

Designing with Communities by Participatory Action Research on Nakhon Silver Nielloware Jewelry in Southern Thailand

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Abstract

Background Silver jewelry is known as an ancient handicraft of Nakhon Si Thammarat, Thailand. However, with existing production processes and patterns still restricted to traditional production, the price of silver jewelry is quite high and appeals to a specific customer group. Therefore, this study aims to develop a product of Nakhon silver niello jewelry for added commercial value in order to create the product which is beautiful, contemporary, valuable, and reflective of the identity from traditional wisdom. This complies with the tastes of modern consumers resulting in community development and can continue to produce in the process of creating works.

Methods We studied forms and production processes of silver niello jewelry and current trends and demands of customers for the product. The researcher and the production community cooperated to brainstorm for data analysis. Suitability and feasibility for the product design development were also considered. As a result, the researcher proceeded to the data analysis step so that the data would be utilized for product design and development using participatory action research.

Results The Nariang nielloware group would like to develop products. Thirteen participants joined the group. Guidelines on the development are as follows. First, newly designed products still sustain local wisdom. Second, the products are created using easy technical methods. Third, beauty and intriguing features are communicated through unprecedented designs. Fourth, the sizes are suited to the products' utilization. Fifth, the product offers affordable prices, thus easing purchase decisions. Twenty-three product models were outlined, and 10 product prototypes were produced. The Nariang nielloware group further applied the synthesized prototypes in the creation of 12 various self-customized designs and marketed the prototypes. Overall evaluation results of the commercial development of Nakhon silver nielloware jewelry averaged 4.43. The project also resulted in recruiting youth leaders for the commercial development of Nakhon silver nielloware jewelry.

Conclusions The research is beneficial for the community in terms of reducing production costs and time. The new products yield positive results for target group expansion leading to concrete commercial benefits.

Keywords Designing with Communities, Participatory Action Research, Jewelry Design, Nakhon Silver Nielloware Jewelry

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1. Introduction

1. 1. Rationale

Jewelry is used to express the status, beauty, and sentimental aspects of people (Batista, 2004). Pieces of jewelry are made with very noble materials, utilized for personal adornment, or to express a meaning (Batista, 2008). Therefore, jewelry must be elaborately designed research related processes are required together with creativity and continuous planning of jewelry production with an emphasis on aesthetic functions, convenience, and durability. These tasks are determined by the designer who always takes into account the creation of new ideas material selection appearance of the workpiece's practical use even before it goes to the production line (Batista, 2004).

Thailand is one of the world's major jewelry manufacturing centers in aspects of design and manufacturing Thai jewelry is therefore recognized in the world market potential. The jewelry design reflects the value and reflects wisdom, culture, and identity of Thailand as well. The country is home to skilled workers who can produce pieces of detail, meticulous, beautiful, which are widely accepted as well (National Gem and Jewelry Research and Development Institute, 2018 and the Ministry of Commerce, 2019) report that Thailand's top 10 export products in 2018 were gems and jewelry products with the third highest export value. Up to 3.83 billion baht, after computer products which have the export value of no. 1 which shows that jewelry is an important product. Thailand's jewelry industry stands out significantly as a center of the jewelry trade of the region and craftsmanship of Thai jewelry manufacturers with expertise to heat and cut gemstones intricately. However, the industry is faced with some limitations and challenges such as the upstream industry experiencing a shortage of raw materials resulting in sole reliance on imported materials, the midstream industry faced with a shortage of young-generation workforce and technological development in the country, and the downstream industry going through contemporary product development and design as well as ways to distribute and advertise the brands so that they are internationally recognized.

In addition, if considering the issue of people's needs in the present era found that wearing jewelry is still continuously and widely popular. Although jewelry is a luxury that is expensive and not considered one of human 4 basic life essentials, people still wear accessories to enhance their personalities and to decorate their bodies to beautify their bodies in addition to clothes. The jewelry industry is a large part of Thailand's economy (Thammaruaksa, Saneha, and Apirajakamol, 2010). which employed several thousand high-skill workers and millions of people in related industries (Rungreungpol, Kongjutirat, Dumrongsri, Prechasud, and Supanitpon, 2010). Thailand is one of the top exporters of silver jewelry in the global market. (UN Comtrade, 2018) Competing in the global jewelry market is a key challenge for the Thai silver jewelry industry. The jewelry industry is very dynamic. The price of raw materials is very fluctuated, especially for the precious metal. The jewelry product is a fashion product with a short life cycle. As a result, the manufacturing process is a fine process with low-volume production. Therefore, it relies heavily on high-skill labor processes. To be more competitive, manufacturers, wholesalers, retailers, and traders of Thai jewelry. Among all precious materials, silver jewelry made in Thailand represents Thai culture. Therefore, Thai silver jewelry products are popular among Thai people. and foreigners as well (Department

of Industrial Promotion, 2007). Silver jewelry in Thailand There is various formats. and there are important production sources scattered in major tourist attractions throughout the country, such as the production source at Wua Lai Road, Mueang District, Bo Sang District. and San Kamphaeng District Chiang Mai Province, Mueang District, Surin Province, Khlong Lan District, Kamphaeng Phet Province, and Mueang District Nakhon Si Thammarat Province (In Khong, 2014).

