The Creation of a Glass Mosaic Art to Reflect Dharma Using Recycled Glass

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Abstract

Glass art is a traditional art that has existed since the ancient times when glasswork was commonly applied to decoration of buildings in monasteries and significant utensils. The creation of artworks of this style emerged from the belief in Buddhism and the respect to the King with the objective to make the aforementioned effects look beautiful (The Fine Arts Department, 2002, p. 80). This idea concurred with the religious belief which related to the concept of heaven, where things were decorated with glittering diamonds. Religion has been an inseparable core of Thai society's spiritual beliefs and therefore, religious teachings have been reflected through artworks, since 'art' is a medium that easily disseminates knowledge and builds understanding. I created artworks for 2 temples. In the process, it was observed that colored glass that was used in the creation of art works was expensive, and there were only 6 colors available, which caused limitation to the creation. Therefore, I tried a new glass coloring technique by combining the technique to paint the color underneath the glass pieces in ancient style with modern materials. This technique enabled the creation of various art works as more colors could be painted on glass. As for the experiment in this research project, I used glass from abandoned computer screens in order to create works of art. There were issues and problems that led to limited popularity of glasswork, including high price of glass. However, this technique saved money and reduced the polluting wastes. To research and experiment the reuse of used glass material by scientific method then used to create a glass art. This project was presented as contemporary art works under the title 'Silp-Dharma' or 'Art- Religion (Religious Art)'. The processes of this scientific experiment were painting, pasting of gold leaves and putting pieces of glass together as images. Students and those interested in art can apply this technique and further develop other ideas in the future.

Keywords: Glass Mosaic Art, Reflect Dharma, Recycled Glass

Concept and Inspiration for Creation

The research project of "The Creation of a Glass Mosaic Art to Reflect Dharma by Recycled Glass" received the support from the Thailand Research Fund (TRF), for the fiscal year of 2018. 'Art' is a medium that directly and indirectly teaches and suggests direction so that audiences can understand Buddhist teachings and stories, as well as those moral and ethical principles (Khemanan, 1985, p. 1). In ancient times, drawings and paintings were used as a tool to teach people, who were often illiterate, to make them understand the Buddhist's teachings more easily. Examples of such are mural paintings in the main chapel (Ubosot) or chanting hall (Vihara) in a monastery. When people came to monasteries to listen to sermons, they had a chance to also observe the mural paintings on walls, which depicted stories relating to Buddhism such as Traiphum (the Three Worlds), History of Lord Buddha, Hell-heaven, as well as various other traditions and customs, which were easily comprehensible for people of all genders and ages, as ancient Thai paintings were a form of story-telling and communicated the gospel in a straightforward manner with simple compositions. These ancient styles of artworks are 2 dimensional and contain symbols that are easy to grasp and thus comprehensible. "Symbol" is a Greek word derived from "sym" and "ballo" meaning "to throw together". "A symbol that can guide the human mind to reach the knowledge and understanding according to the goal or the purpose of communication" (Leenawat, 2012, p. 47). These ancient works were drawn and painted on paper or fabric such as Samut Khoi (book made from pulp of Khoi plant (Siamese rough bush-Streblus asper Lour) and Phra Bot (long strip of hand-woven fabric).

Buddhist principle inspired me to create art works as media to disseminate Buddhist's teachings, which are reflective of such principles, and easy to follow and to understand. Buddhist's teachings often depict images of commonly observed creatures and natural elements to show the beings in the nature and the cycle of life that coexist with one another in form of mutual reliance and exploitation for survival, which are the fundamental truth of life. Furthermore, Buddhist's principles often reflect the notion of karma (results from past actions) and the difficulty of rising to higher levels toward enlightenment. In the process of developing related art works, natural forms were created and simplified in order that the symbols could express the teachings relating to puzzles of religious precepts and Paticcasamuppāda (or dependent origination). Thus, this research project was entitled 'Silp-Dharma' or 'Religious Art' (Buddhadasa Bhikkhu, 1976, p. 49), because the works in this project were inspired by the puzzles of religious precepts in many ancient Samut Khoi (books made from pulp of Khoi plant (Siamese rough bush-Streblus asper Lour), which Buddhadasa Bhikkhu, in the final section of the pictorial book of "Puzzles of Religious Precepts", stated, "...teaching Dharma with images is a way to disseminate Buddhism that is quick, fun, not boring, appropriate in accordance to natural principles and suitable for the current world in which people have limited time; but Dharma is still important to the world or world peace forever" (Buddhadasa Bhikkhu, 1970, p. 2).

