INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH & DEVELOPMENT

ISSN 2278 – 0211 (Online)

Design and Production of Commemorative Ceramic Mural for Can 2008: Ghana the Host Country

Donkor, K
Department of Technology Consultancy Centre, College of Engineering, Ghana
Howard, E. K
Department of Industrial Art, College of Art and Social Sciences,
Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

Abstract:
Though Ghana has hosted the African Cup of Nations tournament for three times, there had not been any artistic monumental piece to commemorate the events despite the passion Ghanaians have for football. This art experimental study sought to design and produce a commemorative Ceramic mural for CAN 2008 which was hosted by Ghana. To achieve this, intensive literature search was carried out on functional and aesthetic significance of murals which served as the theoretical framework for making appropriate drawings of scenes of activities of the tournament toward the realization of the set objectives. Field survey findings show that, modern ceramic murals do not only perform functional and aesthetic purposes but also educate the general populace on their subjects. Experiments were conducted on different clay samples with specific reference to moisture absorption, linear shrinkage, production and finishing techniques. Physical test results of Mfensi clay indicate that at 1050ºC and 1100ºC, the moisture absorption rate were 23.5% and 18.8% respectively whereas the linear shrinkage at the same temperatures were 3.5% and 5.8%. However, the study considered firing at 1100ºC due to low absorption rate which could withstand hash weather. Based on the field survey findings and physical experimental results, a 6x8 feet mural was produced not only to commemorate the event but expected to add aesthetic appeal to its setting and educate the general public on CAN 2008.

Keywords: *Ceramic mural; Commemorative; African cup; Aesthetic*

1. Introduction

1.1. Background of ANC

With reference to BBC Sport (2007), the African Cup of Nations also referred to as the African Nations Cup (ANC) is the main international football competition in Africa. It is authorized by the Confederation of African Football (CAF), and was first held in 1957. Since 1968, it has been held every two years. In 1957 there were only three participating nations namely Egypt, Sudan and Ethiopia and South Africa but South Africa was disqualified due to the apartheid policies of the then government in power. The number of participants in the final tournament reached 16 in 1998 and since then, the format has been unchanged with sixteen teams being drawn into four groups with the top two teams of each group advancing to a "knock-out" stage. The nation with the most cup wins is Egypt, with six, followed by Ghana and Cameroon, who have won four titles each. Three different trophies have been awarded during the tournament's history, with Ghana and Cameroon winning the first two versions to keep after each of them had won the tournament three times.

South Africa (Gleeson, 1990) hosted the 20th ANC competition in 1996, marking their first ever appearance after a decade's long ban was lifted with the end of apartheid in the country. The Bafana Bafana won their first title on home soil. The 2000 edition was hosted jointly by Ghana and Nigeria, who replaced the originally designated host Zimbabwe. In 2002, the Indomitable Lions became the first nation to win consecutive titles since Ghana did it in the 1960s. The 2006 tournament was also won by the host, Egypt, who reached a continental-record fifth title.

The 2008 tournament was hosted by Ghana. Before the start of the tournament, as required by CAF two of Ghana's football stadia that is Baba Yara (Kumasi) and Ohene Gyan (Accra) had to be rehabilitated and two new stadia namely Essipong (Sekondi) and Tamale

were also constructed alongside other training pitches to meet the tournament standard (Boadu, 2007). The Kumasi Sports Stadium and Essipong Sport Complex were rehabilitated to 40,000 and 20,000 seating capacities respectively (Asare 2006; Otoo, 2006).

1.2. Ceramic Murals

The word "mural" comes from the Latin word "murus" which means wall. A mural therefore is any decoration done directly on a wall; an extremely large work of art, most often a painting applied to the surface of a wall, ceiling, or floor for aesthetic and didactic purposes (Wisegeek, 2012). They may be executed on wooden panels and fixed on walls or painted on canvas in the artist's studio and glued to walls or ceilings, interiors and exteriors of buildings.