Nakhon Si Thammarat in the South of Thailand, geographical typography of golden peninsular braced by the ocean on both sides is a source of natural resources in the sea, coastal plain, and forests located close to the equator. The country is home to residents of multinational and multicultural backgrounds, seeking refuge through land and marine means of transport to settle. Among several nationalities were Malays, Chinese, and South Indians but the biggest majority is Thai Siam (Na Thalang, 2001). The province's name means "Glorious City under the ruling of the virtuous king" (TAT Nakhon Si Thammarat, 2015). The province has progressed in its rich history and culture for thousands of years and fullness of cultural and wisdom heritage (Wasi,1993). With the vision "City of Learning, Agriculture, Tourism, Comfortable Living and Strong Community" in alignment with the National Economic and Social Development Plan Issue 11 "strategy directed to establishing a production base promoting strong and balanced economic growth". The plan features a statement on the development of commodity production and services based on the creative economy by promoting the integration of creativity to add values to commodities and services, promoting and improving potential creative businesses, developing fundamental infrastructures and environment oriented toward the creative economy, promoting government agencies to adopt the applied work system for the public policy-based projects, especially those for development of a wide variety of One Tambon One Product (OTOP). There are many types of handicrafts that are unique to Nakhon Si Thammarat Province, especially Nakhon Si Thammarat nielloware, a refined work of art accepted on a national and international scale (Panchapak, 1991).

Niello is a black material composed of one or more metal sulfides. It contrasts particularly with the metal when inlaid or fused into a recessed design in gold or silver, but is also found on bronze and brass. It has long been known as a high-class handcraft product, the pitch-black color of niello seeping into elaborately engraved Thai designs makes silver or gold containers or accessories stand out and be of higher value. Nakhon Si Thammarat's nielloware artisans receive praises for their advanced craftsmanship, resulting in the nielloware products earning the name "Nakhon Nielloware" (Phuangpakdee, 1998), especially those executed by the Nariang nielloware group based in Phrom Khiri district, Nakhon Si Thammarat, Thailand which was listed as a One Tambon One Product (OTOP). in a category of appliances and accessories. However, even though the nielloware products are marked by uniqueness, prevailing production processes and design still conformed to old traditions either in the making of appliances or accessories, so typical prices of the nielloware are only affordable to a small exclusive group of customers at the dispense of other target groups.

The beginning of the nielloware product manufacture of the Nariang nielloware group was when the head of the group started practicing nielloware skills with a cousin and achieving a mastery level. The group has been operating for 35 years under support from government agencies having the community join the Nakhon Si Thammarat province OTOP group in the year 2003. At present, traditionally-made silver nielloware jewelry is produced with

an emphasis on advanced craftsmanship that emphasizes refinement. As a result. Creating each piece, niello ornaments made of 95% silver, is time-consuming. The Nariang group specializes in producing each workpiece intricately as shown in the way it is formed only by hand to obtain the optimal and most proportionate shape. Additionally, there are exquisitely detailed patterns with delicacy. The overall appearance of Nakhon Niello jewelry ornaments of the Nariang group is defined by two colors: white (silver) and black (Niello) and the craftsmanship on jewelry making is passed to local youths as well. The problem of the Nariang nielloware group in its current operation is the form of the product which is not diverse and the price is quite high. The product also appeals to a specific group of customers. The Nariang nielloware group aims to develop product designs to be beautiful, contemporary, and valuable, yet still convey the identity of the traditional wisdom of nielloware making. The research team, therefore, concluded that the members of the group would like to encourage the development of commercial Nakhon Niello jewelry products with the participation of the group members and the research team to achieve sustainable development in the future.

This pressing issue inspired the researcher to develop Nakhon silver niello jewelry for a commercial purpose with Participatory Action Research (PAR) with Nariang nielloware group. Participation has played an important role in the development of social design (Triggs, 2016). PAR - Participatory research attempts to promote democracy and equality among everyone involved in carrying out the research (Kara, 2017). A democratic aim in itself and a pragmatic effort aimed at creating better designs (Greenbaum and Halskov, 1993). Reason and Hilary (2001) define PAR as a participatory, democratic process concerned with developing practical knowledge in the pursuit of worthwhile human purposes. Simply stated, this is a systematic approach that seeks knowledge for social action (Fals-Borda and Rahman, 1991). Although many variants exist, action approaches possess commonalities based on their commitment to general. (Bennett, 2004). This Research silver nielloware jewelry design, it was observed the need of providing the communities with a methodology, to develop a structured, systematic, and organized work. To assist and guide the Nariang nielloware group throughout the jewelry design stages, the research team has developed a method composed of three main steps: Investigation and Analysis; Creation; Construction, and Evaluation. (SPINUZZI, 2005) (Batista, 2012). The group expects that the project will help to generate new contemporary designs representing the value and identity of Nakhon silver niello jewelry and also respond to the needs of the production community and Nariang nielloware group to take the product to a level encompassing aesthetic appeal, contemporariness, and value which coordinate with identity derived from Nakhon's old wisdom of nielloware making. This is in alignment with the taste of new generations of customers and community development. Furthermore, the production group can build further progress upon the reinvented designs by themselves and will be able to expand into a national market.

