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## Using Metalsmithing Techniques to Produce Metal Plaque for Promoting Public Health Education: The Case of COVID-19 Safety Protocols and Symptoms

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### Abstract

*In 2020, public health education became a very great concern for people all over the world due to the outbreak of coronavirus disease (COVID-19). To protect humanity from this deadly virus, the Centre for Disease Control (CDC) and WHO put in place a preventive mechanism. The media used to print the protocols were mostly paper and stickers which were torn and washed away easily when it rained. This study aimed to design and fabricate COVID-19 protocols on Metal Plaque using metalsmithing techniques to promote Public Health Education. The researchers adopted a qualitative research paradigm with a Studio-Based research design within praxis and exegesis principles in artistic research. Chasing and repousse techniques and Aluminium sheets were used in the construction process. Results of the study revealed that these techniques and the material are suitable for fabricating metal*



*artifacts for education on infectious diseases, drug abuse, illegal mining, waste management, bribery and corruption. It is envisaged that the use of metal plaques for public health education be expanded beyond COVID-19 protocols to include other critical societal issues such as infectious diseases, drug abuse, illegal mining, waste management, and anti-corruption efforts. Public health agencies, educational institutions, and relevant stakeholders should consider metal-based communication tools due to their durability, resistance to environmental wear, and long-term visibility.*

**Keywords:** Covid-19 protocols; public health education; metalsmithing; metalcraft; metal Plaque; Chasing and repousse

## 1. Introduction

Public Health Education has always played a vital role in promoting the well-being of communities, especially, in times of health crises. The outbreak of the COVID-19 pandemic in 2020 underscored the urgent need for effective communication strategies to disseminate critical health information worldwide. To mitigate the spread of the virus, international health organizations such as the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC) developed and circulated preventive protocols aimed at educating the public on safety measures. However, the predominant use of paper-based media for displaying these health guidelines has often proved inadequate. Particularly in outdoor environments where materials could be easily damaged by weather conditions. In response to these limitations, this study explores the potential of metal plaques as a durable medium for promoting Public Health Education. The use of metalsmithing techniques to design and fabricate metal-based artifacts can convey critical health information in a more permanent and weather-resistant format. The application of chasing and repousse techniques on aluminium sheets highlights the suitability of metal as a material for public health messaging, particularly in regions with high environmental exposure. This paper, therefore, integrates artistic methods into public health communication and opens up new possibilities for enhancing the visibility and impact of public health education initiatives. In 1920, Winslow defined health, which has been adapted in the work of

Rosner and Fried (2010) as the following:

The science and art of preventing disease, prolonging life, the control of community infections, the education of the individual in personal health and promoting health through the organized efforts and informed choices of society, organizations, public and private communities, and individuals. (pp. 5-6)

In line with the above, Jaenecke et al. (2023), leveraging on the explanation of health by the American Public Health Association indicate that public health is the practice of protecting a group of people, being those in the villages, towns, cities and a country as a whole from disease and promotion of good health is said to be public health. This indicates that at any point in time people have to be on the known of the state of their health and where there is some shortcoming, they must also have an idea of the factors that are affecting their health with the necessary instructions that they have to abide in order to attain good health. The process that provides knowledge and what to do about people's health to the public is called Public Health education (Coombe et al., 2022; Harrison et al., 2015; World Health Organisation [WHO], 2006). It must be noted that health education is a continuous process that needs to be followed in each and every step of one's life. This enables individuals to establish the changes in the knowledge, attitudes and behaviour for a healthier life. Health education helps people to achieve good health through their efforts. It is in the light of this that in the year 2020, Public Health Education became a very great concern to people all over the world due to the outbreak of Coronavirus disease (Chow & Guo, 2023; Dabbagh, 2020).