Tarantino (2011) explains that any tile or fired clay that is glazed with a design or a number of such tiles that are individual segments of a larger design and fixed to a wall or floor can be referred to as a ceramic mural. Ceramic murals are tiles or bricks designed with motifs or symbols. It may be made in varied geometric shapes like rectangle, triangle, circular, cylindrical, conical or half-spherical. They are usually glazed or left in terracotta and are often installed on interior and exterior walls, ceilings or floors of buildings. Bernard (1994) has stated that ceramic murals are a form of art as old as the pyramids of Egypt. Pictures made of tiles and sculptured thousand years ago. He also said that a tile with a design painted on it, cemented to a wall becomes a mural decoration. A particularly distinguishing characteristic is that the architectural elements of the given space are harmoniously incorporated into the picture (Campbell, 2003; Howard and Opoku-Asare, 2012).

A major feature of murals is their large sizes. Mural design subjects are made in large dimensions to a particular aesthetic limitations and functions (Bhuyan, 2011). Anaba (1995) explains that the selection of colour, design and production technique go hand in hand to enhance the beauty and alter the sensation of spatial proportion of the building. Historical evidence shows that mural painting began in the prehistoric era and examples were seen in the Altamira in Northern Spain and Lascaux in France. Ancient Egyptians decorated the walls of their palaces and tombs with brightly painted murals to depict everyday life and life after death. Mural art is seen and practiced all over the world. Mural started as far back as the pre-historic era. Canaday (1980) asserts that fresco in one form or another has been employed since pre-historic time but reached its magnificent flowering in Italy between 14^{th} and 16^{th} centuries and was given a high profile during the Renaissance period. This study aside its general objective of producing commemorative mural for CAN 2008 also aimed at promoting ceramic murals in Ghana for aesthetic development and to educate the general public on the event.

2. Materials and Methods

The most significant material used for the mural is clay which is generally used for the production of pots, vases, bowls and cups. In this project, Mfensi clay, grog and manganese were found most appropriate because they have low moisture absorption, relatively strong and offer a good ground for painting. These parameters were determined through physical test experiments conducted to assess the suitability of clay and other auxiliary materials like acrylic paint for the creation of the mural. The experiment aimed at finding out the linear shrinkage, moisture absorption and firing temperature at 1050°C and 1100°C. The tools and equipment that aided the experiment and the actual creation of the mural were pug mill, kiln, sack board, guide sticks, scrapper, rolling pin, knife, and brushes.

3. Results and Discussions

This section presents and analyses the results of the experiment conducted on the suitability of clay for mural production. It again discusses the results of the preliminary survey of local murals, and ceramic techniques adopted for the mural, and the design and production processes

3.1. Survey of Local Murals

The survey of libraries, hotels, residential buildings, and educational institutions in the Kumasi and Accra metropolis revealed the use of indoor and outdoor murals. Murals found portrayed academic themes such as teaching and learning, sports, entertainment and feasting activities. Murals in the churches depicted biblical themes which serve as objects of worship and beautification. The following ceramic murals were identified within Kumasi and Accra through field survey:

- Ceramic mural at Cedi house, Accra, Messrs. Kofi Asante and J.K Amoah
- Ceramic/painted mural at FORIG, Fumesua, Kumasi, Mr. K.K. Broni
- Ceramic mural at Swanmill, UAC headquarters, Central Accra, Messrs. W.C. Owusu and J.K Amoah
- Ceramic mural at Bank of Ghana, Accra, Mr. J.K Amoah
- Ceramic mural at Roses Guest House, Kumasi, J.K Amoah
- Ceramic mural at Golden Tulip Hotel, Kumasi, G.Von
- Ceramic mural at KNUST gymnasium, Kumasi, Mr. K. K Broni and K Adjei
- Ceramic mural at Kumasi Brewery Ltd., J.K Amoah

The techniques used for these murals were mainly fresco painting, slabbing, relief carving and modelling and featured abstract and figurative designs. They also employed the use of brushes, chisels, modelling tools, acrylic, oil paint, clay, cement, and wood. The survey revealed little application of ceramic murals suggesting that ceramic murals are not widely available in Ghana. Hence the basis of this study that seeks to expands the scope of ceramic mural production in Ghana for artists and muralists to explore to enhance their work for the artistic and economic development of Ghana.

