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Relief modelling using the Chiaroscuro technique: A project work among student-sculptors

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Abstract: Relief modelling is a very peculiar task that requires the creation of three-dimensional forms onto two dimensional surfaces to depict depth and volume in a composition. Preliminary research revealed that students in the Sculpture section in the Department of Painting and Sculpture in the Kwame Nkrumah University of Science and Technology faced the challenge of producing relief sculptural pieces to give them the three dimensionality that suggests volume and depth. This project work that utilized studio-based research approach rooted in the constructivism theory was aimed at experimenting on how to overcome the flaws in relief modelling using the chiaroscuro technique. Twelve (12) student-sculptors participated in this project using the stratified sampling technique. They were taken through practical sessions in modelling compositions of geometric forms, still-life, and human figures, with drawn or image references with the chiaroscuro technique as the focus. After the project, the student-sculptors were able to interpret the illusion of three-dimensionality in picture reference into the actuality of depth and volume during modelling, rendering compositions in its right planes or surfaces. The study recommends the application of the chiaroscuro technique in relief sculptural practices such as relief carving, repoussé, and other relief related sculptural practices.

Keywords: Chiaroscuro, Image/photo references, Plane/Surface, Relief modelling, Relief sculpture, Three-dimensional forms

1. Introduction

Chiaroscuro is an art technique with its etymology from the Italian words *chiaro* (light) and *oscuro* (dark) and is defined as the interplay of light and shade to achieve a three-dimensional effect (Adom, 2014; Luzi, 2017). The careful depiction of light and shade is often aimed at increasing the value of the work of art, making the visual art pieces look more persuasive (Summers, 2013). It is an artistic expression that gives depth and volume to works of art, especially relief sculptural forms (Ward, 2008). When it is creatively applied, it leads to a pleasing work of art that makes it easy for artists to put expressions to important aspects of the composition that need emphasis (Kraguljac, 2008). Chiaroscuro is an artistic expression used in achieving optical naturalism (Hara, 2017). It is a universal concept that have been applied to various art forms such as painting, architecture,

photography, woodcuts, sculpture and textiles (Ward, 2008; Gnann et al., 2014; Ramadhan, 2019). The chiaroscuro technique was used by renowned artists in the Renaissance, Baroque, and Rococo periods (Calvin, 2005). These renowned artists include Giotto, Cimabue, Caravaggio, Leonardo da Vinci, Rembrandt van Rijn, Raphael, Correggio and many others (Ramadhan, 2019; Ward, 2008). Great Renaissance art masters such as Baccio Bandinelli, Ghirlandaio, Verrocchio (Cadogan, 1983; Thomas, 2005) deliberately taught their apprentices chiaroscuro techniques as an important ingredient in depicting accurate depth and volume of forms when producing relief modelling forms.

Despite the significant role that chiaroscuro plays in the production of relief sculpture, art facilitators and teachers have noticed that students over the years relate well with the chiaroscuro technique in shading, painting, drawing, photography, and other two-dimensional art practices. However, students tend to limit the chiaroscuro technique when rendering actual three-dimensionality in their relief modelling practices. The illusion of three-dimensionality, which is usually captured in drawn or photograph materials, has a direct effect on the level of planes or surfaces when rendering out a relief piece. This indicates that; tones of shade are relatively in lower planes, whereas, tones of light are relatively in higher planes, with regards to the distribution of light and shade in the picture reference, with exemption to colour. According to Miller (2021) "light play and shadow is everything in modelling. Sometimes when I am lost in creating, I feel as if, I am painting light and shade with clay in relief modelling in particular. It is all about planes and creating perspective. I enjoy working through the many puzzles until I get it right". Applying this visual technique comes with understanding and interpreting the components of light and shade in an image, which creates the illusion of three-dimensionality. Relief modelling reflects the peculiar task of pushing forms, which is three-dimensional onto a two-dimensional surface while, retaining as much as possible the fine details of the three-dimensional scene (Ji et al., 2014). Relief modelling relatively has similarities with other two-dimensional art practices. One key similarity is that they are all rendered from a surface, usually referred to as a support (background and foreground). The purpose of this study was to embark on a project that would enable student-sculptors to know how the concept of chiaroscuro could be applied to relief modelling by transforming the illusion of three-dimensionality of form to actual three-dimensionality, limiting unnecessary technical challenges. Art facilitators and lecturers at the Sculpture-Section, KNUST have observed that student-sculptors encounter the challenge of transferring three-dimensional forms onto two-dimensional planes. One of the main challenge student-sculptors go through in their relief modelling practice is how to create the right planes of depth and volume from three dimensional illusions in drawn or picture reference (Amenuke, 2021). This challenge often frustrates student-sculptors' relief practice because they tend to limit their concept of chiaroscuro to only two-dimensional art practices, and end up not exploring this key technique in relief practices. In this project, the chiaroscuro technique was explored and implemented in relief clay modelling. Relief modelling is an interesting art practice in the field of sculpture that transforms the distribution of lights and shades into an inclination of surfaces to create a three-dimensional composition on a surface. Applying this visual art technique comes with understanding and interpreting the components of light and shade in an image, which creates the illusion of three-dimensionality.