As for the experiment in this research project, I use glass from abandoned computer screens for creating art work. There are issues and problems that have made the popularity of glass work decrease, such as the high price of glass, the limitation of available colors, and the complexity and danger from the use of glass. I solve the aforementioned problems by using glass from abandoned computer screens in order to create art works, save money and reduce polluting waste for the environment (Freudenrich, n.d.).

The glass works in this project are presented as contemporary art works under the title 'Silp-Dhama' or 'Art-Religion'. The works are designed to be media that reflect and visualize the religious teachings concerning religious metaphors and Paticcasamuppāda (factors that cause things) in order that audiences can understand the meanings of symbols in Buddhist teachings. The works also reflect the guidelines for doing good deeds and the process of scientific experiment that is not complicated and everyone can apply by using the glass screens of computers which are painted, pasted with gold leaves, drawn with lines, shaped and put together as images. Other artists, students and everybody interested in art can apply and develop for more advantages in the future (Wanjing, 2014, p. 257).

Background

This research project presents ideas that reflect religious teachings through creative artworks with glass from used computer screens as the main material. I create artworks that present religious teachings similar to those practices in the ancient era, while paintings were used instead of preaching to enable people to easily grasp the meaning of spiritual guidelines. I thus decided to combine the two ideas, namely, presentation of symbolic images and use of modern communication devices instead of old-style paintings on fabric, paper or walls. These art works were therefore presented on glass screens of television sets, computers and mobile phones, which are disruptive and innovative art forms in the modern era.

From the study of information in Thai history There is a Thai painting About the technique of painting under glass In the reign of King Rama 3 - Rama 5, this technique is similar to Lacquer Paint, using the material used as a powder paint mixed with "rak", which is wood resin. which is used in watermarking and lacquerware work

which was influenced by China (Ruean-in, 2018). I tried the glass coloring technique by combining the technique to paint the color underneath glass mosaics in ancient style with modern materials. This technique has enabled the creation of works from imagination because more colors can be painted on glass. In addition, the problem of costs has been reduced (Wanjing, 2018, p. 55).

In this research project, glass screens from abandoned computers were used in order to create artistic benefits and values. However, based on past experience pertaining to the creation of glassworks, the researcher realized certain restrictions which hindered glassworks to be popular. These issues relate to high cost of colored glass and the limited selection of colors. Thus, the researcher attempted to create artworks using glass screens of abandoned computers in order to save costs and reduce polluting wastes by reusing them for the creation of artworks that are beautiful and useful as a contribution to Thai contemporary art. This project is titled 'Silp-Dharma', and the artworks are designed to reflect Buddhist's teachings through images of puzzles of religious precepts and Paticcasamuppāda or dependent origination (Association of Beneficiaries for Buddhism of Thailand, 2011, p. 83). The artworks enable audiences to gain knowledge in accordance with the religious teachings so to understand the concepts relating to good practices. In addition, this project is also a study and experiment of the reuse of used glass with a simple scientific method that everyone is able to undertake. The experiment started with sorting the glass screens of computers before the pieces of glass were painted, pasted with gold leaves, trimmed into desired shapes, formed and put together to create certain images. This technique can be further developed for other uses in the future.

The creative art experiment used recycled computer screen glass material It was found that most of the glass panels were arranged in a row only. But still haven't found a technique that uses glass cutting as an image, for example.

- The Raw Edges has removed the broken recycled computer screen glass. to create a work of art as a sculpture He has the idea in this work that "Questioning our relation to the screen, recycled computer monitors are randomly placed in a cabinet and cascade naturally to the floor. He used recycled computer screen glass material same The encyclopedic collection of stuffed animals shown at the museum left us with the obsession of imagining them come to life. From 'Night at the Museum' to 'Pinocchio' and 'Toy Story' this recurring scenario established how much of a popular fascination it is. Subsequently, we decided to design a lively installation where animals placed in a cabinet spontaneously and freely move within. Across the independant screens runs a flowing animation featuring repeated cycles of activity. It mixes all sorts of species in the most unnatural way: ocean and nocturnal animals as well as preserved specimens in jars". (Mer & Alkalay, 2011)