1. 2. Research objectives

1. To design and develop Nakhon silver niello jewelry
2. To develop Nakhon silver niello jewelry for a commercial purpose

1. 3. Anticipated research outcome

1. The production group can design and develop Nakhon silver niello jewelry.
2. Nakhon silver niello jewelry can be made for commercial purposes.

1. 4. Research scope

1. Area scope: Nariang Niellware Group, Phrom Khiri district, Nakhon Si Thammarat.
2. Content scope: content scope is determined in compliance with the research objectives to design and develop Nariang niello jewelry for decoration of the head and body parts.
3. Population scope: research population was recruited using purposive sampling which is Nariang niello jewelry, Phrom Khiri district, Nakhon Si Thammarat. The researcher proceeded through the preliminary data search before commencing this study, starting from field observation by visiting the sites of niello jewelry production groups and selecting the Nariang niellware group stating its needs to have their silver niello products developed.

2. Research Methodology

Study and analyze data Initially, in the first month, at the preparatory stage, the researcher studied the forms and production processes of silver niello jewelry and also the current trends and demands of customers for the product. Exchange of knowledge, skills, and experiences to gain an understanding of limitations and problems, as well as needs and potential for product design development, were obtained through interviews of participants in the production community and observations. In this process, the researcher and the production community cooperated to brainstorm for data analysis. Then, suitability and feasibility for the product design development were taken into consideration.

Action plan for product design development In the second month, an action plan for product development was laid out to detail each person's responsibilities needed for the work based on data from brainstorming and observation. The researcher and the production community cooperated in planning for product development.

Production of prototypes of the reinvented designs From the third to the eighth month, the process for product development was planned under cooperation between the researcher and the production community. Action plans and equipment for the making of prototypes and observation were employed.

Follow-up and evaluation In the follow-up and evaluation step in the 9th month, this stage was intended to examine whether the plan had been implemented as determined, whether it fulfilled the objectives and what improvement had to be made, and what challenges and problems arose. Informants including the production community and experts in product design development and customers were asked to evaluate the product designs using an evaluation form. Additional data were collected using a follow-up form and observation.

Report of conclusion In the tenth month, the research team presented conclusions of product design development and presented study results to the production community in a form of a complete report.

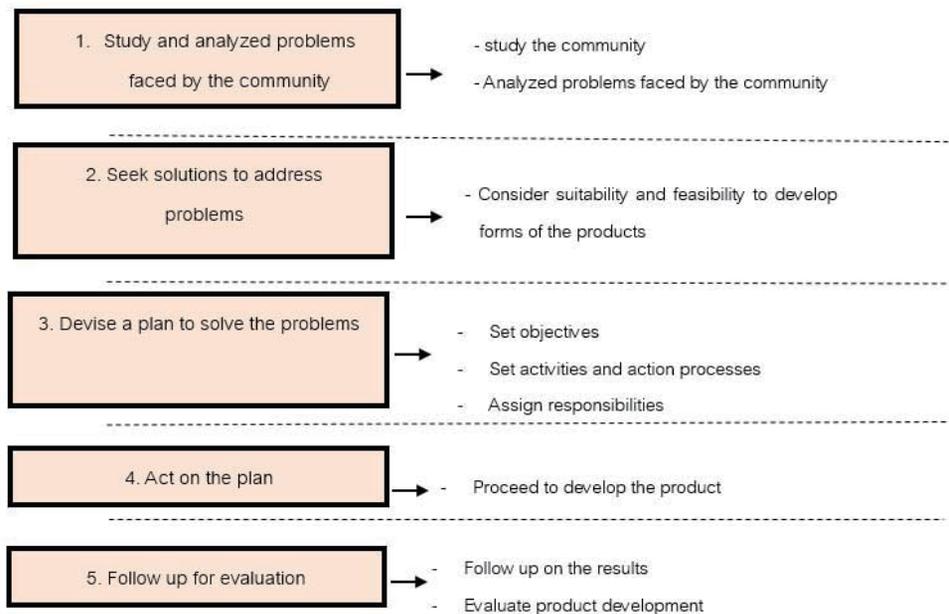


Diagram1: The Processes of Participatory Action Research (PAR)