Coronaviruses belong to a family (coronaviridae) of enveloped positive-stranded RNA virus of vertebrate virus that infects both animals and humans (Canuti, et al., 2019). On the 19<sup>th</sup> day of December 2019, a novel genomic strand of the SARS-COV (coronavirus) that had not been seen in people previously, appeared in Wuhan, China (Xu, et al., 2020). This prompted WHO to rely on its knowledge about SARS, MERS as well as how respiratory viruses spread to come up with a wide range of technical guidance and accompanying advice to help in detecting, testing and management of potential cases. To protect health workers and humanity in general, the organisation also developed a prevention control guidance which included prevention of personal contacts at the time they were taking care of potential patients. The WHO Emergencies Preparedness also

made the pronouncement that the outbreak of the new type of Coronavirus, SARS-CoV-2 that causes respiratory disease, as a global pandemic and referred to it as COVID-19 (Althobaiti, et al., 2020). About six weeks after the declaration of the COVID-19 pandemic by WHO, 52 countries in Africa officially reported cases in their jurisdiction with more than 23,500 confirmed cases, with over 1,100 deaths (Obande, et al. 2021). Luckily, over 5800 people who contracted the disease recovered fully from the COVID attack. Again, Afriyie, et al. (2020) espouse that on 12th March 2020, the Government of Ghana announced the maiden two cases of COVID-19 in the country which subsequently increased the case counts to 48,643 with 320 deaths as of 4th November 2020 (Meo, et al. 2020; Worldometers, 2020). This heightened global focus on COVID-19 also extended to Africa. By then the epicentre of the pandemic had shifted from Asia to Europe and began advancing rapidly toward the continent. The threat of COVID-19 to humanity became global of which Ghana was not an exception. Acting on the advice of the Centre for Disease Control (CDC) and WHO, the Ministry of

Health (MoH) and its agency, Ghana Health Service (GHS) designed a preventive and safety protocol to reduce the risk of Ghanaians contracting the virus. These safety protocols included using alcohol-based sanitizer or soap and water for washing hands regularly, mandatory wearing face covers (masks, shields, etc.), a flexed elbow or a disposable tissue used to cover your mouth and nose when coughing or sneezing to prevent close contact with someone who has a fever and cough and social distancing (Owusu, *et al.* 2020; Ghana Health Service 2020).

The emergence of COVID-19 brought a practice where almost every public building that one visited was likely to have a COVID-19 protocol notice posted to caution and educate the public. The primary media used to print these protocols were paper and stickers. These were easily damaged, torn or washed away when exposed to rain. In addition, these papers sometimes derailed the beauty of the building and its environs. A preliminary observation of the buildings on the Kwame Nkrumah University of Science and Technology (KNUST) campus since the beginning of the 2020/2021 academic year showed that the COVID-19 symptoms and safety protocols were printed on paper and posted on some of the buildings on the university campus had either torn or removed. These materials often left patches of

residue on building walls, resulting in a dirty appearance and diminishing the effectiveness of the information intended for the university community. As a result, the crucial health messages were not reaching the audience as they were supposed to be. Meanwhile, day in and day out, the COVID infection rate in Ghana kept getting bad which meant that the education on the protocol needed to be improved by producing them in a manner (metal plaque) that could stay longer and in a form that could add aesthetics to the environment as compared to the use of paper.

In respect of this, there was the need to produce the COVID-19 preventive protocols on a material (metal) that can withstand the test of time when it is used to make artifacts such as plaque to serve as a communication channel for educating the public on the COVID-19 disease. This study therefore sought to design and fabricate COVID-19 safety protocols and symptoms on a metal plaque using metalsmithing techniques to promote Public Health Education on COVID, especially to the members of the KNUST community and beyond.

## **2. Review of Related Literature**

### **2.1 The Notion of Plaques**

From the era of the ancient period, mankind has been using diverse channels to transmit information among themselves (Besedina, et al., 2018). For instance, Bateman et al. (2016) opine that, this phenomenon which is defined as multimodality, has been considered by some researchers as a basic means of regular practice of interaction. It is wealthy to note that the past two to three hundred years have witnessed growth in many forms of multimodal texts. Notable among them are internet memes, advertisements, demotivators, comics, cartoons, and memorial plaques. A Plaque comes from the French word 'plate' and can be defined as a thin, flat plate or tablet of metal, intended for ornament and to display an information, as on a wall. Plaques and plaquette were mounted as sword-hilts in caskets and in jewels and applied as decoration to variety of objects. Small ones which serve as buttons and as religious objects were mounted as decorative pieces in churches. The use of plaques has existed since ancient times. This art flourished in a brief period during the end of the 14th to the middle of the 16th century. Being transportable, plaques were both copied in their country of origin and abroad. It was found not only in minor arts but was also incorporated in designing important sculptural works as well. Like engravings, plaques also disseminate the taste of the Renaissance.