- Soo Sunny park's work is an artist born in Seoul. South Korea who moved to the United States at age 11 years. Over the last fifteen years, her work has moved toward casting light as a sculptural material. She reconfigure boundary materials—fencing, plastic, glass,sheetrock—to expand and explore a variety of liminal spaces between inside and outside, sculpture and drawing, vision and perception, objects and their shadows. Light is usually treated as a liminal being: something that mediates our visual awareness of the world, but not something that we see in and of itself. In her work, light is not just a means by which the form is seen, but part of what constitutes the work of art. Light is a sculptural material, not because without it one cannot see the forms, but because without it there is no projection, reflection, translucency, or shadow, so the drawing/ sculpture is not complete. Her work challenges the boundaries between sculpture, installation, and drawing. Individual pieces are hybrids, which fall in-between, rather than within, any of these categories. Sculptures are drawings, drawings are sculptures, and

installations are sculptures and drawings at once. She label the totality of her work as sculpture to provide an overarching framework within the critical discourse of studio art, to identify work that Vladimir Tatlin called the "real object in real space". She use art to explore the spaces between the categories that structure our existence. (Sunny Park, n.d.)

Objectives

1. To build a body of knowledge in the field of humanities through the creation of glassworks in the series of 'Silp-Dharma' that reflect the religious teachings through images of puzzles of religious precepts and Paticcasamuppāda (or dependent origination).
2. To attain a body of knowledge that can be used for educational purposes, for further utilization in appropriate settings in the future and for the purpose of showcasing in exhibitions and for training.
3. To research and experiment the reuse of used glass material by scientific method then used to create a glass art.

Process or Methods

In the process, I used recycled glass materials to replace colored glass that was rather costly. Therefore, I studied various forms and techniques for creating glassworks, including art works created from used materials in order to analyze and determine the possibility for the implementation of styles and techniques suitable for the current era.

Properties of Computer Screen Glass

The telephone was first invented in the United States of America by Alexander Graham Bell in 1876, which varies greatly with current devices. Today's glass screens of computers, tablets and mobile phones are plasma. The structure of a plasma screen consists of two clear transparent glass plates put upon each other. On the upper or frontal glass plate, transparent electrodes are embedded that are aligned to set vertical pixels. On the rear or lower glass plate, lines of RGB colors are built-in to address electrodes and fluorescent agents. The number of the address line determines the horizontal pixels of RGB colors. Each address line is separated from one another with rubber bands in order to separate the space for the emission of electric charge and to prevent the color mix up. Between the two glass plates, there are Xenon (Xe: Xenon) and Neon (Ne: Neon) gasses. The mixture of various gasses is called plasma. Neon emits the charges whilst Xenon generates ultraviolet 43 ray. The circuit that receives the image signal will feed electric charges, which generates voltage between transparent electrode and the address electrode. Consequently, Neon emits the charge that urges Xenon to emit UV ray to make fluorescent agent to illuminate light with different brightness levels in accordance with the emission of colors on the screen to show images with high resolution. (Google Sites, n.d.)

As for the operation of LCD screens is composed of liquid crystal inside. Thus, it is half solid and half liquid, and transparent. The screen also consists of a light source at the back of the screen. This source emits white light, and is called 'Cold-Cathode Fluorescent Lamps (CCFL)'. The light will be emitted through a diffuser that makes the light scatter all over the screen. Afterwards, the light will go through the "polarizer" that filters the horizontal light wave. At the same time, the liquid crystal layer will be activated with electricity and become twisted. The light will go through the liquid crystal and refract before going through three-color filters, namely: red, green

and blue. Afterwards, the light will go through the outer polarizer that filters the vertical light wave. This screen is called LCD (liquid crystal display) By pressing finger on the screen, one will feel that the screen contains a form of liquid. (Google Sites, n.d.)

Study on Specific Information

I received a large number of used computer screens from a computer repair shop in Chiang Mai Province. In the process, I dismantled the screens and broke them down into smaller pieces. The decomposition of computer screens led to the discovery that a screen is composed of various materials put together in layers. Such materials can be used for the creation of other works or for other artistic purposes.

Experimental Practice

Concerning the inner parts, a computer screen is an instant product that is produced in a factory outside the country. Therefore, when there is a defective part, the entire set has to be replaced. Consequently, a great number of computer screens are abandoned, as repairing is almost impossible. The number of abandoned computer screens has been growing steadily over the years. If there is no attempt to eradicate or reuse such devices, they will further remain a burden to the natural environment in the future.