3.2 Assessment of Physical Properties of Clay for the Production of the Mural

The assessment of physical properties of clay and selected acrylic paint was carried out under art studio conditions. For this reason, the selected clay types were subjected only to basic physical tests, including moisture absorption and linear shrinkage, purposely to determine the rate of absorption and level of shrinkage. Table 1 shows the results of linear shrinkage and moisture absorption test at 1050°C.

Sample	Wet length (cm)	Dry length (cm)	Fired length (cm)	Difference (cm)	Fired weight (mg)	Soaked weight (mg)
1	5	4.8	4.65	0.4	33.2	39
2	5	4.9	4.7	0.3	32.6	39.6
3	5	4.9	4.7	0.3	31.5	40
4	5	4.8	4.6	0.4	32.8	40.1
5	5	4.8	4.6	0.4	32.4	38.9
6	5	4.8	4.6	0.4	31.6	40
7	5	4.8	4.6	0.4	31.6	38.8
8	5	4.8	4.6	0.4	31.4	40.1
9	5	4.9	4.7	0.3	32.5	39.1
10	5	4.7	4.5	0.5	30.8	40.8
AVERAGE	5	4.8	4.63	0.38	30.2	39.5

Table 1: Linear shrinkage and moisture absorption test at 1050°C

Samples	Wet length (cm)	Dry length (cm)	Fired length (cm)	Difference (cm)	Fired weight (mg)	Soaked weight (mg)
1	5	4.8	4.6	0.2	34	41
2	5	4.8	4.5	0.3	33	40
3	5	4.8	4.5	0.3	33	41
4	5	4.8	4.5	0.3	33	40.1
5	5	4.8	4.5	0.3	33	38.9
6	5	4.8	4.5	0.3	34	40
7	5	4.8	4.6	0.2	31	38.8
8	5	4.8	4.5	0.3	31	40.1
9	5	4.8	4.5	0.3	32	39.5
10	5	4.8	4.5	0.3	31	40.8
AVERAGE	5	4.8	4.52	0.48	32.5	40

Table 2: Linear shrinkage Test conducted at 1100°C (90% Mfensi clay and 10% Grog)

In calculating the moisture absorption of the fired samples at the various temperatures, samples were weighed and recorded. They were then placed in boiling water for about an hour and allowed to cool. The samples were removed and excess water wiped and their weight recorded.

Moisture Absorption= $\frac{\text{soaked weight-fired weight X100}}{\text{Soaked weight}}$

Therefore, at 1050°C the Moisture Absorption=$\frac{39.5-30.2X100}{39.5} = \frac{9.2X100}{39.5} = \frac{920}{39.5} =$ **23.5%**

At 1100°C the Moisture Absorption= $\frac{40-32.5X100}{40} = \frac{7.5X100}{40} = \frac{750}{40} =$ **18.8%**

Linear shrinkage = $\frac{\text{dry length - fired length X100}}{\text{dry length}}$

For 1050°C	$\frac{4.8-4.63X100}{4.8}$=**3.5%**
For 1100°C	$\frac{4.8-4.52X100}{4.8}$=**5.8%**

Table 3:

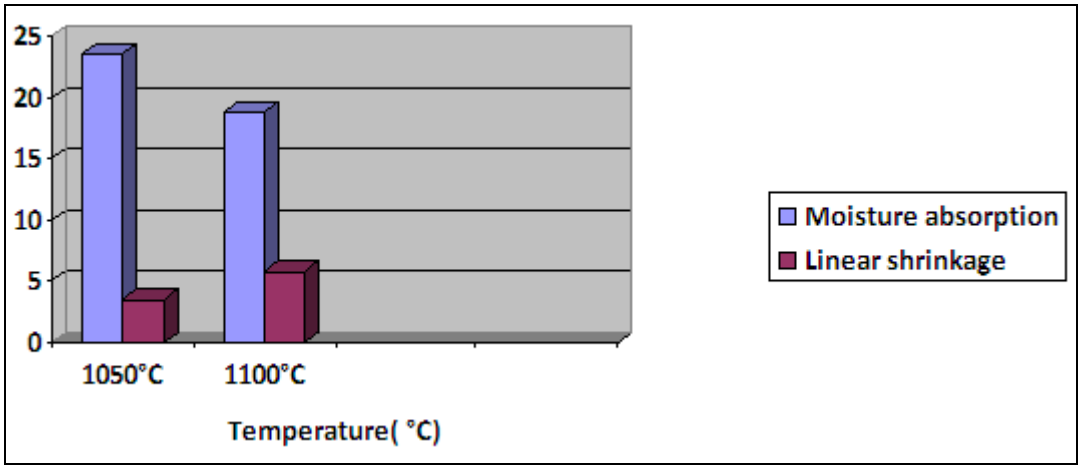

Figure 1: Percentage of Moisture Absorption and Linear Shrinkage against Temperature