The New English Dictionary on Historical Principles by Murray (1987) explains that a man by name Russell Diary from India had a plaque executed in diamonds and emeralds in a form of his turban as far back as 1860. Murray further explains that in 1875 Maskell ivory plaque with its borders of foliated ornaments, birds and animals, flowers and fruits also existed in Paris. He continued to share the following:

On 8th December 1888, a wall by a North Italian artist in Bronze was exhibited in Academy. Fast forward around 1903, plaques were use in Great Britain. History confirms that on 1st December 1903 a meeting was held in Great Britain and at the reception, each British M.P was presented with a beautiful silver plaque representing England and France fraternity. Flotner's plaquette and plaques, for example, helped to make his designs a common property among German artists. (p.182)

According to Murray (1987), though Donatello is the greatest name connected with the art of plaques and plaquettes, the greater number of plaques, however, has its place of origin as unknown authorship. Plaques come in the following variety; Wood plaques, Ceramic plaques, Plastic plaques, Porcelain plaques, Enamel plaques, Stone plaques and Mosaic plaques as well as Metal plaques. Also, the Thorndike Barnhart's World Book Dictionary by Barnhart (1997) shows that a plaque is an ornamental tablet of metal, porcelain, plastic or wood, intended to be hanged up as a wall decoration or to be fixed to something such a furniture. Again, the Webster's Third New International Dictionary by Gove (1981) on the other hand defines plaque as an ornamental brooch especially the badge of honour or flat thin piece of metal, clay or ivory used for decorations, as on a wall or in an article of furniture, to identify a site or commemorate an individual or event. It is therefore not out of place for the researchers to use jewellery and metalsmithing techniques to produce the COVID-19 preventive protocols that borders on health and safety of humanity throughout the world. It must be noted that, before one employs the various techniques especially metalsmithing and jewellery making to make wall plaques, one has to come up with a concept design.

## **2.2 The Concept of Design**

Design is the act of inventing or developing ideas and then conveying those ideas to others in a way that is understandable. In other words, design is said to be a systematic action by which solution to the needs of humankind are obtained and communicated (Kovacevic, n.d.). Notwithstanding, some people are of the view that design is the creative activity that targets at projecting the usefulness and aesthetic nature of objects (Binder et al., 2011; Crilly et al., 2004; Risatti, 2009), while others observe the word design as the set of studies necessary to achieve the title of designer and exercise that activity (An, 2022; Gregory, 2013; Jones, 1992; Taşpınar, 2022). To sum up, design can be viewed as the ability exhibit the tendency creativity by people when they are deciding on the shape of an object, either in the physical or virtual form. To this end, the first step in coming out with any form of artwork or a product is the design aspect. This makes design aspect as the planning which deals with a drawing or pattern showing how the piece of work is to be made. In the light of this, design is seen as a scheme of lines or shapes for forming a pattern or decoration. For that matter a designer needs to apply the elements and principles of design in art when trying to attain the objectives of creativity to enhance beauty. Design could also be seen as the general arrangement or layout of a product, a work of art, printed material (Ashby & Johnson, 2013) as well as the art of planning or creating such an arrangement (Hautala, 2015). When one says 'design', it could mean: the design disciplines covering products, places and communication, design management, design theory, eco and environmental design as well as gender issues in design (Atkinson, 2017). The work of Bowen et al. (2016) explains design as currently applied to planning and decoration, by saying that the term 'design' originated from the Latin word 'Designare' that refers to designate or mark- out and suggest the component of identification in description. The execution of a metal plaque therefore involves designing a piece of metal work through planning and the use of lines, shape, texture to create a decorative piece through various fabrication processes.