I selected the screen of portable devices such as iPads and tablets as they are in proper sizes and can be cut in desired shapes. Meanwhile, screens of mobile phones are too small. In the experiment, I separated screens of notebook computers (including iPads/tablets) in a laboratory at the Faculty of Sciences, by applying the knowledge of properties of glass from an expert, Dr. Kamonphan Phengphat, from the Faculty of Sciences, Chiang Mai University, the advisor of the project, who suggested to remove the film from the glass screen in order to get the glass material for creating the art works.

During the extraction of glass screens of iPads/Tablets, it was found out that each screen was composed of several components that were put together in layers. Such components had different properties depending on their use. Furthermore, these recycled glass materials were in good quality and many contained acrylic sheets, light filtering film as well as glass plates, which can be used for the purpose of creation of art works. After sorting the materials, the film was removed from the screens, which was done at the Department of Material Science, the Faculty of Sciences. Afterwards, the glass screens (plates), without the film layer, were used to create the art works.

Extraction of Glass from the Computer Screen

The abandoned computer screen was taken apart in order to get the glass plates.

Figure 1 Layout of All Layers of Computer Screen Glass (Taken on 25th June 2019).

Removal of Film Sheet from Computer Screen Glass Plate

A computer screen is composed of several components such as glass, paper, acrylic sheet and light filter. (Figure 1) A screen is composed of 2 glass plates that are put together as two layers. When taken apart, with black film removed, one glass plate is a clear transparent glass, whilst the other is in sepia color.

Concerning the removal of the film from the glass screen of an iPad or tablet, I explored for an easy and convenient method that could be taught to students. For this purpose, I used "acetone", which is a widely available type of alcohol. This alcohol is an organic solvent that is extracted from natural sources and synthesized through petroleum-chemical processes and can easily evaporate, is not halogenated, and is widely used in industrial processes as a solvent (Figure 2).

The acetone was sprayed on the film (Figure 3). The black film was peeled off and the glue was cleaned so that the glass plate was completely flat. (The glue should be totally cleaned out; otherwise, the cutting with the diamond cutter would not be smooth and precise, and cutting lines would not be attained.) After the acetone was sprayed on the screen to remove the film, the next step would be to paint the glass. Thus, during the phase of material preparation, the glass screen should be completely taken apart and the black film should be completely removed from the other glass plate. It was important to note that after removing the film with acetone, the glue should be completely washed off by sprinkling water or powder on the glass and using a blade to scratch the remainder of glue from the glass plate.

Figure 2 Removal of Black Film from Computer Screen (Taken on 25th June 2019).

Figure 3 Spraying of Acetone between Black Film and Front Glass Plate (Taken on 25th June 2019).

The removal of the film with acetone left glue stains on the glass plate. Thus, alcohol should be used for wiping off these glue marks. Apart from alcohol, water and powder can be sprinkled on glue stains which were scratched off by a razor blade in order to clean the glass plate. (Figure 4)

After the black film is removed, the glass plate that used to be sealed with black film would become a clear transparent glass plate, whilst the other glass plate that is attached as the other layer was in sepia color (Figure 5). Computer screens of different brands have different sepia tones from grayish brown to light brown.

Figure 4 Separation of Screen of iPad (Taken on 23rd June 2019).

Figure 5 Two Pieces of iPad Screen, i.e., a Sepia Glass Plate / a Glass Plate with Black Film (Taken on 23rd June 2019).

Cutting the glass is a major step, and artisans should have a good understanding of the properties of glass and glass sheets. Also, this is a highly delicate task and requires skills and expertise on the artisan's behalf to cut this extremely fragile material. Selecting a proper glass cutter is also key, and it should be chosen based on the thickness

of the glass. In this particular case, both types of glass cutters were utilized, namely: a diamond head and a metal head. A glass cutter with a diamond head is very hard and very sharp.

Experiment of Glass Coloring

After the film was removed from the glass, and before the glass was used, the back of the glass plate could be colored with glass paints that are sold in general stationery shops (Figure 6). In order to paint the back of the glass plates, an ancient technique was used (Wanjing, 2018, p. 14). Colors were painted on clear glass plates before gold leaves were applied all over the glass plates. The glass sheets were trimmed into fine shapes. In order to cut clear float glass, a diamond head cutter was used. The cut had to be done with care as this type of glass is more fragile than general tinted glass due to its different production process. The experiment revealed that the coloring of the glass on the iPad screen was effective and simple (Figure 8). The glass could be made more illuminant with the technique of pasting of silver leaves or gold leaves at the back of the glass plate (Figures 7). This technique enabled the abandoned glass waste to be reused and to have added value in terms of arts (Wanjing, 2018, p. 55).