As indicated in Table 1 and 2, the composition used for the experiment was in the proportion of 90% of Mfensi clay and 10% grog. These were fired to temperature of 1050°C and 1100°C to ascertain their shrinkage and moisture absorption rate. It was interesting to note that increasing the temperature, shrinkage and moisture absorption are inversely proportional to each other. The implication of these tests is that care must be taken to use the right materials to preserve the mural produced in order to prolong the shelf life after it has been installed. In view this, firing at 1100°C was considered based on its low absorption rate. These moisture absorption and linear shrinkage tests justify especially the suitability of 90% Mfensi clay and 10% grog for the production of the commemorative mural.

3.3. Design and Production of the Commemorative Ceramic Mural

Mural design is conformed to activities that are significant and a reflection of what is in the environment for which it is made to serve. In this project, both realistic and abstract objects were adopted to portray activities and tradition of the Africa Cup of Nations with specific reference to CAN 2008, which Ghana hosted. Simplicity and harmony of forms, organisation of design elements and principles which are essential parameters in mural production were duly followed. The designs were derived from the trophy, football players, flags and names of participating countries of the CAN 2008 tournament to create imaginative compositions for the project. These were modified to render them suitable to the tools, techniques and materials identified. It is important to mention that incision, relief, embossment, glazing and painting were the main ceramic techniques employed for the study. The following sections describe in detail the procedures followed in the production of the ceramic mural.

3.4. Procedure

The following processes were followed in creating the final mural.

3.4.1. Design Concept

The design for the project was developed from scenes or activities of CAN2008 tournament. The design consists of four human figures, three balls, a trophy and flags of participating countries based on realistic and semi-abstract concepts. Figure 2 shows the preliminary sketches for the project. The final composition (Fig. 3) shows three male figures playing football, a giant trophy and flags of participating countries.