## **2.3 Fabrication as a means of Producing Metalcraft**

Metal fabrication is a process that involves cutting, shaping or moulding materials made of different kinds of metals into the desired product (Stephenson & Agapiou, 2018). It includes bending, forging, drilling and

altering raw materials such as sheet metals and plates to form structural pieces either through hands-on or modern computerization methods. As a result, the fabrication process deployed takes into consideration the material to be worked on and the final product that is to be created. Aluminium, copper, iron, brass, magnesium, nickel, gold, steel, silver, and titanium are some of the common metals or alloys used for fabrication. Metal fabricators find work from manufacturers of equipment, contractors, and others. Song et al. (2009) have intimated that a metal fabricator submits a drawing to a manufacturer or contractor and if the drawing is approved, the fabricator starts working on the agreed rate. For ensuring precision and high-quality products, fabricators make use of CNC machining. Sometimes, fabricators sub-contract a part of the project for increasing work efficiency. Specialized metal fabricators or fab shops may also offer finishing services that involve working on the exterior surface of the fabricated products. This white paper provides in-depth information on metal fabrication and discusses in detail the statistics on metal fabrication, types of metal fabrication processes, and factors affecting the selection of a CNC machine shop. In this regard, Hague et al. (2004) have given exposure to the fabrication process that a fabricator chooses to be depending on the following three factors; Geometry of the part; the purpose for which the product is to be created as well as type of material used in creating the product. Common metal fabrication processes include casting, forging and forming. Other are cutting, punching, chasing and repousse of which the researches used the later three for designing and producing of COVID-19 safety protocols and symptoms on metal plaque.

### *Cutting*

This is one of the most common types of fabrication processes. It involves cutting a piece of metal into smaller sections. Cutting methods that are deployed by a fabricator include sawing, water-jet cutting, plasma arc cutting, laser cutting (Liu, 2019) etc. Tools available for cutting include manual tools, power tools, and CNC cutters. If a die is used to cut metal, then the process is called die-cutting. Rotary die- cutting makes use of a cylindrical die attached to a rotary press. For processing thicker materials, flatbed cutting is preferred over rotary die-cutting. Flatbed dies cutting press along with steel rule dies are deployed in a flatbed die cutting fabrication process.



### *Punching*

In this process, impressions are formed on a surface by striking a piece of metal into a die by the turrets of a punch press (Parkinson, 2015). His piece of metal can then be used for fastening. One can also use the punched-out piece known as a blank. In the majority of the processes, mechanical punch presses are used. In some cases, small punch presses operated by hand are used. CNC punching process is also common and involves the use of a CNC punch press for plate or sheet metal fabrication. A CNC punch press can be utilized for both types of metal work - heavy and light.

### *Chasing and Repousse*

Repousse is the forming of low or high relief on the surface of sheet metal normally by means of small punches (Corwin, 2009). The sheet metal is either placed on a wood or pitch contained in a shallow wooden bowl. The action of the punches causes the metal to be depressed into the wood or pitch. A punch or chasing tool with a sharper edge is used to delineate the edges of the forms being formed. This delineation of relief edges is known as chasing. Both require a chasing or a repousse hammer.

## **3. Materials and Method**

Figure 1 demonstrates the processes in which the researchers went through to execute the study.

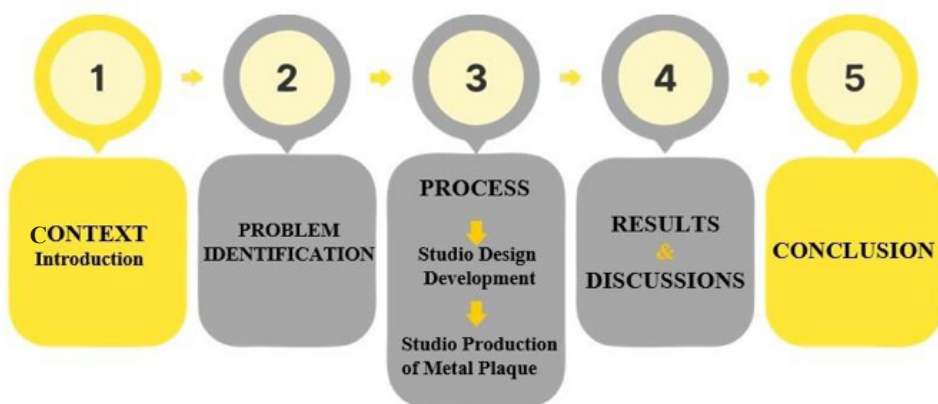


Figure 1. Methodological chart flow of the study (Researchers' construct).