1.1. Chiaroscuro as an artistic expression

Chiaroscuro has been used as a stylistic and narrative device of aesthetics throughout art since the 17th century, which has helped define several artistic genres and movements. This technique has been experimented with, for

several purposes in different fields, from imaging through; drawing, painting, photography, and time-based media such as movies and animations. Students of Michelangelo Merisi da Caravaggio and himself identified a new technique of figure representation methods by employing a very contrasting light quality, which amplifies the information shape and material properties and builds more emotional and allegorical opportunities in their paintings applications. Through the use of Chiaroscuro, artists have conveyed a dramatic mood., capturing simulated views from other periods, applying allegorical meanings to the character and environment representations, and so on (Lally, 2010). On a two-dimensional piece of paper or a canvas, using the Chiaroscuro technique, the illusion of three dimensions is created using tones, shades, shadows, and highlights. Clarity and darkness are the two Italian words that describe chiaroscuro, a technique that dates back to Renaissance times in English translation: "light-dark" (Harmon, 2021).

1.2. Chiaroscuro in drawing

"Chiaroscuro" is the use of light and dark to create the illusion of three-dimensional volume on a flat surface, according to Scott (2019). Chiaro-scuro means "bright-dark" in Italian. The drawings below clearly exhibit this concept, by rendering three-dimensionality of forms, using tones of lights and shades, to bring out the illusion of three-dimensionality. This is seen in both the geometric forms and the still-life composition, as indicated in Figure 1 and Figure 2. It depicts three-dimensional illusion of distance, thickness, and volume all onto a two-dimensional surface. or support.

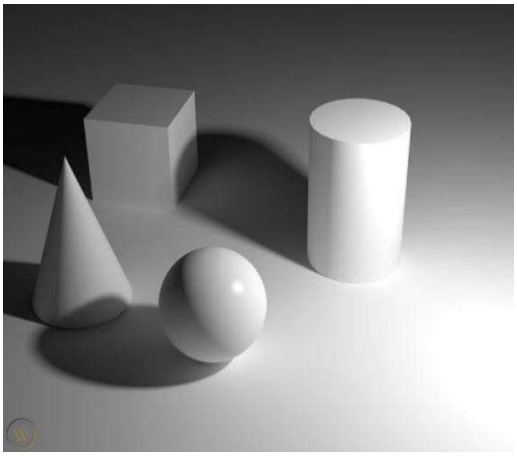


Figure 1: Geometric forms Composition
Source: Academy of Art University, 2022

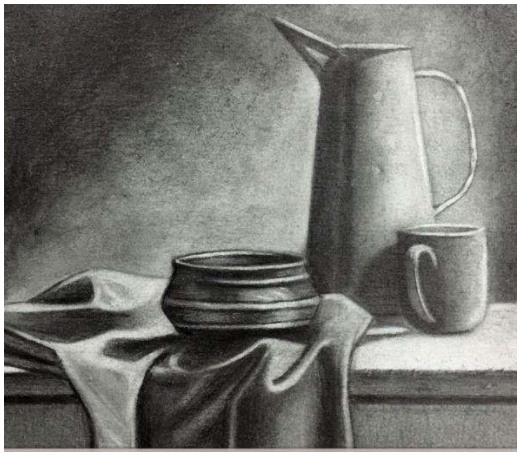


Figure 2: Still-life Composition
Source: Freixieiro, 2022

In the compositions above, the artists expressed the chiaroscuro technique to attain an illusion of three-dimensionality in form. Here, the artist played with two elements, which are; light and darkness. The interplay of tones of light and dark enabled the artist to create three-dimensionality on a flat surface, indicating a foreground; on which the objects rest, and the background; the space, behind the composed objects. The artist depicted in this imagery with graphite and charcoal pencil, interplaying the contrast of white support or paper, and dark or shade effect from the graphite and charcoal pencil. The shading bring-out the tonal gradation in

form, turning a line into shape, a shape into a form, that manifested the three-dimensionality on a surface with the use of the chiaroscuro technique.

1.3. Chiaroscuro in painting

In paintings, chiaroscuro employs strong light-dark contrasts. This technique is often employed by art historians and artists to define the application of contrast tones in a painting to attain a sense of volume. It is a bold contrast to light, which influences the whole structure. Caravaggio, Gerrit van Honthorst, Leonardo Da Vinci, Rembrandt, and Vermeer are known for the development of the chiaroscuro method. The fundamental concept of the technique of chiaroscuro is the solidity of form, best depicted with light (Koehler, 2020).

Figure 3: "Christ before the High Priest" by Gerrard van Honthorst, 1617

Source: UK National Gallery (2022)

"Christ Before the High Priest", by Van Honthorst, was listed as a substitute for the exaggerated contrast in several of Caravaggio's paintings. Contrary to the invisible light sources of Caravaggio, it was Van Honthorst's idea to have Christ and the High Priest be highlighted by one candle on stage. A single light source allows Van Honthorst to maintain the drama of the scene while capturing an accurate representation of the naturalistic ambient light that fills the room, allowing secondary characters to remain barely visible in the background. The chiaroscuro technique was used by Van Honthorst and Caravaggio relating colour and form to their scientific and naturalistic appearance.