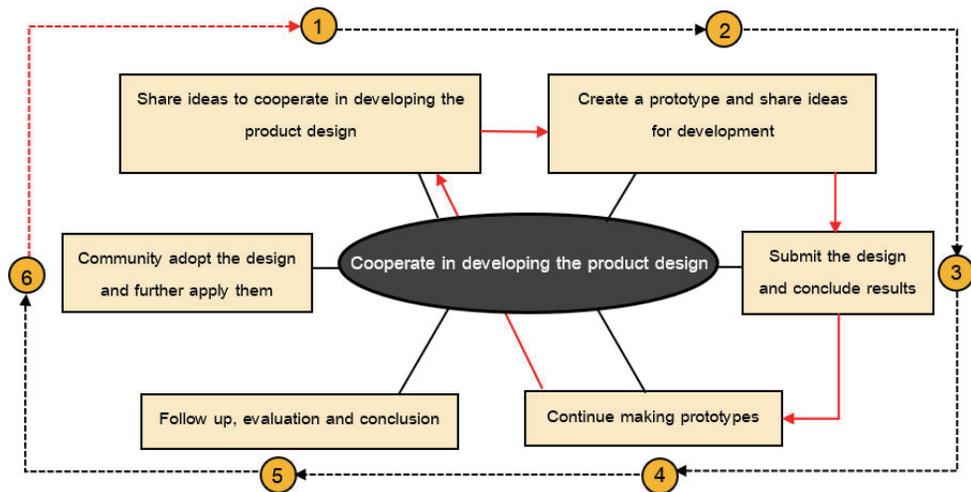


Diagram 2: product design development of Nakhon Silver nielloware accessories

Responsibilities assigned to participants in the activity

The participants in the Nakhon silver nielloware product development activity are assigned responsibilities as shown in the table below

Responsibilities	Persons in charge
1. Coordinate and facilitate the activities planned and prepare the material for activities	- Head of the Nariang nielloware group - Research team
2. Venue	- Members of the Nariang nielloware group
3. Product design development and prototype development	- Head of the Nariang nielloware group - Members of the Nariang nielloware group - Designer
4. Product sales	- Head of the Nariang nielloware group - Sales Consultant
5. Follow up and evaluation of the product design development	- Research team
6. Experts in product design development of Nakhon silver nielloware accessories	- Experts in nielloware production - Owner of design businesses

3. Result

3. 1. Research result and problem analysis

3. 1. 1. Research results regarding the community

The Nariang Nielloware Group started with Ms. Kanchanapon Praepranam having practiced nielloware craftsmanship skills with her uncle Mr. Sawai Fangchonlachit since she was 16 years old and asked her siblings to join the practice until they mastered the skills. It was not until 2003 that the group contributed 30,000 Thai baht in funding and passed the selection process to be assessed as a five-star level in 2004. In 2006, the group took part in the Cost Analysis Accounting project. Later in 2010, the group received a five-star level in the selection. Accumulating 35 years of experience in silver jewelry production under the supervision of her uncle as well as support from the government sectors by having communities in Nakhon Si Thammarat listed in the OTOP group since 2003 and the experiences derived from workshops where she passed on the knowledge to local youths, Ms. Kanchanapon founded the occupation support for youths in Moo.2 of Nariang subdistrict, Phrom Khiri District, Nakhon Si Thammarat. The group's objectives focused on helping youths in the community earn extra incomes and creating a sense of unity within the community through the transfer of traditional knowledge to current generations. Presently, Mr. Peeraphon Praepranam is the head of the group.

The group's present issues were concerned with the Nariang niello jewelry products being limited in terms of designs and affordable only for certain groups of customers. The Nariang nielloware group aimed to integrate aesthetic appeals of the product including designs, contemporariness, and value with its authenticity and legacy of Nakhon wisdom of nielloware making. Therefore, the researcher in cooperation with the Nariang nielloware jewelry group concluded that members of the group would like to promote the development of Nakhon silver nielloware jewelry design for a commercial purpose in coordination with the research team for sustainable development.

3. 1. 2. Analysis results concerning problems of Nariang Nielloware Jewelry Group

At this stage, all parties involved in the Nariang silver nielloware jewelry development project for commercial purposes collaboratively analyzed the group's problems through discussions and opinion sharing. The participants were afforded a chance to fully engage in product design development through the exchange of knowledge and experiences to grasp the contexts of the issues as well the strengths and limitations of the production process of product design development. The results of product design development derived from experience sharing and participatory processes can be divided into the following topics.