Figure 2: Fig 1

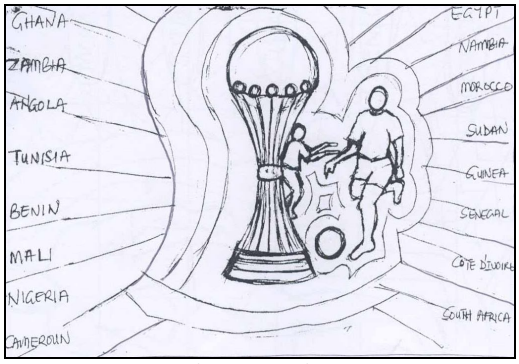

Figure 3: Fig 1

Figure 4: Fig 2 : Preliminary sketches

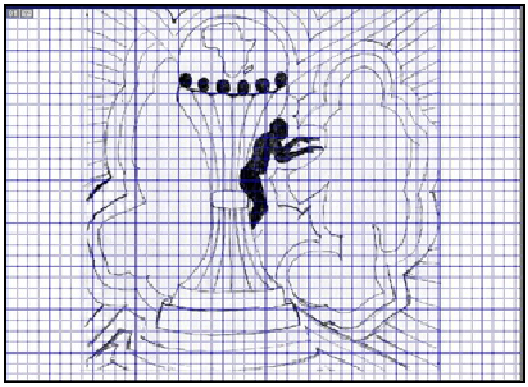

Figure 5: Fig 2 : Preliminary sketches

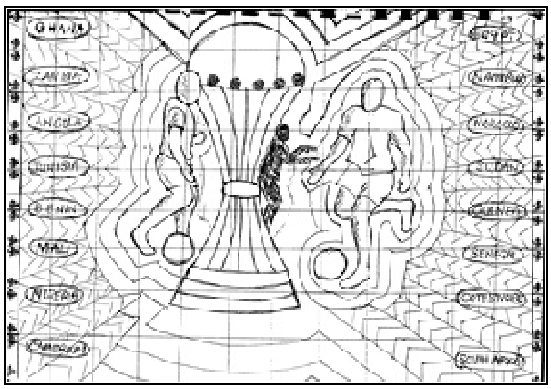

Figure 6: Fig 3: Final composition

3.5. Transferring the Design onto the Tiles

Looking at the original drawings or sketches, the research team scaled the selected drawing unto a graph sheet in proportion to the tiles. This was carefully calculated on the entire layout and all the lines and figures drawn on the tiles using a modeling tool. The final sketch drawing had three (3) human figures, a trophy and two (2) footballs.

3.6 Incision and Modeling of Figures on the Tiles

The study employed mainly incision and modeling techniques for the creation of the mural. The techniques were adapted to suit specific areas in the design to achieve desired results as follows:

3.6.1. Working on the trophy

The outline of the trophy was scored with clay slip. Additional soft clay was built on that area for a sculptural relief. After the clay had hardened to a workable stage (leather hard), detailed work of the trophy was done. The small balls which represent the 16 countries on the trophy were modeled, left to dry to a leather hard state, and then scooped to remove excess clay in order to make it lighter. They were later fitted on the side of the big globe at the top of the trophy with the help of clay slip.

3.6.2. Working on the figures, footballs and boots

The outline of the jubilating figure at the center of the mural was first cut out in low relief. The outline of the other figures were scored with clay slip and soft clay built on in the form of high relief. Details of the relief work were done afterwards. The faces of the figures were left blank in order not to depict any personality. The shapes for the balls and boots were modeled taking in consideration the designs on the balls and boots using the modeling tools as exhibited in Fig. 4.

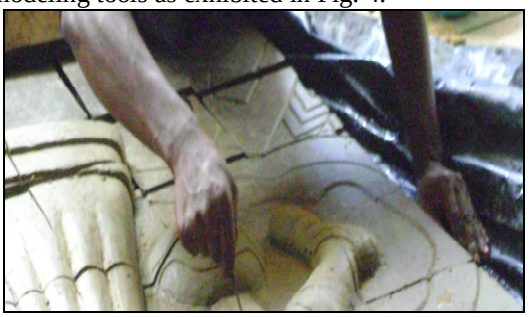

Figure 7: Fig. 1: Detailing the boots and footballs

3.6.3. Working on the background and separating the individual tiles

To achieve a well-balanced composition, the background of the mural was incised using different types of lines to conform to the figures in a unique harmonic fashion. After completing the entire composition on one hundred and eight tiles, the individual tiles had to be separated to enable the back to be scooped. To do this, a modeling tool was used to mark out the lines of each tile. A scrapper with a broad blade and a sharp edge was used to separate the tiles. After this the tiles were numbered from one on the left to one hundred and eight towards the right (horizontal direction). This pattern of numbering was to facilitate easy assemblage after firing for mounting on the wall.

Figure 8: Fig. 2: Separated tiles

3.6.4. Drying, packing and bisque firing of the tiles

Drying ceramics tiles need to be controlled well to avoid warping. The tiles were arranged on shelves with the back placed on the shelves (Fig. 5). These were placed in a warm airy room just to allow the tiles to dry gradually. The tiles were dried for a month. The dried tiles were placed vertically close to each other on the floor of an electric kiln. This is to prevent the tiles from warping. To expel the excess water in the tiles, the kiln was preheated for 5 hours before it was set at full blast. It was then fired for 12 hours to a temperature of 1100°C based result of the experimental test.

Figure 9: Fig.5: Drying of tile on shelves

3.6.5. Glazing and Firing of the Flags of Participating Countries

Different enamel colours glaze was purchased and used for the project. The colours were yellow, blue, black, red, green and white. To achieve consistency a spraying gun with an air compressor was used for the purpose of having smooth glazing effect. Before a particular colour was mixed and sprayed, areas of the tiles were marked as indicated in Figure 4(a). Areas that are not associated with a particular colour were covered or blocked with sheets of paper and masking tape as indicated in Figure 4(b). The sprayed flags were placed flat on bats or kiln furniture and put in the kiln. They were positioned strategically to avoid touching each other. The flags were fired to a temperature of 750C to avoid running of the glaze.