### **3.1 Context**

This study focused on using metalsmithing techniques to produce metal plaque that depicts COVID-19 safety protocols and symptoms to promote public health education. The researchers adopted Studio- Based Research Method under the qualitative research design to achieve the purpose of the study. As it has been alluded to by Barrett and Bolt (2014), studio-based research method gears towards an approach that focuses on producing tangible artefacts that are based on their theory as well as practice in the studios. In other words, studio-based research combines the use of theories and methods to produce creative work piece, which differs from already known research process (Puadi et al. 2020). This makes studio-based research unique and rich. Scholars who engage in studio-based research ultimately contribute to the body of knowledge in two ways, i.e., the creative aspect and that of report. This is supported by the Sullivans (2006, xi) who said that “Imaginative intellectual work performed by artists is a form of research”. The application of metalsmithing techniques to produce COVID-19 safety protocols and symptoms on metal plaque, was studied from the perspective of visual arts but not as a study of visual arts, an endeavour that adheres to Sullivan’s art practices as a study. Against this background, scholars have recently acknowledged that the practice of art is a form of academic research that can react to each other (exegesis and practice), yet they are independent. The adoption of Studio-Based research method for the study meant that the researchers used some materials, tools, equipment as well as methods to accomplish the goal of the study (Afriyie, 2022).

### **3.2 Problem Identification**

With the emergence of the COVID-19 pandemic, a lot of efforts were put in place to protect human lives. This was done by educating the masses on the symptoms and safety protocols (WHO, 2023). These protocols were printed on media such as paper and pasted on public buildings to educate the people about what they should in order not to contract the disease. The unfortunate aspect when papers were used for printing the protocols was that after sometimes and especially when it rains, the papers either get torn or removed leaving patches of paper residues on the walls of the buildings which in some cases derail the beauty of the building and the environment in which they are situated with the ripple effect of losing the essence of the information it sets out to give to the people in the community. It is in the

light of these that researchers focused using Metalsmithing techniques to produce Metal Plaque for promoting Public Health Education.

### **3.3 Process**

The fabrication of the metal plaque began with initial sketches (figure 2) which displayed different compositions depicting the focus of the project. A comprehensive search of the protocols and symptoms of COVID which could be produced on metal sheet using chasing and repousse was carried out.

#### *Materials used*

Materials for art works are important because it helps in executing works for it to be seen and appreciated pictorially. The main material used was metal, specifically aluminium sheet. Metals are refined products of ores having different properties and characteristics. They are divided into two main groups namely ferrous and non-ferrous. Under this, there are elemental metals which are pure and alloys which are metal are mixed with other metals (Khan, 2022).

#### *Tools employed in the Production of the Metal Plaque*

Tools are the devices that are needed to execute a work of art which do not form a part of the work but rather help in making up the work. The tools that aided in the execution of the metal work are outlined with their functions as well.

*Chasing and Repousse tools:* A set of chasing and repousse tools were used in the fabrication stage of the work. It was used during the chasing and repousse process to trace and push out the design on the metal sheet. These tools were used to create the sunken areas of the design to produce relief forms.

*Wooden Mallet:* The wooden mallet was used in together with wooden sharpen tool in order to create shallow forms in the design on the metal to create the relief figures on the work.

*Sand Bag*: sand bag that was used during the fabrication of the repousse stage to support the aluminium (figure 2). It also allows the aluminium to be formed into curved shapes without damaging the surface.