1.4. Chiaroscuro in photography

When it comes to photography, the term chiaroscuro refers to high contrast lighting. To create an arresting image using the extremes of dark and light. For colour or black and white photography it is suitable (Mateer, 2020). Through a medium that is based solely on the capturing of light; photography represents the first major technological evolution in the representation of chiaroscuro in the media. The chiaroscuro effect in classical paintings is more closely related to photography that uses artificial lighting, and most implementations of the technique have some overlap with its representation in film, which was heavily influenced by early

photographers' methods and techniques (Lally, 2010). Image references from photography, are mostly referred to when modelling relief pieces, because the medium of photography, betters captures the concept of chiaroscuro for easier understanding and rendition.

In this study, the researchers encouraged the participants to use more photographic media as references for practicing relief works, this is because photo references have higher imitational qualities as compared to drawn references. Though, drawn references help one to have an in-depth understanding of tones of lights and shades their relation to relief modelling.

Figure 4: "Kara" by Robert Moran, 2014

Source: Flickr (2022)

The distribution of light and shade on the human figure, expresses an interesting view of three-dimensionality, depicting; an interesting tone of light and dark, to bring out the flow of the figure in planes. The dark and light tones, on a dark background create a vivid illusion of three-dimensionality, with the highlights giving dominance to some features on the figure in the photograph. The lighting condition in this photograph enabled the artist to perfectly express the concept of chiaroscuro, by creating a perfect three-dimensional illusion in form or volume.

1.5. Chiaroscuro in sculpture

The chiaroscuro technique has not really had its direct hand in sculptural practices but has played a significant role in rendering three-dimensional pieces, especially in relief sculptural practices such as; repoussé, engraving, woodcut, or printing block (relief print), and other related forms. This technique could also be seen as the effects of light and darkness on already made sculptural pieces or objects. Relief printing is a printing-block technique in which ink is then applied on the block and used to press on a surface to print. Ink is not applied to the engraved, lines or shapes in the printing block, therefore those parts become the negatives. And, the printed items reveal the non-carved surfaces that the ink was applied. The printed image then becomes the mirrored print of what is on the block (Royal Academy of Arts, 2017). Relief printing is the process of engraving a printing block surface for printmaking so that only the design remains of the original surface. Examples are woodcut, anastatic printing or relief etching, linocut, and metal cutting processes (Britannica, 2021). Using gouges and

other tools, woodcutters carve a design into the surface of a wooden block. For example, ink is used to print on the elevated areas that remain after cutting and ink is not used to print on the recessed areas that are cut (Metropolitan Museum of Art, 2021). The above definitions give a clear view of how the chiaroscuro technique has been employed in sculpture, through carving, to enable printing. This technique was used by some renaissance chiaroscuro artists to create multiple colour prints, where a different palette of carved block surfaces was used to print. This process employs a carving technique, through which the concept of chiaroscuro is implemented.

Figure 5: Diogenes, seated before his barrel, reading from a book, a plucked hen standing behind him at right. by Ugo da Carpi, 1527–30

Source: Metropolitan Museum of Art (2017)

"Ugo da Carpi was the first Italian artist to experiment with the Chiaroscuro technique, a multi-block woodcut technique. Each shade needs a different block, which is inked and printed one on top of the other to create the composition. The artist creates form, through areas of tone in this exceptional example of the medium. Ugo seems to have been influenced by Parmigianino's wash sketches, with whom he may have collaborated. Diogenes, the Greek philosopher, is depicted in the print, engrossed in his studies. His mocking response to Plato's description of man as a featherless biped is represented by the chicken at right: "Here is Plato's man!" Diogenes is said to have offered a plucked chicken (Metropolitan Museum of Art, 2017).

2. Research methodology

This study adapted the procedural steps in the Arts-based research approach known as the Double Helix of Praxis Exegesis Model (Figure 6) by Marshall (2010). The model allows to the smooth transition between creative processes both in theory (exegesis) and practice (praxis). The procedural steps in this model includes observation, reflection, creation and analysis. These procedural steps in the Double Helix of Praxis Exegesis Model are undergird in the constructivism philosophical paradigm which was sourced from the interpretivist's philosophical paradigm enabled students to be fully engaged in the learning process, so that they could discover knowledge or truth on their own (Adom, 2016).

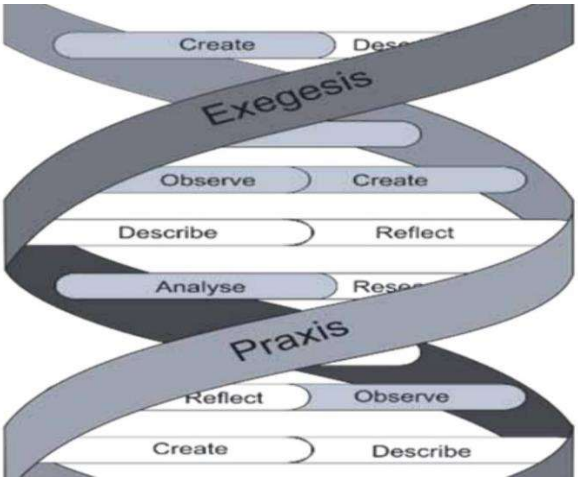


Figure 6: Double Helix of Praxis Exegesis Model

Source: Marshall (2010)