Figure 6 Painting at the Back of Glass (Taken on 3rd August 2019).

Figure 7 Experiment of Paint (Taken on 3rd August 2019).

Glass Cutting

To cut glass that is a screen of a computer (iPad/Tablet) is more difficult than cutting glass in general as a computer screen is very fragile. Thus, it is fortified with liquid crystal. Therefore, a sharp diamond-headed cutter was needed. In addition, craftsmen, who cut the glass, must have expertise and understanding of glass cutting so that the glass could be cut to have curves and to be in desired shapes. In the process of cutting the glass, each craftsman should use his own cutting tool and be accustomed to the angles that were required for cutting. The cutting must be carried out gently; otherwise, the glass would be fractured or broken as it was very thin and fragile.

Some interesting properties of computer screen glass are that they are thin and lightweight but their surfaces are durable and not easily breakable because they are sealed with a polymer film. The content of the glass is Boron-glass or Borosilicate glass. Borosilicate is a glass with boric-oxide; hence, it has low thermal expansion Coefficient (COE) and is resistant to thermal change. Glass of this type can be used for making scientific glassware and microwaveable containers.

Creation of the Artwork

I had analyzed and synthesized all available information, and created the art works. The process started with the conclusion of the concepts of all stories before designing the sketches, which would then be developed into the actual works. The creation process included the following steps: 1) conceptual design, 2) sketch design, 3) design development, 4) design construction, 5) design refinement, 6) design presentation, and 7) design evaluation.

As for the process relating to the creation of the artworks in this project, the works were designed to have the forms of animals and plants in the nature, such as birds, fish, lotus flower and trees, as they are images that

audiences can easily understand. The forms were used to depict stories that were related to Buddhist's preaching, which some audiences might have known or learnt about at younger ages. The process started with designing sketches followed by design construction and design refinement.

The main concept of this research project was to reflect on the teachings in Buddhism and related practices to help practitioners stay away from bad and evil with the concept of three marks of existence, which emphasizes the righteousness of ethics and morals, especially the teachings and practices for freedom from agony. This is due to the fact that all things are not immortal, not durable and not truly existent. They are just in forms of cause and requisites.

Method and Style of Presentation

This research project was the creation of art works on colored glass using abandoned glass material. The researcher had conducted the study and experimented on various materials. As for the experiment, it was conducted at the Department of Physics and Material Science, Faculty of Sciences, Chiang Mai University. I received significant advice from the experts in applying scientific principles and methods. The key factor to consider was the objective – what objectives were set out and what the research work was for. Thus, it was necessary to find a process that fit the goals and target groups as there were a great number of scientific processes and technologies. Science could make things possible. Therefore, I attempted to find a possible method that was not complicated or difficult so that artists and students could apply it to their art creation. In addition, one should not too much rely on industrial processes because they are generally costly and may be less worthwhile or untenable.

As for the design of forms, I used forms of creatures in the nature, such as birds, snakes, fish, lotus flower and trees, as they enabled audiences to understand the works more easily due to the fact that they are generally seen on a day to day basis. Such forms were used to show the birth-death, the reliance, the food chain and the Samsara, which is the cycle of life that is commonly seen, in order to depict the stories in the preachings in Buddhism, the basic meanings of which are comprehensible to most people.

The use of glass materials in each work is different from others in accordance with the concept of each image. Such materials include colorless transparent glass, colored glass, computer screen glass, on which lines are drawn, painted, and pasted with gold leaves. However, the techniques applied to creation of each work have varied from one to another.

As for the presentation, each work consisted of a 2 dimensional image displayed by hanging from the ceiling or by installing with some distance from walls.

- As for the works that were hung from the ceiling, the purpose of such installation was to allow audiences to see around the images, as a unique property of glass is transparency, that enables audiences to see from the back and from the front. This installation aimed at showing the property of the material to the fullest extent.

- As for the works that were hung with a distance from walls, each were placed at least 20 centimeters away from the wall so that the shadow of the work would reflect on the background wall. Thus, it was also necessary to determine spots to install spotlights so that would allow the light to shine on the work from right angles. The idea to use the shadow on the wall at the back of a work was to represent the 'truth', whilst the shadow at the back represents the 'belief' that follows the truth. The clarity of the shadow depends on the distance between the wall and the work. This reflects the idea that the 'truth' and the 'belief' are the same thing. Meanwhile, the distance between the work and the wall is like a time gap. The wider the gap is, the vaguer the shadow becomes. At a distance, the shadow will disappear.