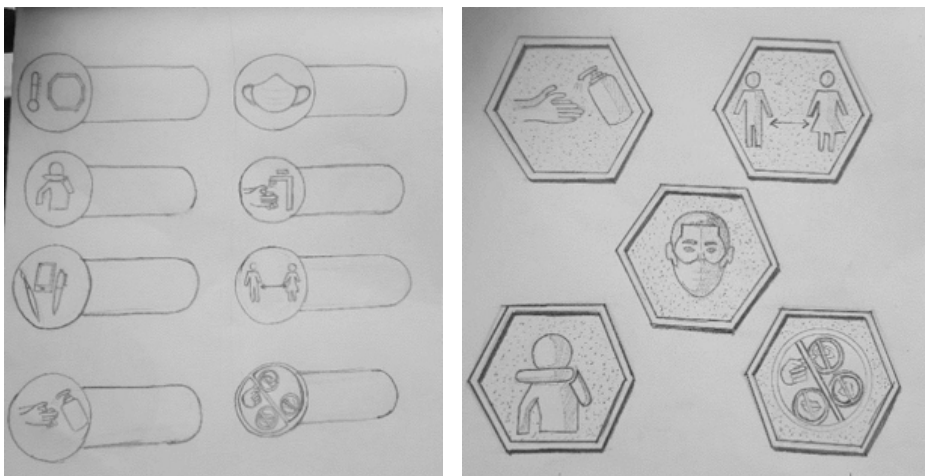
Figure 2. Aluminium sheet that was used for the Plaque (June 2021).

### **3.4 Design Stage**

Design is the act of inventing or developing ideas and then conveying those ideas to others in a way that is understandable. In other words, design is said to be a systematic action by which solution to the needs of humankind are obtained and communicated (Kovacevic, n.d.). Notwithstanding, some people are of the view that design is the creative activity that targets the projecting the usefulness and aesthetic nature of objects. Whiles others observe the word design as the set of studies necessary to achieve the title of designer and exercise that activity. To sum up, design can be viewed as the ability exhibit the tendency creativity by people when they are deciding on the shape of an object, either in the physical or virtual form. To this end, the first step in coming out with any form of artwork or a product is the design aspect. Based on this, designers have explained design as a scheme of lines or shapes for forming a pattern or decoration. For that matter a designer should apply the element and principles of design in art when trying to attain the objectives of creativity to enhance beauty. When one says 'design', it could mean the disciplines that cover the designing

of products, places and communication, management, theory, eco and environmental as well as gender issues (Atkinson, 2017). Bowen explains design as currently applied to planning and decoration, by saying that the term 'design' originated from the Latin word 'Designare' that refers to designate or mark-out and suggest the component of identification in description. The execution of a metal plaque therefore involves designing a piece of metal work through planning and the use of lines, shape, texture to create a decorative piece through various fabrication processes. Several ideas or designs were made in relation to the project topic.

The researchers began with initial sketches which displayed different compositions depicting the focus of the project. A comprehensive search was done on the protocols and symptoms of COVID which could be done on metal. Therefore, elements like, human wearing nose mask and all the safety protocols and symptoms were essential in the design composition (figures 3a & b) to convey the necessary information to the viewer.



Figures 3a & b: Sketches of covid safety protocol (March 2021).

### 3.5 Production

The researchers went through a number of processes to achieve the aim of the study which is using metalsmithing techniques to produce COVID-19 safety protocols and symptoms on metal plaque for promoting public health education to Ghanaians. Among the metalsmithing techniques used are, fabrication and finishing, annealing as well as chasing and repousse processes.

*Fabrication Process:* Fabrication is a process that involves cutting, shaping or moulding materials made of different kinds of metals into the desired product. It includes bending, forging, drilling and altering raw materials such as sheet metals and plates to form structural pieces either through hands-on or modern computerization methods. The fabrication process deployed takes into consideration the material to be worked on and the final product that is to be created. Aluminium, copper, iron, brass, magnesium, nickel, gold, steel, silver, and titanium are some of the common metals or alloys used for fabrication. Metal fabricators find work from manufacturers of equipment, contractors, and others. Common metal fabrication processes include casting, forging and forming. Other are cutting, punching, chasing and repousse of which the researches used the later three for designing and producing of COVID-19 safety protocols and symptoms on metal plaque. The various processes that were carried out during the production of the Metal Plaque include annealing, gluing the paper to the metal, chasing and repousse.