3. 1. 2. 1. The silver production process of the Nariang Nielloware Jewelry Group

The traditional nielloware-making techniques emphasize a high standard of craftsmanship and consume a considerable amount of time to completely finish each piece. Nakhon silver nielloware jewelry produced by the Nariang silver niello jewelry group made of 95% silver but also shaped by hands to ensure proportional and balanced figures. Intricate lines and curves of patterns making peace with the well-molded shape originate from patterns being carved by a chisel onto jewelry's texture appearing as embossed lines. Niello will be filled into the carved patterns and then the unwanted parts shall be polished off revealing shiny niello-black lines rid of blots or pinpricks. The end products shall possess the quality of being durable and resistant to easy peeling or fragility. At the final stage, a small chisel will be used to give the jewelry a touch of shading, and light shafts to produce shininess adding more detail and value to the jewelry.

3. 1. 2. 2. Product design of the Nariang Nielloware Jewelry Group

Problem analysis of the Nariang Nielloware group revealed the group's conditions, limitations and possibilities for the development of Nakhon silver niello jewelry's design for a commercial purpose as follows.

1. Due to the high costs associated with the silver jewelry's technical necessity for 95% silver metal, Nariang Nielloware Jewelry group's jewelry designs are of the typical patterns considered saleable by the group members. Repetition of designs seemed to significantly result from the group being afraid to experiment with new ideas for fear that any reinvented or untypical designs may not meet customers' demands meaning a waste of resources.

2. Skills and intricateness for work production were one defining element, necessitate both expertise and a maker being extremely detail-oriented, passionate and patient. Given these reasons, new generations tend to not be interested in becoming a nielloware jewelry artisan causing dwindling makers of Nakhon silver nielloware jewelry. This is also an issue the Nariang silver nielloware jewelry group is facing. At present, Mr. Peeraphon Praepranam is the only youth successor of the nielloware wisdom.

3. Time-consuming process: One piece of work can take months to process due to the intensive demand for delicate pattern engraving. High demand for the product also contradicts its inadequate supply causing the group to lose sales opportunities despite, irrespective of the product's prohibitive prices commanded by expensive materials.

4. For exclusive target groups: Due to the preservation of traditional designs and patterns as a tribute to ancient wisdom and culture, it remains a challenge to expand the sales into new customer groups who gravitate to accessories embedding modern attributes. Furthermore, the available designs of silver nielloware jewelry seem to fit for very specific occasions

such as a decoration for merit-making outfits which are also markedly popular among older customers. Therefore, an issue regarding age-preferred style was added to a list of distribution-related problems.

3. 2. Results concerning solutions to the problems

3.2.1. In the aspect of local wisdom: Members of the Nariang Silver Nielloware Group are residents of Nakhon Si Thammarat inheriting Nakhon nielloware craftsmanship from ancestors, all of whom are equipped with the dedication to nielloware making which is cultural wisdom and identity of the province.

3.2.2. In terms of community groups for occupation: the Nariang Silver Nielloware Group practices the art of nielloware making as a major way to earn income and asks younger siblings to join for practices taking the rookie to mastery level.

3.2.3. In terms of continuation of wisdom: the Nariang Silver Nielloware Group is capable of transferring the craftsmanship knowledge of local youths to encourage them to make the most of their free time.

3.2.4. In terms of the development of Nakhon silver nielloware jewelry's designs: Members of the group had acquired an understanding to a certain level because they were pursuing a vocational certificate at The College of Arts and crafts and Nakhon SI Thammarat. Promotion of knowledge and opinion sharing with professional designers are believed to establish the solid potential for the group's development of product design.

Research results concerning solutions to the problems of silver nielloware jewelry's product design development are 1) high production costs 2) expertise and delicate production processes 3) time-consuming production processes and 4) a very specific customer group and difficulty expanding beyond it. With these issues being brought to light, the researcher was able to outline approaches to developing the design of Nakhon silver nielloware jewelry as follows:

1. Products of contemporary designs which still strongly preserve the local wisdom
2. Easy production processes in a technical sense
3. Have aesthetic and interesting appeals which are not commonly seen
4. Utilization-appropriate sizes
5. Affordable prices allow little time to make a purchase decision



Figure 1 approaches to developing design of Nakhon silver nielloware jewelry for a commercial purpose

3. 3. Result of the plan to solve problems

The objective is to develop Nakhon silver niello jewelry for a commercial purpose which is to design and develop Nakhon silver niello jewelry products into new and saleable products. Activities and procedures for the development of Nakhon silver niello jewelry's design for a commercial purpose. There were actions taken to develop Nakhon silver niello jewelry for a commercial purpose going side by side with the transfer of knowledge and technologies of product design by a professional designer team and sharing of knowledge and experiences among the project participants. Four activities were arranged. Participants in the development of Nakhon silver niello jewelry's design for a commercial purpose set specific responsibilities and benefits that Nakhon silver niello jewelry will get. Participants in the development of Nakhon silver niello jewelry's design for a commercial purpose will gain the following benefits.