The concept of the constructivism paradigm, was implemented in this study to generate outcomes during the practical session with participants. This study through the constructivism concept, allowed participants to make their own discoveries on how to achieve the goal of the study. Twelve (12) students out of twenty-three (23) students in their second year from the Sculpture-Section were selected through stratified random technique. Their participation in the project was voluntary. The study adopted; participant observation, interview and focus group interview tools. The following steps were followed for the project work:

Step 1: This first stage of the process involved the garnering for images or drawn references and identify how the concept of chiaroscuro was demonstrated through a careful observation.

Step 2: In the second stage, deep meditation and reflection on the design qualities of the chiaroscuro images were made.

Step 3: The third stage allowed the study participants to create chiaroscuro images, picking clues from the observed and reflected chiaroscuro images. They engaged in participatory art of drawing and rendering in shading to replicate the concept of chiaroscuro. The creation was then translated from a two-dimensional form to a three-dimensional form in relief clay piece.

Step 4: In the fourth stage, the study participants identified the right tools and materials for the chiaroscuro project. The materials, tools and equipment included clay, sketch pad, pen, pencil, metal ruler, spatulas, wire-ended tools/scooping tools, serrated-edge tools, brush, wooded patterned board, polythene sheet, foam, studio bench, and the pug-mill machine.

Step 5: In the fifth stage, clay slabs were prepared from the clay that have been worked on to a state suitable for artistic rendering in sculpture.

Step 6: In the sixth stage, the chiaroscuro referenced image was drawn onto the prepared clay slab.

Step 7: In the seventh and last stage, the sculptural form that reflects the characteristics of the chiaroscuro technique was produced.

3. Results and Discussion

3.1. Chiaroscuro technique in relief clay modelling; the project work of student-sculptors

From the results of the study, as depicted in Figures 7 and 8, students were able to depict effects of light and shade distribution in picture references, creating an illusion of three-dimensionality by drawing and shading. Here, the study participants were taken through a series of drawings and shading, focusing mostly on still-life drawing and descriptive drawing. The participants were given the liberty to select objects for the still-life drawing and also choose an existing picture for the descriptive drawing. It was observed that participants were familiar with creating a three-dimensional illusion through drawing and shading. This is because, the concept of chiaroscuro is conventionally ascribed to two-dimensional Visual Art practices. This exercise was taken to make participants aware of tones of light and shade distribution in image (drawn or photograph) references and their effects on planes or surfaces when modelling a relief piece.

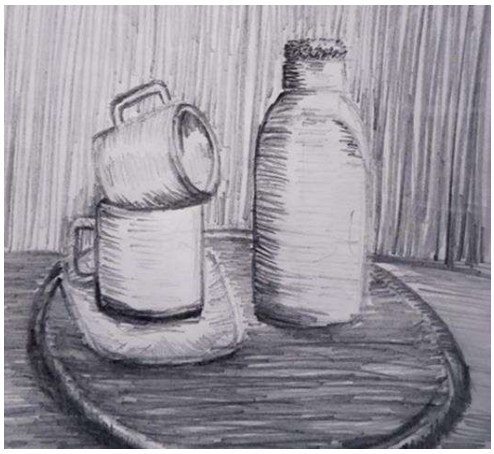


Figure 7: Still-life Drawing with Pencil

Figure 8: Still-life Drawing with Pen

(Drawing of participants expressing the Concept of Chiaroscuro)

Source: Participant's Studio Session, 2021

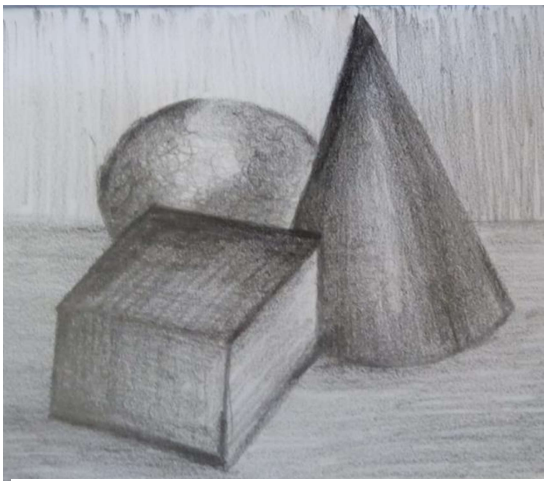


Figure 9a: Drawn Reference Composition of a; Cube, Cone and Sphere

Figure 9b: Relief Modelling Composition of a; Cube, Cone and Sphere

Source: Participants' Studio Session, 2021

Figures 9a and 9b above, present a three-piece composition of geometric forms of cube, cone, and sphere. Here the position of each form determines how it was modelled with regards to background and foreground. The object closer to the foreground becomes the form with the highest surface or plane, the object closest to the background becomes the form of the lowest surface or plane, and the form in the mid-zone lies between the two forms. With reference to this, the cone becomes the form in the mid zone, the cube as the highest form, whereas, the sphere is the lowest form in this composition, regarding the planes or surfaces.