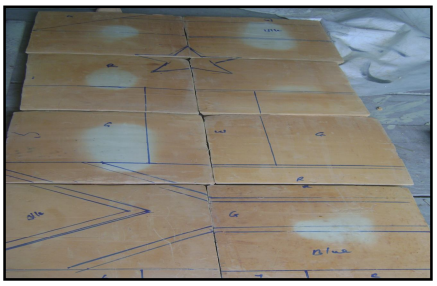

Figure 10: Fig 4 (a): Marked tiles for spraying

Figure 11: Fig. 4 (b): Covered areas left for spraying

Figure12: Fig: 5 (c) Sprayed tiles

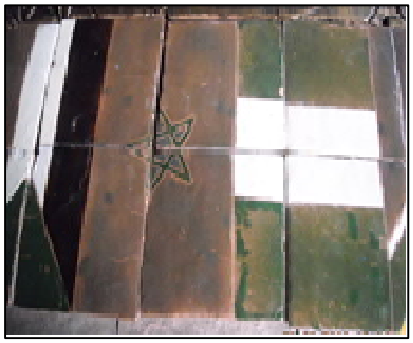

Figure 13: Fig. 5 (d): Glazed flags

Enamel glaze was considered for the project due to its readily availability on the local market. However, one major challenge observed was that the enamel glaze application was ineffective for producing participating countries' flags because of the varied characteristics of their respective colours which predominantly fall within the primary range of colours. Firing at different temperatures to obtain specific colours was not very successful as expected in that there was significantly change in the various shades of colours after each stage of firing. The flags of the various participating countries were therefore painting directly with oil base acrylic paint to achieve the right shades of colours in the respective flags.

3.6.6. Repainting of the glazed flags

After firing the glazed flags, it was noted that some colours like red and green as seen in Figure 5 (b) did not appear as wanted. The flags were re-painted with acrylic paint but that did not also work out well so the flag areas were replaced with incised names of the participating countries.

3.6.7. Incising the names of participating countries

Not satisfied with the result of the re-painted flags. A new set of tiles were made and the names of the participating countries incised on them surrounded by circular lines.

3.7. Border Design

Tiles measuring 7.5cm x 20.5cm, numbering eighteen were used for the border design. An Adinkra symbol *"Funtunfunafu denkyem funafu, won afuru bom nso wɔrididi a na wɔre fom"* was used for the border to give the mural a traditional touch. The cut template of the symbol shown in Figure 6(a) was embossed on the tile using a hammer as indicated in Figure 6 (c). This was done to enhance the aesthetics of the work.

(a)  *(b)*  *(c)* 

Figure 6: (a): Template for Embossment (b) Template been hammered on tile (c) Embossed symbol

3.8. Painting of the Entire Mural

The bisque fired mural was painted with black and gold acrylic paint. First, the entire surface was painted with black acrylic paint, and then with a good brushing technique the gold paint was carefully applied over the black colour. To highlight the importance of the main trophy, it was painted to look brighter and more golden than the rest of the mural. This is seen in the final work (Figure7).

Figure17: Figure 7: Final work-Commemorative Mural for CAN 2008
(Displayed at the Ceramic section, KNUST, yet to be erected at KNUST sport stadium)

3.9. Analyses of the Final Mural

The ceramic mural in Figure 7 is a commemorative mural for CAN 2008. The animated serene atmosphere created in the scene depicts the seriousness, skills, flair and all it takes for every football game acceptable within the scope of soccer rules. The two main figures with the balls explains that regardless of the number of teams participating in a tournament only two teams can be seen on the field of play at a time. Both eager to win the trophy, for each of them possessing the ball, the ultimate medium to victory is to immerge as winner. The silhouette figure behind the trophy is the famous "Kangaroo dance" which emanated from the CAN 2008 tournament where the hands are stretched at the eye level with the fingers pointing forward while the person hops from one place to another. The genesis of this popular celebration dance performed during the tournament by both supporters and players was first performed by the black star player "Michael Essein". The silhouette figure depicts the enthusiasm that marks every soccer tournament from both teams' supporters irrespective of losing. To the loser, the euphoria shows a deep sense of active participation in the tournament and belief that only one team is bound to win at a point in time.