1. The community acquired knowledge about reinvention of Nakhon silver niello jewelry's design.
2. Development of teamwork and appreciation of the cooperation
3. Develop prototypes of Nakhon silver niello jewelry.

The team succeeded in creating the prototypes of Nakhon silver niello jewelry's design which will be developed into new products to offer a wider range for consumption, and improve sales opportunities.

3. 4. Result of implementation of the plan

Development of Nakhon Silver Niello Jewelry's Design 1

The product successfully delivered beauty, contemporariness, and value yet preserved the authentic identity of Nakhon silver niello jewelry. In terms of production, there would be an integration between modern procedures and local materials such as coconut shells, colored stones, and gems to reduce costs and revolutionize against the commonly produced designs.



Figure 2 Designs of Nakhon Silver Niello Jewelry 1

Development of Nakhon Silver Niello Jewelry's Design 2

Authentic local wisdom was still preserved in the patterns the group specializes in and all the traditional techniques were still made imperative however with a reduction of the size. Also, the surface area which would have been typically filled with niello was decorated with materials of different colors instead. Slight adjustments to the process also shortened the overall production time, yet each piece of the jewelry still reflected both beauty and interest in an unprecedented fashion appealing to teenagers and adults.



Figure 3 Designs of Nakhon Silver Niello Jewelry 2

Development of Nakhon Silver Niello Jewelry's Design 3

The value of local wisdom was still maintained under more contemporary designs responding to the interests and styles of all customers across genders and ages. This design scheme adopted the concept “Nakhon Silver Nielloware Jewelry, Wisdom to the world”. New production processes were adopted and the overall production time was shortened through the use of Centrifugal Casting. However, to preserve the characteristic values of silver nielloware, the old process played a part at some stages.



Figure 4 Designs of Nakhon Silver Niello Jewelry 3



Figure 5 Designs of Nakhon Silver Niello Jewelry 3

Prototypes created based on the Nariang silver nielloware jewelry for a commercial purpose

Participants of the project of silver nielloware jewelry's design development for a commercial purpose succeeded in creating prototypes in activity 3 to be used for reproduction and distribution. The production community was the party overseeing the reproduction for sale and other different applications as guided by Nariang silver nielloware jewelry's approaches until being able to execute the saleable works.

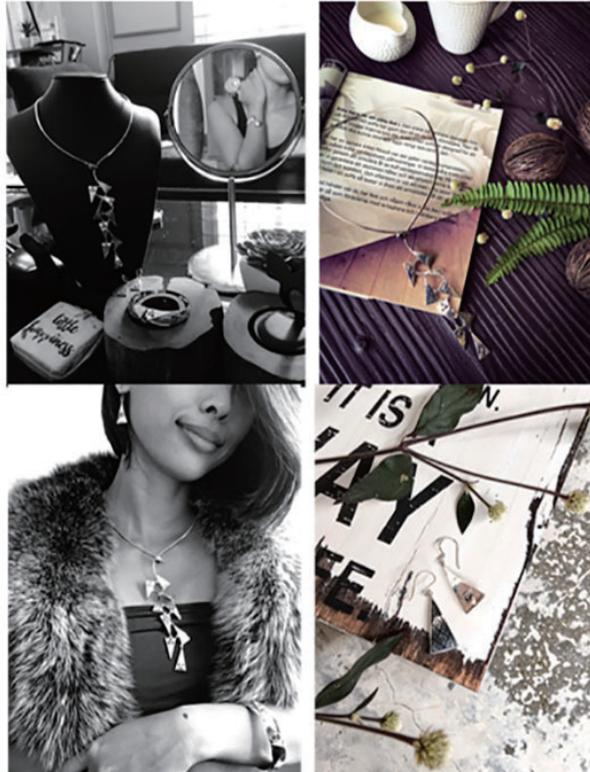


Figure 6 Prototypes created on the basis of Nariang silver niello jewelry for a commercial purpose

3. 5. Results of follow-up and evaluation

Follow-up on the development of Nakhon silver nielloware jewelry's design for a commercial purpose. Implementation of the action plan resulted in success in the development of Nakhon silver nielloware jewelry's reinvented design for a commercial purpose which corresponded well with the objectives. Despite certain challenges arising due to the members' obligations and full-time job responsibilities, every member demonstrated enthusiasm for the assigned responsibilities and completed them to the best of their knowledge. After having taken part in four sessions in the project of development of Nakhon silver nielloware jewelry's design for a commercial purpose, participants offered the silver nielloware jewelry with reinvented designs created based on the Nariang nielloware group's methods for sale at trade fairs. The products received encouraging responses from customers and had good sales. According to the customers, factors influencing their buying decisions included unique designs, affordable prices, and daily utilization. The project inspired and trained a group of youth leaders to take part in the development of Nakhon silver nielloware jewelry's design for a commercial

purpose and be able to further manipulate the process into producing works under trendy designs. Results from the follow-up suggested that the youth group applied the taught techniques and methods acquired from the project to their designs. Also, a line of products reproduced based on the prototypes collaboratively developed during their participation in the project of development of Nakhon silver nielloware jewelry's design for a commercial purpose. Participants in the project of development of Nakhon silver nielloware jewelry's design for a commercial purpose reported satisfaction with the reinvented designs created during the project and a sense of pride in what all the project participants had achieved together. They developed confidence in building more designs upon the ones they had just succeeded in creating and experienced a positive feeling when the products proved saleable.