Figure 10a: Photo Reference of a four-piece Still-life Composition

Source: Flickr (2021)

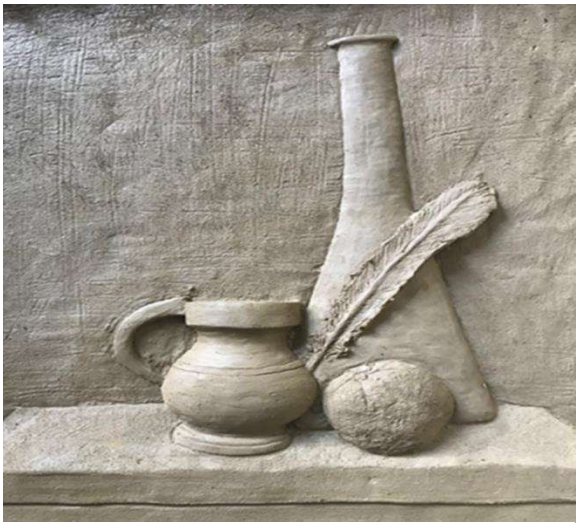


Figure 10b: Relief Modelling of a four-piece Still-life Composition

Source: Participants' Studio Session (2021)

The composition in Figure 10b depicts a still-life composition of a conical jar, a mug, an orange and, a feather. It is a four-piece object composition; with some basic geometric forms of a; cone seen in the conical jar, cylinder seen in a mug, and, a sphere, as seen in the orange. The revolving nature of the objects in the composition creates a fair distribution of light and shades; creating a good illusion of three-dimensionality as depicted in the photo reference in figure 10a and actualised from illusions to relief planes of surfaces in conformity to the chiaroscuro effect; as seen in Figure 10b. The tonal differences on each object, speak to the kind of textures given by the participant on the objects in the relief composition.

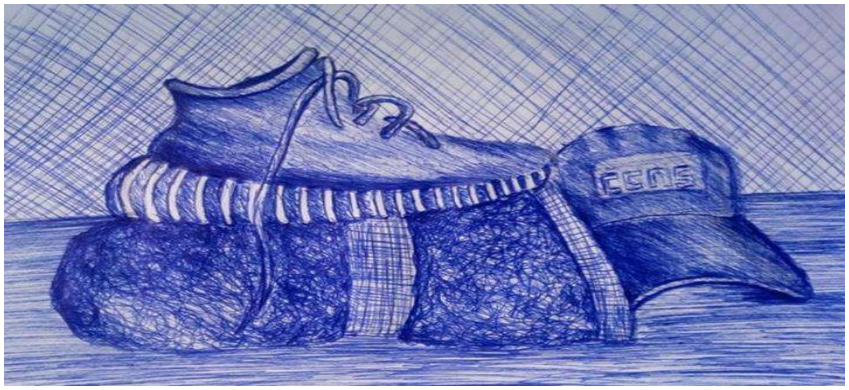


Figure 11a: Drawn Reference of a three-piece Still-life Composition

Source: Participants' Studio Session, 2021

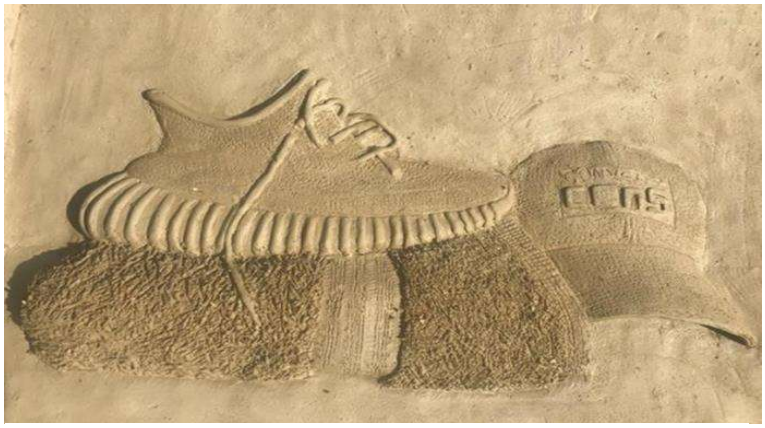


Figure 11b: Relief Modelling of a three-piece Still-life Composition

Source: Participants' Studio Session, 2021

The rendition in Figure 11b depicts a composition of a cap, a towel and, a laced right footwear. The participant of this composition made a good choice of objects with differences in form, texture and, position. Here, the participant presented the towel as the highest plane; with the footwear on it, as the mid-zone plane, and the cap as the lowest plane with the visor of the cap projecting from the embroiled panel into a mid-zone plane. The towel was interestingly rendered with different textural effects; the pile area was given scribbled textural effects, the border with some parallel textural incisions, and, the cross hem; was also given a criss-cross textural incision. And the footwear; rendered with bulging convex vertical projected lines on the sole of the footwear, fused with the top part, and stripes of clay depicting the lace. The participant, modelled these objects on a relatively smooth foreground and background surfaces, to enable the composition to stand out regarding the concept of chiaroscuro. In a critical study of the drawn reference, it could be observed that the participant exaggerated the objects in the composition, expressing what could not be captured during the still-life drawing session, as seen in Figure 11a.