Knowledge Derived from the Creative Work/ Problems/ Suggestion

From the separation of computer screen glass, it was apparent that each computer screen was composed of many materials piled together as layers. Each material had unique properties and functions. It was also evident that they were in good shape and many of them could be reused. Examples of such materials are acrylic plate, light filtering film, glass and stencil paper. After the materials were separated, the screen glass were used for the experiment. First, the black film was removed from the glass and was then cut in forms as in the sketch, before being used for creating art works in this project. Some of the other separated materials were given to students, who in turn used them in experiments and for study whilst some are kept for future experiments.

Some very interesting properties of computer screen glass are that they are thin and lightweight but their surfaces are durable and not easily breakable because they are sealed with polymer film. The content of the glass is Boron-glass or Borosilicate glass. Borosilicate is a glass with boric-oxide; hence, it has low thermal expansion Coefficient (COE) and is resistant to thermal change. Glass of this type can be used for making scientific glassware and microwaveable containers. From the creation of art works in this project, it was also found out that each work was more lightweight compared to other commercial colored glass or transparent colorless glass in two ways, namely: when the sizes of works were considered, because computer screen glass was thin and lightweight, it could be conveniently used for creating art works; In addition, the lightweight nature of the recycled computer glass made the installation and movement of works much more convenient. Consequently, artists would be able to create art works of various sizes.

Discussion

Design Presentation

As for the forms used in each work, I designed them to be in the forms of creatures in the nature, such as birds, snakes, fish, lotus flower and trees, as they enabled audiences to easily understand the Samsara, which is the cycle of life that is commonly seen to depict the stories in the preachings in Buddhism, the basic meanings of which are comprehensible to most people.

As for the presentation, each work was a 2 dimensional image that was displayed by hanging from the ceiling or placing at a some distance from walls so that audiences could see the shadow of each work on the wall at the back of the work. Thus, it was also necessary to determine spots to install spotlights so that light would shine on the work from right angles. The idea to use the shadow on the wall at the back of a work was to represent the 'truth' whilst the shadow at the back represented the 'belief' that follows the truth. The clarity of the shadow depended on the distance between the wall and the work. This reflected the idea that the 'truth' is followed by the 'belief'.

From the research work, it is discovered that 'Silp (Arts) - Dharma (Religious (Art) and Lord Buddha's Teachings)' coexisted with each other. This led to a retrospective, panoramic and in-depth view. The creation of art works in this project had the main objective to reuse waste, which was glass from computer screens. Newly manufactured screens were valuable because they were usable as a medium to display images that were shown on the screens. However, when a device was broken and could no longer be used, it was like a dead body that was forsaken because it was no longer wanted. Unlike organic waste, this waste was not biodegradable and thus caused

accumulated waste that was toxic and harmful to human health and the society. The number of this waste was growing greater as time goes by.

Discovery from Managing the Materials in the Experiment

Furthermore, the study of religion, practice of meditation and praying enabled me to attain a better understanding of all preachings from the doctrines. In addition, religious practices in accordance with the preachings, during the creation of art works, led to even better understanding to determine the meaning behind self-exploration, and as well, to better understand the remarks by Buddhadasa Bhikkhu, who stated that in order to truly understand Dharma in religious study one has to practice by one's own self and to understand one's own self. As Buddhadasa Bhikkhu mentioned in Dharma Bucha Book in his own words 'an earthworm that does not see the earth and a human being who does not see the world' (Khemanan, 1985, p. 14).

The creation of Work 1, I discovered that the properties of glass material as different glass plates have different thickness and shininess. Instant colored glass is vivid and reflective, whilst transparent glass that is colored underneath does not have glossy surface like colored glass; however, the latter possesses all the needed colors because the artist can apply his or her desired colors to the glass. The color painted on the glass was reflected by the gold leaves pasted under the glass plate. However, used glass is generally thicker than instant colored glass. As for glass from the computer screen, it also is in the experiment to remove the film. The researcher attempted to add some pieces of this material to my work in order to test in Work 1 of this project. The outcome was that, in the overview, all the pieces had colors with agreeable tones instead of contradicting ones, because in Work 1 the material was instant colored glass pieces which were available in greater numbers than that of newly made colored glass. (Figure 8)

Figure 8 "Paticcasamuppāda" (Taken on 20th June 2019).