Evaluation results from three experts in the development of Nakhon silver niello jewelry's design for a commercial purpose, 13 participants in the project of development of Nakhon silver niello jewelry's design for a commercial purpose, and 50 other individuals including customers or those interested in silver niello jewelry.

Evaluation results of the development of Nakhon silver nielloware jewelry's design for a commercial purpose were at a high level ($\bar{X}=4.43$, S.D.=0.61). To be more specific, the evaluation results from three experts in the development of Nakhon silver nielloware jewelry's design for a commercial purpose were at the highest level ($\bar{X}=4.72$, S.D.=0.41). The evaluation results from 13 participants in the project of development of Nakhon silver nielloware jewelry's design for a commercial purpose were at a high level ($\bar{X}=4.15$, S.D.=0.64) and the evaluation results from 50 other individuals including customers or those interested in silver niello jewelry were at a high level ($\bar{X}=4.14$, S.D.=0.8).

3. 6. Feedback

Follow-up on the results of the development of Nakhon silver nielloware jewelry's design for a commercial purpose revealed that the goals set in every step of the entire development project were achieved. The study was conducted using Participatory Action Research until 23 designs and 10 prototypes of Nakhon silver niello jewelry for commercial purposes were successfully produced in Activity 1, 2, and 3. The Nariang niello Jewelry group applied the reinvented designs and produced jewelry products for sale in Activity 4 and succeeded in producing 12 pieces of jewelry. In addition, local youths acquired the design reinventing techniques from professional designers and assumed the role of youth leaders in the development of Nakhon silver nielloware jewelry's design for a commercial purpose in the community. Evaluation results of the newly reinvented jewelry designs suggested a high level of appropriateness and received useful feedback for the product's further improvement. Discussions, opinion sharing, and questioning of the project participants reflected how the activities were perceived. Some put forward that, perceived from the marketing point of view, the design proved to be a success in maximizing the value of products because project participants were able to create prototypes based on the designs developed by professional designers. Designs of the products still required further and continuous expansion in terms of ideas. Unlike the previous assumption in favor of the familiar designs' duplication, the new assumption adopted among the participants was in favor of evolution. They reported a sense of satisfaction and confidence. Also, turning to the production process, production costs were not as high as initially anticipated and production time was also shortened

considerably. Lastly, the product's further improvement leaned toward diversification of designs potentially achieved by integration of each maker's knowledge and ability which will reduce both production costs and time. Also, alternative materials to the typical ones can be brought into the process to add value to the product and offer a wide variety of interesting design choices for customers.

4. Conclusion

Procedures for the development of Nakhon silver niello jewelry's design

Research results and problem analyses provided an insight into the conditions, limitations, and possibilities for the development of Nakhon silver niello jewelry's design which includes 1) high production costs due to the silver niello jewelry being 95% silver 2) the requirement of remarkable expertise and close attention to detail in the making of every single piece 3) time-consuming procedures for each piece which can take months or several months for the pieces demanding extraordinary intricate craftsmanship, causing difficulty keeping up with the customers' demand meaning loss of sale opportunities already compromised by prohibitive prices automatically incurred by high costs 4) the product's saleability among specific groups of customers due to traditional designs and patterns oriented toward preservation of wisdom, and culture and art.

Results regarding solutions to the problems which indicated the Nariang nielloware group's potential for the product's design development includes 1) value of local wisdom 2) community occupation group 3) Creating association for wisdom continuation 4) Motivation for youths 5) Development of Nakhon niello jewelry's designs. With more advanced knowledge and sharing of knowledge and opinions with a professional design team, the group members' craftsmanship will significantly unlock the potential for the development of Nakhon niello jewelry's design for the Nariang niello jewelry group.

Results of the action plan made to seek solutions determined that the development of Nakhon niello jewelry's designs should go hand in hand with sharing of knowledge concerning product design from experts and exchange of knowledge as well as hands-on experiences with the participants. Four sessions of learning activities focusing on the design and development of niello jewelry's design for a commercial purpose, as outlined in the action plan entailing responsibilities as deemed appropriate.