Figure 12a: Photo Reference of a female Figure

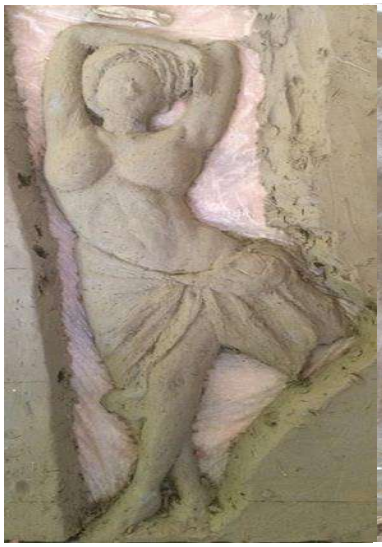


Figure 12b: Blocked Modelling Stage of the Reference

Figure 12c: Finished Relief Piece of the Reference

Source: Participants' Studio Session (2021)

Figures 12a, b, c presents a photo reference, progress rendition, and final rendition of a partially nude female figure; with hands wrapped above her head, and a cloth claded drapery around her waist, in a cat-walk posture. The three-dimensional illusion created in the photo reference made the participant to; actualise the image, in a very interesting finish. The modelling of drapery in the cloth, and scarf, the soft and smooth body flow; with a variation of the body (skin), hair, and cloth. The participant who produced this modelled piece; understanding the concept of chiaroscuro and the states of clay, rendered a very interesting piece, putting the planes at the right levels; especially the overlapping posture of the limbs (arms and legs), with a good burnishing finish, making the surface glossy. Among the single figure pieces, this piece was one of the best-rendered piece with regards to application of the chiaroscuro technique.

Here, the participant did not only give attention to the posture of the figure but also rendered a good details of the facial expression of the figure; in addition to a good finish.

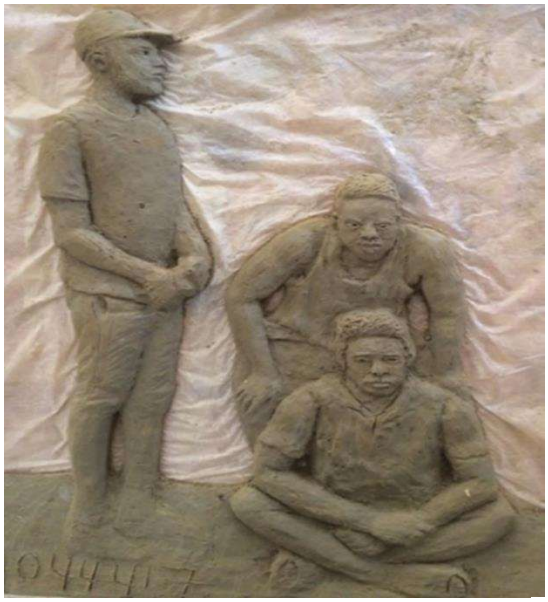


Figure 13: Relief Modelling Piece of three male figu

Figure 14: Relief Modelling Piece of a male and two female figures

Source: Participants' Studio Session

The Figures 13 and 14 present a three-figure composition in postures of; standing, squatting, and sitting; in each piece. The facilitators, upon giving the instructions, asked the participants to form groups of three, in the above mentioned postures, and take pictures of themselves as the photo reference for the exercise. This exercise was undertaken to ascertain how the participants could relate to multiple planes, maintaining good levels of rendition for each figure in the three-figure composition. After the exercise, participants expressed a good sense of understanding of the concept of chiaroscuro and; were able to apply the technique to actualise three dimensionality from illusions in two-dimensional photo references, used for modelling the relief pieces.

Figure 15: Prepared Clay Slab

Source: Participants' Studio Session, 2021

Figure 15 is a prepared clay slab onto which the relief modelling practice was done, using the concept of chiaroscuro. The support (clay slab) became the ground on which the renditions were practiced, splitting them into both foreground and background. The facilitators for this project-based study, made the participants to draw relations between the slab, and other two-dimensional supports for Visual Art practices, which the participants were able to relate. The clay modelling relief practice using slab enabled students to actualise three-dimensional illusions in their two-dimensional visual art practices. The clay is filled into a wooden patterned board lined with a polythene sheet. The clay is prepared into a plastic state, allowed to attain leather-hardness to prepare the slab (Figure 15) to avoid excessive shrinkage and sagging of the slab from the board.

Figure 16 presents the participants in one of the practical sessions of the project. The picture captured the participants in the Sculpture Studio, modelling a nude male figure, with a printed photo at the bottom left side of the slab depicting the concept of chiaroscuro. This is one of the quick sessions for; testing how the participants actualise three-dimensional illusions in images into right planes or surfaces. Here, the task was to block the figure into the right planes with reference to the printed photo used.