Work 2 was created. The work was designed to have a larger size than Work 1. This work was created using combined techniques of colored glass, transparent glass painted with colors, and glass from computer screen. It was discovered that glass material of different type has differences in terms of thickness and weights. Thus, in order to create each image in a work, the understanding of properties of each type of glass was required.

Work 3, "Birds Not Knowing the Sky, Fish Not Knowing the Water" Dharma teachings in Buddhism (Association of Beneficiaries for Buddhism of Thailand, 2011). I used only glass from computer screens in order to solve the problem relating to the differences in thickness of various types of glass and the high weight of other glass types, The sole use of computer screen glass in Work 3 led to more desirable results in term of lighter weight. However, the colors and motifs in the work made the entire work look glittery as the glass pieces were painted with colors and pasted with gold plates. As a result, the lines were heavily stressed, which made the entire work look too bold and stiff. In addition, the multiple colors of the work made it look too colorful. Consequently,

this work was not able to convey the true emotions in accordance with religious concepts. Thus, it could not be considered a prefect reflection. (Figure 9)

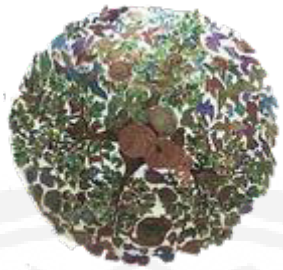

Figure 9 "Birds Not Knowing the Sky, Fish Not Knowing the Water" (Taken on 20th June 2019).

Work 4, I adjusted the work scheme by applying religious concepts and by creating the artwork following the same way as practicing meditation, which means approaching each step consciously and with by concentrating on that moment, and by implementing the concepts and teachings that are core to Buddhist's beliefs i.e., to clinging and letting go in order to create artworks by gaining a better understanding of oneself and delving deep in what one intends do. As for this work, the researcher attempted to solve problems which were encountered in Work 3 (many colors and the glittery look) by removing the step with painting color on the glass and the use of gold leaves, because, after thorough consideration, they deemed to appear unnecessary and insignificant (Association of Beneficiaries for Buddhism of Thailand, 2011, p. 84). However, the lines had to be stressed in order to show all forms so that audiences would clearly understand what forms they pertained to. After Work 4 was finished, the researcher felt that the overall work did not reflect the true meanings of the message and also, the completed work did not display the potentials of glass material. In addition, the deliberate stress of all lines made the images look too robust and unnatural. The lines also hid the texture of the glass that was the core component of the work. (Figure 10)

Figure 10 'Fish Eating Fish' (Taken on 24th September 2019).

Work 5, I decided to create an artwork in accordance with the principles of Buddhism, which is to let go and not to be attached to anything. The decision was also made to further adjust the work scheme by excluding the painting of colors at the back of the glass, the pasting of gold leaves and the stressing of lines with colors to beautify the works so to show the real texture of the key material or glass from computer screens. In this experiment 'Fish Eating Fish'. I attempted to only use computer screen glass in order to create different forms, without using

any other techniques such as painting, color stressing or gold-plating. After the pieces of computer screen glass were aligned into forms, as in the sketch, the artwork was hung on a white wall with a spotlight at the front. The outcome was beyond expectation. The work clearly showed the properties of computer screen glass. The transparency and fragility gave the true feelings of the material. It was also discovered that each computer screen glass plate has its own color such as light yellow, pale pink, pale purple, pale green and colorless, which are greatly unique and beautiful.

In addition, the display technique, whereby the light is projected to the work to create shadows on the wall at the back, shows that the shadow on the white wall is composed of different forms with different color saturation and tones in accordance with the glass materials that are used in the work. This is due to the fact that artworks are hung away from the wall, which allow audiences to walk in the space between the work and the wall in order to see the changing images on the artwork. (Figure 11)

Figure 11 "Eating" The Work Displayed in the Exhibition at Bangkok National Gallery (Taken on 8th November 2019).

As for the creation of Work 6, 'Wisdom Emerging from Mud', the researcher intended to develop the idea and to experiment with a technique in order to showcase continuity. Hence, he implemented the concept used for creating Work 5, which focused on the interesting texture of glass materials. The clarity and transparency of the glass can also be used in the process of creation of artworks as the transparency. On the contrary, the uniqueness of glass work should be completely revealed by the display, which allows the work to be viewed from both sides.