*Annealing the Aluminium sheet:* To release the stress that was induced in the metal, the metal was annealed from time to time after working it. This was done by heating the metal using the open fire method of annealing (Figure 4) to a certain temperature. What followed this is termed quenching. This had to do with leaving the metal sheet to cool after it had been withdrawn from the fire that was used in the annealing process.



Figure 4. Annealing the aluminium sheet (July 2021).

*Transferring the design onto the metal sheet:* Before the chasing process the printed design was glued onto the aluminium sheet using the white glue mixed with water (Figure 5). The white glue served as adhesive for gluing the paper to the metal sheet. The glued paper on the aluminium sheet was left for some time to dry before the chasing the design. The chasing process was done to trace the design from the paper to the metal sheet. This was done using the chasing tools and the chasing hammer.

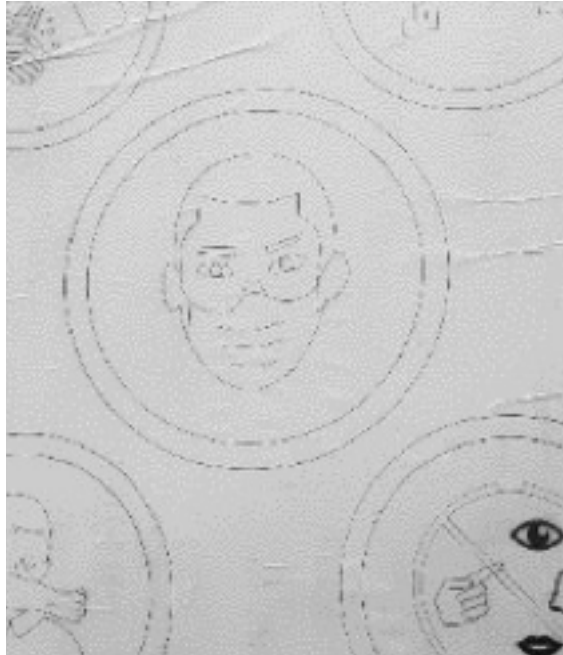


Figure 5. Design glued onto the metal sheet (July 2021).

*Chasing and Repousse processes:* The complicated designs were attained with the combination of the chasing and repousse techniques. Repousse is the forming of low or high relief on the surface of sheet metal normally by means of small punches. The sheet metal is either placed on a wood or pitch contained in a shallow wooden bowl. The action of the punches causes the metal to be depressed into the wood or pitch. A punch or chasing tool with a sharper edge is used to delineate the edges of the forms being formed. This delineation of relief edges is known as chasing. In this study the folding in the nose mask and the hairs of the figures were achieved with the small chasing tools and the chasing hammer hitting from both the front and back of the metal sheet as figure 6 shows.



Figure 6. Chasing of the design (July, 2021).

The aim of this study was to design and produce a metal plaque for Covid 19 safety protocols and symptoms to provide reliable and durable means of communicating a major public health concern. The combination of the metal and the metalsmithing techniques that were adopted to design and fabricate the plaque gives a contrasting effect, which enhances the beauty and the intended message that the researchers want to carry across.

#### **4. Results and Discussion**

In the execution of the work, the researchers made several discoveries. Figure 7 that shows the final work produced contains the following COVID-19 symptoms are displayed on the chased and repousse metal plaque, high fever, dry cough, headache, sore throat and muscle pains.





Figure 7. Finished Metal Plaque of Covid-19 Safety Protocols and Symptoms (August 2021).

Others which are the Covid-19 safety protocols include:

- mandatory wearing of nose mask.
- using alcohol-based hand sanitizers.
- maintaining social distancing.
- avoiding touching the nose, the eye and the mouth.
- covering one's coughs and sneezes with one's elbow.

First of all, the researchers noticed that papers and stickers are not the only medium through which information can be disseminated to people but also metal works like chasing and repousse on metal plaques which are durable and can also be used to display or convey information to viewers. The chasing and repousse technique are suitable techniques for the fabrication of designs that has to do with addressing issues affecting a nation such as drug abuse, illegal mining, waste management, bribery and corruption epidemic deceases. The techniques were able to bring a relief form into the work.