Figure 16: Participants' Working in the Studio

Source: Participants' Studio Session, 2021

The immediate participant in Figure 16 shows how the participants employed the grid-scale technique to capture the right outline of a nude male figure, before using the tones in the printed photo reference to work out the planes or surfaces, thereby, actualising three-dimensionality in the modelled figure. In this study, the practice was done by modelling into (carving in) the slab, rather than modelling onto (adding on) the slab. This was to enhance their relief carving practices as well, which requires a similar techniqueThrough a series of practical sessions using the chiaroscuro technique in this project-based study, the researchers observed from the relief pieces produced that:

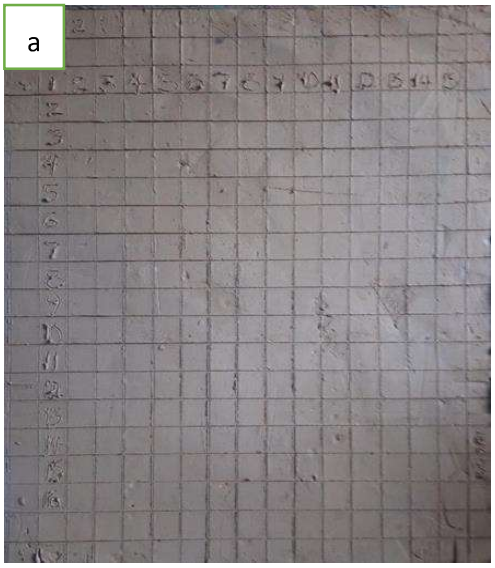
1. Participants were able to render tonal differences in picture references and their relation to planes in relief modelling.
2. Participants were able to actualise illusions of three-dimensionality in drawn or image references into relief modelling.
3. Participants who were able to draw and shade well are also able to render good relief pieces in the right planes.

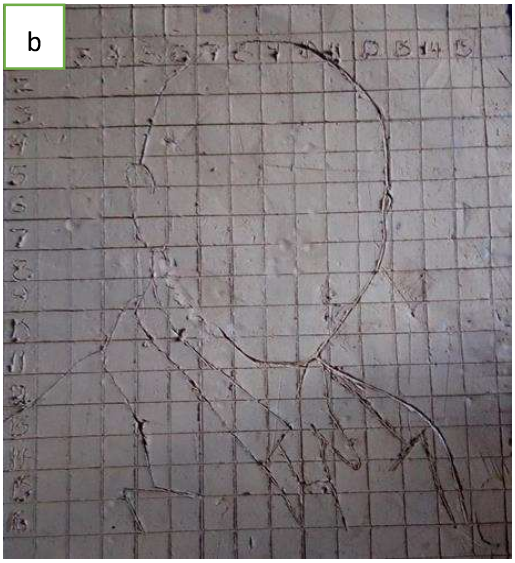
The technique though a novelty in sculptural practices, applying it in the relief modelling practice helped resolve the main challenge the participants encountered; which was modelling three dimensional forms onto a surface, and retaining the right planes of volume.

3.2. The process of creating a Relief Modelling Bust

The process to actualise three-dimensional illusion in two-dimensional image reference, with clay relief modelling technique begins with; preparation of clay slab with grid-lines (a) and drawing the image onto the

gridded slab (b); to ensure the right outline, blocking out the form by carefully checking out tones to ensure the right attainment of planes (c), with a wire-ended or scooping tool, and serrated edged tool, and working out the features by carefully analysing the tonal distribution of lights and shades (d). Through the variations of tones of lights and shades in the picture reference (e-h); the researchers led by the lead researcher, were able to render, textural differences between the hair, skin, and cloth (suit, shirt, and flying tie) and also rendered the wrinkles on the skin by creating grooves or depressing lines, blending (i). The Figure 17 is a relief bust of former President of Ghana; John Agyekum Kufour, modelled as a demonstration to inspire student-sculptors during the studio sessions, to know how the chiaroscuro technique can be applied in their relief sculptural practices to resolve the main challenge of modelling three-dimensional forms onto surfaces.



