design packaging to create added-value for products which will connect the technology that allows consumers to watch video via mobile phone by scanning the QR code from the package. This can make the products interesting by creating stories about the products and adding value to the products as well.

The final process is to transfer knowledge to students of Dan Kwian Witthaya School to provide them the creation and value of the current potters, and to inspire the local youth to bring the knowledge to be the next generation of potters. The creation of souvenir products acquired from the prototype of 3D printing to make the pottery and packaging design will convey the stories of the potter and the source of souvenirs to create added-value for the product as shown in Figure 28. The youths have to learn by observing the potters in the community who gained knowledge from their ancestors for the purpose of transferring knowledge. By studying the video scanned through QR Code, they will get knowledge and beautiful creative forms in a wide range with technology as well as creating prototypes by using 3D printing technology and casting from Dan Kwian clay. Originally, molding is the only inspiration for adaptation and development of the model together with technology and innovation, and for creating value-added products derived from the original wisdom in the community in order to create career and make income.

Figure 28: Knowledge Transfer for the Students from Dan Kwian Witthaya School with the Art Group Teachers Taking Care of the Participating Students

4. CONCLUSION

The souvenir works from the original clay sculpture pieces will be minimized with the innovation of 3D printing as a model for creating souvenir products from Dan Kwian pottery wisdom. It can also be manufactured in an industrial system and packaged conveying the story of the value of a potter which has received attention and inspires local youths who have seen the innovation combined with wisdom, are able to produce a new product and still have their local identity. This will be sold at the learning center of Dan Kwian Subdistrict Municipality to inherit local wisdom through technology as a product that creates income for the community. According to the research of knowledge transferring, young people in modern communities who already understand technology can apply the knowledge. Handicrafts that are in the community will not be overlooked by using modern technology to create value-added products and new inspiration to expand the landscape in order to connect the technology that will create career and make incomes for themselves and the Dan Kwian Pottery Community.

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