The artwork 6 is composed of glass images designed to depict stories that are continuous and can be viewed from both front and back sides. The work was created from pieces of computer screen glass that were pasted on a transparent glass plate to allow audiences to look through them and see overlapping images from the compositions of images on the front and back sides. The image on each side depicts a story that is connected to the image on the other side. However, the researcher wished to change the perspectives from the mediocre view at the front and the back to the view from top to bottom or from bottom to top.

The contents of the work 'Wisdom Emerging from Mud' are from the pictorial book of Thai Puzzles of Religious Precepts in the Kayanakhon Series by Buddhadasa Bhikkhu. The work depicts the truth of the nature. A lotus flower grows from the mud in the bottom of a pond. Even though mud is dirty and undesirable, it is the origin and source of nutrients for a pure white flower like lotus. Even though growing from dirty dark mud that is stinky, a lotus flower grows to be white, pure and beautiful, with pleasant scent. This phenomenon can be compared to the body of a human being. Even though filled with unattractive organs, a body is the origin of wisdom. Only wisdom can eliminate ignorance, lusts and attachment, which are enemies of every human being (Buddhadasa Bhikkhu, 1976, p. 23).

The techniques used to create the image on this side included line stressing and light painting without gold pasting. Thus, the glass plate is transparent so that the image on the back side is seen, making audiences feel like

looking down through water. The absence of gold plate reflects the need to escape from attachments, which is shown as the image on the real texture of the glass that symbolizes the truth. However, the line stressing and light color painting techniques represent those facts that the lotus follows in all the four stages, and those which cannot be avoided (Samsara or cycle of life and death). (Figure 12)

Figure 12 "Wisdom Emerging from Mud" Work: Front-Back (Taken on 8th November 2019).

The additional discovery from the creation of works in this project was that, as for the creation of artworks of certain types, like a scientific experiment, there should be research and experiments done before empirical results or outcomes are attained as the answers for the predetermined research hypotheses. Likewise, the creation of artworks of certain types relies on imagination that leads to creativity in order to reflect feelings and emotions that are intangible, and turn them into tangible works. Without actual execution or practice, things that have been planned or thought are mere hypotheses for guessing the results. Especially, some types of artworks, which were not previously attempted, are like a quest to search for answers. Therefore, the attained results may not be the same as the ones anticipated in the objectives. Otherwise, there may be new concepts or ideas discovered from the works. Thus, there is the question relating to research works that pertain to the creation of artworks, and whether it is necessary to execute the research and compose a research paper in accordance with the research methodology that has a robust framework and a standard for all works, or to rely on other forms and styles in order to attain results that concur with the subject of each particular research project.

Using the knowledge and data from various techniques of glass mosaic, the researchers experimented with glass works using a variety of materials and techniques such as cutting colored glass plates into traditional Thai shapes and forms to align glass plates with one another as mosaics like the ones at Chiang Thong Temple, Lao People's Democratic Republic, and to paint color behind glass plates like works at Shwe Yan Pyay Temple in Myanmar. These experiments have been conducted in a variety of forms so to develop a better understanding in regard to techniques of glass mosaic. This has also helped to reveal that, in fact, there are a variety of readily available materials that could be combined in such works. By understanding the properties of materials and appropriateness of expression, new artworks can be created. The researcher has conducted a number of experiments to develop glass cutting and attaching techniques in order to make them suitable for the creation of this particular project. The researcher also conducted experiments by painting and applying gold foil on the back of glass sheets. These experiments in the research led to a new technique as there was an increase in color varieties and options from only six available colors to various shades of colors. This technique also helped to increase the ability to draw more details and to independently create various shapes for the images. As a result, this creation of glass mosaic was quite special and more exquisite, as it was elaborated in this research report. Nevertheless, the research is at its initial stages and requires more time in order to detect problems and to develop techniques, to further improve the process.

As a final note, the researcher believes that works of art, similar to this 'Silp-Dharma' project, are very effective tools to use as materials for teaching religious concepts in order to make these guidelines and principles more comprehensible. In addition, practicing and self-learning lead to understanding, To experiment the reuse of used glass material by scientific method then used to create a glass art. This phenomenon can be used for creating new artworks in the future. To attain a body of knowledge that can be used for educational purposes, for further utilization in appropriate settings and for the purpose of showcasing in exhibitions in the future.

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