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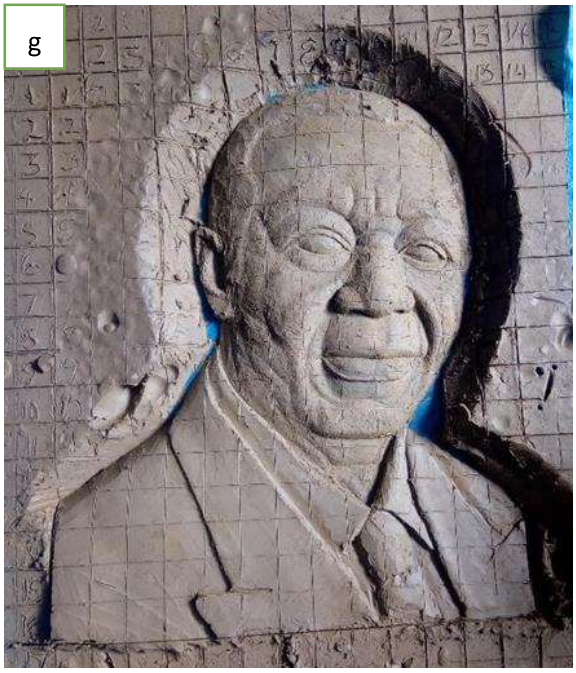
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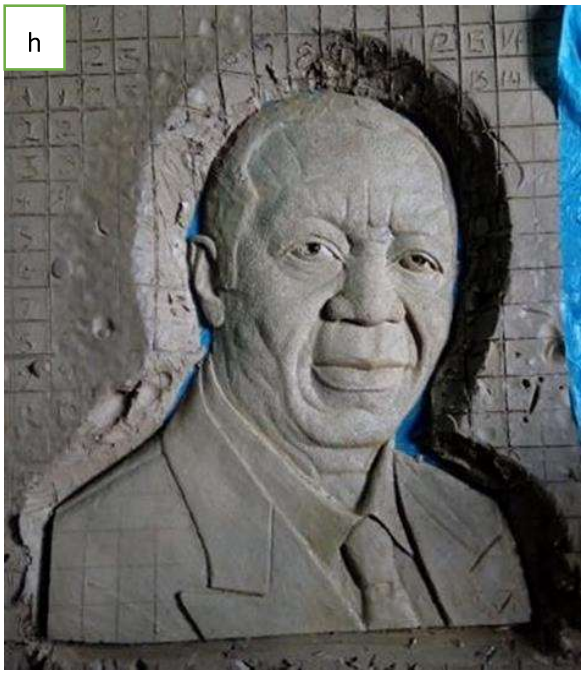
h

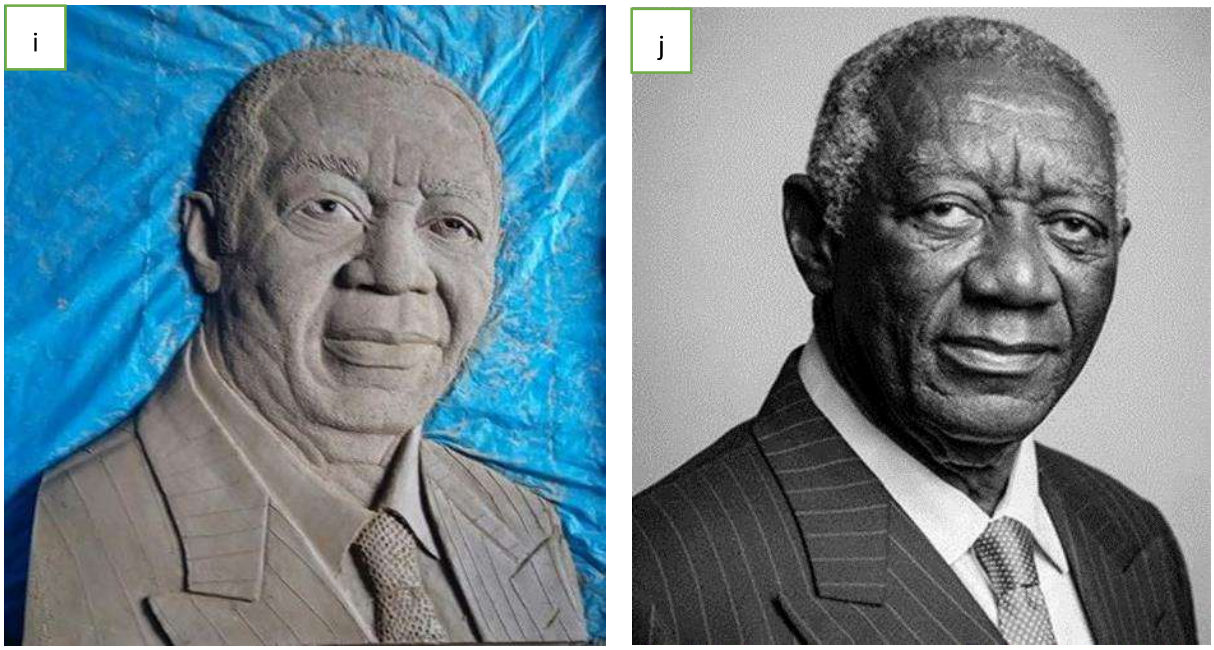

Figure 17 (a-j): A relief bust figure of John Agyekum Kuffour in Chiaroscuro
Source: Researchers' demonstration work on chiaroscuro in relief sculpture

4. Conclusion

The main purpose of this study was to embark on a project aimed at assisting student-sculptors to overcome the challenges they encounter when practicing relief clay modelling. The persistent challenge mainly was how to represent three-dimensional forms onto a two-dimensional surface. In resolving this challenge, the researchers adopted the chiaroscuro technique which is conventionally known in two-dimensional Visual Art practices and applied it in relief clay modelling practices. The study enabled participants to understand and use illusions of three-dimensionality in photo and drawn references, studied and actualised it into relief clay modelling pieces. The tones in the picture references informed the planes or surfaces of the relief pieces. The study contends that through drawing and shading, students were able to replicate the concept of chiaroscuro in image references for relief modelling. Also, the application of the chiaroscuro technique enhanced students' output in their relief clay modelling practice. Therefore, the study recommends the application of the chiaroscuro technique in relief sculptural practices such as relief carving, repoussé, and other relief related sculptural practices.

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