The outcome of this study revealed that the safety protocol and the symptoms of COVID 19 can be made in a form of plaque using metalsmithing techniques on metals. Aside the fact that the safety protocol and the symptoms on the metal plate providing a last long medium for communication it also adds some beautification to the environment. This supports the notion of Bateman et al. (2016) that information transfer can be done through the usage of varied several channels to listeners, observer or reader as the produced COVID-19 Metal Plaque is intended. Such medium for communication has been defined as multimodality which has come to the attention of mankind since ancient times.

This communicative process using the medium of metal to produce the COVID-19 Metal Plaque is to be of diverse nature. In the first instance, it is going to contribute to the securing the knowledge of the devastating COVID-19 which once brought the world to standstill. On the other hand, for a society as a whole, to be conscious of things that they are required to do in order to protect themselves from the disease. The interaction of cognition and communication in the COVID-19 Metal Plaque, content (i.e., the Covid-19 symptoms and safety protocols which are in figure 10B and A respectively) provides the comprehension of language interpretive function. The very “genre” of the plaque gives the understanding that one coordinate system for its perception by both artists and the public. The researchers designed and fabricated the COVID Metal plaque with certain elements that will help to educate the public on their safety as far as COVID-19 is concerned because of people’s socio-cultural inclination. This implies that, it is essential to distinguish between the interpretation of the meaning laid down by the artist (researchers) and the interpretation that is developed by each individual who comes across the plaque according to his/her views. The position of the researchers can be supported by Boldyrev and Dubrovskaya (2015) who commented on what scholar artist can do in research:

participants compare, analyse, and organise information into discourse according to the sociocultural knowledge they obtain as active members of a particular socio-culture. Social roles, values, norms, and other social modes result in the national, professional, religious, gender, age and other identities, the knowledge of which is culture-specific and affects discourse construction. (p. 27)

The COVID-19 Metal Plaque, is a kind of 'ensemble', in which its artistic decoration and the motifs used corresponds to the architectural or graphic style of the relevant era, the shape and the material from which the plaque was made of – all play their roles (Bykova, 2011). It must be noted that functions and meaning of the visual elements of a plaque can go beyond the boundaries of the motif that are used in the artefact. This suggest that interpretations observers give to the content of a plaque may have additional meanings which are not the same as the predictable meanings of the researchers (Voloskovich, 2011). This does not negate the fact that the COVID-19 Metal Plaque cannot serve its purpose.

## **5. Conclusions**

The purpose of the study was to design and fabricate COVID-19 safety protocols and symptoms on a Metal Plaque using metalsmithing techniques to promote public health education (COVID) especially members of the KNUST community. The study has provided a Metal Plaque made from aluminium sheets. One part of the plaque shows the Covid-19 safety protocols, which include mandatory wearing of nose mask, using alcohol-based hand sanitizers, maintaining social distancing, avoiding touching the nose, the eye and the mouth and covering one's coughs and sneezes with the elbow. The other part also covers the symptoms of Covid-19. These symptoms include high fever, dry cough, headache, sore throat, and muscle pains.

The researchers are, therefore, concluding that the study has provided a reliable and durable means of communicating to the public the Covid-19 safety protocols and symptoms in a form that gives education as well as aesthetics. Successful execution of the study has made a case for the techniques and the material to be suitable for fabricating metal artefacts for the educating the public on pressing national issues such as COVID-19, drug abuse, illegal mining, waste management, bribery, corruption and epidemic diseases using the chasing and repousse techniques with metal as the support. Additionally, Metal Plaques can also be used to display information to viewers apart from papers and stickers. Plaques are also good medium of transferring information to viewers. The chasing and repousse technique should be used to communicate information to viewers. It is, therefore, recommended that artists who intend to explore their creative process use this technique. It is important for researchers who intends to

use this technique to produce a model on a smaller scale in order to achieve accurate results. It is anticipated that the application of metal plaques for public health education will extend beyond COVID-19 protocols to address other significant societal challenges, including infectious diseases, drug abuse, illegal mining, waste management, and anti-corruption initiatives. Public health agencies, educational institutions, and relevant stakeholders should explore the use of metal-based communication tools, given their durability, resistance to environmental degradation, and long-lasting visibility.

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