In terms of the results of the implementation of the action plan for the development of Nakhon niello jewelry's designs, participants took part in 4 activities, each of which yield the following results: In Activity 1, two attempts of product design development were made producing eight design sketches and one set of product prototype consisting of three pieces namely a bracelet, a pendant necklace, and a ring. After that, a discussion for opinion sharing and experts' feedback was conducted and the conclusions were applied to the improvement of Nakhon silver niello jewelry in Activity 2. In Activity 2, a total of 5 design sketches were created together with one product prototype, a pendant necklace. A similar step of discussion and feedback as in Activity 1 was repeated. Then, the conclusions would be utilized for improvement of Nakhon silver niello jewelry in Activity 3. 10 design sketches

were made together with one set of product prototypes consisting of 6 niello jewelry pieces namely a pendant necklace, a pair of earrings, a bracelet, a tie clip and jewelry for a specific spot. As before, a discussion for opinion sharing and experts' feedback was organized and the conclusions were further brought to Activity 4. The community acquired knowledge and hands-on experiences from the activities described and integrated it into the development of Nariang niello jewelry. The group introduced 12 pieces of reinvented jewelry and cooperated to price the products for sale.

Results of the follow-up and evaluation indicated success in following the collaboratively formulated action plan. Prototypes of Nakhon silver niello jewelry with diverse reinvented designs were produced as set by the objectives. All parties involved assumed their responsibilities to the best of their knowledge and the created prototypes proved to be a success in terms of saleability. Furthermore, the production community could apply the knowledge to sustainably produce product designs associated with their styles. The products received encouraging responses from interested customers and the project created the mainstay of the development of Nakhon niello jewelry's designs which was Mr. Peeraphon Praepranam. Participants in the development of Nakhon niello jewelry's design project expressed satisfaction with their work as well as a sense of pride derived from team collaboration. Overall evaluation results of the development of Nakhon niello jewelry's design project obtained a high level of appropriateness ($\bar{X}=4.43$, S.D.=0.61).

In terms of feedback from the discussion, it was concluded that reinvented designs could add value to the products. Project participants were able to apply the prototypes created by designers to expand ideas. The production community developed confidence in their product development. The reinvented designs also lower production costs but can add value to the product's saleability. The reinvented design also helped to simplify the production process which was so simple that every family member could take part in it. Local youths having learned the skill became the mainstay inviting friends to participate to earn extra income in their free time. The production community has speculated an approach to diversifying design patterns by integrating their unique ability into products contributing to a variety of creative works.

Conclusion of development of Nakhon silver niello jewelry's design for a commercial purpose

Positive change in designs of Nariang Nielloware Group's Nakhon silver niello jewelry from traditional to more modern patterns. Prior to the study, most were in a form of a niello bracelet. After the development of Nakhon niello jewelry's design project using participatory activities 1-3, 23 sketches of reinvented designs and 10 pieces of jewelry prototypes were produced. In the 4th round in a series of activities for the development of Nakhon silver niello jewelry's design for a commercial purpose, 12 pieces of niello jewelry pieces produced based on the integration of the reinvented prototypes with the group's method into the development of various designs and the products proved to be saleable.

Participatory research allowed the community to achieve the development of Nakhon silver niello jewelry's design by incorporating the locals' craftsmanship and ability. For the production community, community members got an opportunity to unlock their full potential, create occupations for the community members, pass on knowledge to youths and have them wisely spend their free time, etc. These factors undeniably contributed to

the long-term strength and sustainability of the community. Everyone involved got to be both a giver and a taker and learned to understand and evolve with problems, limitations, needs, and potential for problem-solving. More importantly, participants joined hands in seeking solutions for their own community's problems meaning the problems were likely to be relevantly addressed and other problems could also be solved. Participatory Action Research (PAR) is seen as a flexible method that complements the ideals held by many academic researchers in the various fields of anthropology, social sciences, history, theology, economics, philosophy, social work, community, and economic development. PAR as being an integrated approach to research that involves the participation of community members. as an alternative style of research, which uses a three-part process of social investigation, education, and action to share in the creation of social knowledge (Bennett, 2004).

For the production community, the community gained knowledge and got an opportunity to pass on wisdom, and engage in cooperative processes including thinking, planning, making decisions, and implementing the plan. Community members cultivated a sense of pride and ownership of the collaboratively developed works and the community perceived participatory processes with a favorable perspective. Some locals stepped up to be mainstays for product development for sustainable development in the future.

For the designers, gained a deeper understanding of the community's context and acquired additional data for future adjustments in terms of design and product development to other communities' contexts. Collaboration has become important owing to the challenges designers face to compete in fast-paced global markets. Designers need to capitalize on the strengths of different stakeholders to develop shared knowledge and practices to better deal with the complexity of problems facing society today (Feast, 2012).

For the research team, the results of the development of Nakhon silver niello jewelry's design suggested that the research team gained hands-on experience in conducting a participatory study with a community. The production community got to learn to adjust to the community's context to gain trust and cooperation from the start to the conclusion of the study.

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