One may wonder why the trophy at the centre of the mural is bigger than all the objects regardless of the principles of perspective. The trophy is the most important object in the tournament therefore in order to show its significance, the trophy is projected much bigger. The manipulation of lines to form a pattern created a powerful effect on the viewer. Here the individual lines are not perceived but rather the dramatic forms they suggest with their direction conveying an aesthetic response. For any work of art to be fully appreciated for its aesthetic value, it must be capable of sustaining the interest of the viewer. And this is what the mural seeks to achieve.

The Adinkra symbol used for the border called *"Funtunfunafu denkyem funafu, wɔn afuru bom nsu wɔrididi a na wɔre fom"* which literally means "two crocodiles sharing one stomach yet they fight over food". This is a symbol of Unity particularly where there is one destiny. The symbol is used to show that even though different countries from different regions with various social, economic, political and traditional backgrounds participate in the tournament, all their differences distil to one common goal, Africanism.

4. Conclusion

Although clay is traditionally used for pots, flower vases, brick etc., the study has revealed the possibilities in using Mfensi clay to produce a mural that can be managed, transported and erected easily because of its weight and the square tile size. This ceramic mural can serve as platform for the teaching and learning of ceramic Decoration, Techniques, Elements and Principles of Art, Aesthetics, Appreciation and Criticism in both secondary and tertiary institutions in Ghana. The mural can enhance the environment while providing food for thought, focus, pleasure, emotional therapy and calmness to sports men and women knowing that their achievement could be honoured in the future. It will also educate the public on the Africa Cup of Nations 2008 event. The success of this research therefore opens up new avenue for ceramic muralists to explore other forms of materials and techniques to create murals to widen the use of mural for the developing architectural industry in Ghana.

5. References

1. Anaba, A. (1995). Symbolism in Murals of Nankam Speaking area of Upper East Region. MA
2. Thesis, Kwame Nkrumah University of Science and Technology, Kumasi.
3. Asare, E. G. (2006). Baba Yara Stadium demolished Wednesday, March 15, 2006, Daily graphic, pg 47.
4. Asihene, E. V. (2004). A brief History of Art with special reference to West Africa. Woeli
5. Publishing Services: Accra.
6. BBC Sport (2007). Early growth of the African Nations Cup competition. http:// news.bbc.co.uk/sport2/hi/football/ africa /3396199.stm. Retrieved 9th March2007,
7. Bernard, R. (1994). Research methods in anthropology, 2nd edition, California: Alta Mira.
8. Bhuyan, R. (2011). Mural Painting Techniques. http://www.buzzle.com/articles/mural-painting-

a. techniques.html. Retrieved 07/02/2014.
9. Boadu, A. K. (2007). Tuesday, January 30, 2007. More pitches in Kumasi to be developed for CAN2008 soccer fiesta, Daily Graphic, pg 21.
10. Canaday, J. (1980). What Is Art: An Introduction to Painting, Sculpture and Architecture. New
    a. York: McGraw-Hill, Inc.
11. Campbell, B. (2003). Mexican Murals in times of Crisis. Tucson: University of Arizona Press.
12. Gleeson (1990). The arrival of South Africa, BBC Sport, Cape Town. Retrieved 10 December 2007, from http://news.bbc.co.uk/sport2/hi/football/africa/3736102.
13. Howard, E. K. and Opoku-Asare, N. (2012). Assessing the Suitability of Woven Fabric and Composite Textile Techniques for Mural Production. Journal of Science and Technology, Vol. 32, No. 1, pp 140-149.
14. Tarantino, A. (2011). Seattle Street Art - A Visual Time Capsule Beyond Graffiti.
    a. http://en.wikipedia.org/wiki/Mural#Tile_mural. Retrieved 08/02/2013.
15. Wisegeek (2012). What is a mural? http://www.wisegeek.com/what-is-a-mural.htm. Retrieved
    a. 24/01/2013.