

Hand-Crafted Clay Kerbs: New Approach Towards Students' Skills Acquisition in the FCT College of Education Zuba, Abuja 155

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Abstract

Landscape design is an integral part of built environment, which culminates to functional and aesthetic architectural building. Cement has been the major material for the production of kerbs with little or no emphasis on clay. However, this study is proposing a paradigm shift from conventional use of cement to clay for the production of kerbs. The use of clay as medium of teaching ceramics in the field of visual arts predates history because it is a natural gift of nature. Clay has produced a lot of products through teaching methodology in the arts school over the years, yet its potential is less utilized and far more than what it captures in the National Commission for Colleges of Education (NCCE) visual arts curriculum, hence, further clay exploration in this study. This study employed purposive sampling technique to select location for pilot study at the Dei-dei Building materials Abuja market while, FCT College of Education Zuba, Abuja served as the production site. Also sample clay was collected from Giri Community Gwagwalada Area Council, Abuja, while total population of 700 and sample size of 250 were pulled from all the six Area Councils of Abuja. Structured interview, unstructured oral interview, participatory observation and questionnaire were used to collect data while, digital camera and video recording were made possible to record production activities. Apart from the primary sources, the study extracted data also from secondary sources (internets, journals, and exhibition catalogues). Data collected were analyzed descriptively and qualitatively using the ordinal scale for normative description and analytic assessments. This is with the aim of imparting hands-on experience to the students, and also in conformity to NCCE Minimum Standard. The study therefore recommends among others that, there should be consideration for students-based research grants by the Government through relevant agencies to develop students toward research discoveries.

Key words: Handcrafted; Clay; Kerbs; Students' Skills Acquisition

1. Introduction

Concrete kerbs are cement cast blocks which are used to guide and guard cement slip float, interlocking block and flower bed. It culminates environmental landscaping in the built-environmental technology. The use of cement for building construction is by way far sophisticated in the building of houses, even though it is one of the major media used in the visual arts possibly in the making of sculptural piece. As good as it is, it is apparently expensive for student affordability, whereas, clay can compete favourably in this regard. Needless to mention that, if clay can complement the effort of cement in building landscape, it will reduce overdependence and add uniqueness to output. This can be witnessed in the merger of concrete block and brick in the construction of building. The role of clay is appraised even from the inception of world civilization as one of everlasting materials and God-given environmental gifts. Manaa, Hanafiahb and Chowdhury (2017) have emphasized the content of clay as inherently occurring material constituted with fined-grained mineral. The minerals are generally less than 2 microns and occur to be plastic in water content which solidify when dried. It is the plastic and solidity characteristics that allow the artist to creatively exhibit his talent.

In the making of kerbs for instance, the plastic nature of clay enables easy manipulation to a desired shape to take place, while the solidity gives strength, finesse and good finishing (Adeoti, 2021). The world of today dictates that, student must be far ahead in thinking especially as it concerns self-sufficiency and creating employment. It must be noted that, kerbs-making is not part of content break down of National Commission for Colleges of Education Minimum Standard (NCCE). However, there is need to go beyond NCCE minimum standard as they are just benchmark in curriculum dispensation. To achieve a better impactful skills and knowledge, it is imperative for teacher education to adopt variety of pedagogy to deliver subject content in tandem with the yearnings of labour market. This is the advocacy of this study, by yet another methodology of ceramic approach to teaching hands-on experience to students in the production of hand-crafted kerbs for landscape design in built environment.

2. Statement of Problem

This study was confronted with the production of hand-crafted clay kerbs for landscape design as a method of skills acquisition among the students of the Federal College of Education Zuba, Abuja. Several materials are supportive of skills acquisition in ceramic education. The use of foreign technology has become preference over local content hence, it reduces value attachment to clay which is indigenous to us. Considering significant amount of the contribution of clay products in the field of visual arts, yet, its potentials have not been quite harnessed to the maximum.

Despite the hardship imposed by the current economic situation in the country vis-à-vis globally and the inability of students and teachers to purchase materials for demonstration and assignment. The study believe that Nigerians have to look inwards and tap from the abundant natural resources such as clay in order to reduce cost of teaching and learning. Therefore, this research is geared towards cushioning effects in this regard. Besides, the spate of crime among the youths in the community and Nigeria school system which is on the high side, hence the making of clay kerbs can help to push down this situation through teaching and skills acquisition of kerbs making that can potentially benefit the students toward self-reliance.

3. Justification of the Study

The use of clay is in no doubt a potential material in the teaching and learning in the visual arts, especially for the design of landscape where production of hand-crafted kerbs is made possible. Hence, this research is justified for many reasons.

- i. It is an attempt to rediscover our past as a foundation for the future. The rediscovery of our history and identity may turn out to be a viable alternative to our present interest in foreign values importation;
- ii. In recent times clay has been used for modern architectural buildings due to durability

sustainability and economic values including ornamental items;

- iii. It considerably reduces importation of cement and adds to Gross Domestic Product (GDP);
- iv. It will expose the students to entrepreneurship activity;
- v. Beautification of the environment.

4. Objectives

- i. To investigate whether quality clay deposit will be available abundantly for making hand-crafted clay kerbs;
- ii. To demonstrate procedural steps for making clay kerbs as a method of teaching;

5. Research Questions

- i. How availability of abundant quality clay deposit be investigated for making hand-crafted clay kerbs?
- ii. How can procedural steps for making clay kerbs be demonstrated as a method of teaching?

6. Literature Review

The inherent qualities of clay are abundant to the extent of mineral resources present therein. For example, Edama, et al, (2013) report that, clay mineral such as bentonite, kaolinite and diatomite are used for many purposes such as wastewater treatment and immobilization because of their capacity to adsorb inorganic and organic molecules. In addition, this naturally occurring material is widely used to replace activated carbon as an adsorbent due to its abundant supply and it can be produced at a much lower cost and it has satisfactory sorption properties (Hamzah and Bakar, 2009). The quality of clay is also echoed by Suzanne, Marlia and Ahmed (2017) that clay minerals are used in a number of geological applications such as stratigraphic correlations, indicators of environments of deposition and temperature for generation of hydrocarbons. In agriculture, the clay minerals are a major component of soils and determinants of soil properties. The clay minerals are important in construction where they are a major constituent in brick, lavatories, roofing and tile (Adeoti, et al, 2011).

The physical and chemical properties of clay minerals determine their utilization in the process industries particularly in the ceramic company where major material is clay. In the ceramics industries clay is commonly used because of its contribution to the moulding and drying properties of the wares being produced (Adeoti, 2021). Clay portends favourable behaviour during firing as it produces favourable properties in fired ware. Corral (2016) opines that techniques of building clay ware in pre-Hispanic and contemporary Mesoamerican are moulding that is pressing plastic clay into or over a mould which is made from clay and fired or from gypsum for durability; coiling, that is building up a vessel with rolls or coils of clay of uniform thickness and

pinching that is squeezing clay between the fingers in order to build up walls.

Clay brick technology has evolved from traditional approach to a more advanced technology. According to Brick Industry Association (2008), building of contemporary brick is substantially more efficient and has improved the overall quality of the products. A more complete knowledge of raw materials and their properties, better control of firing, improved kiln designs and more advanced mechanization have all contributed to advancing the brick industry. With the use of extruder, an improved brick is made to meet with the market demand and latest technology as advanced by Professional Supplier of brick factory solution (2022).

In the work of Adeoti et al (2011), it has been established that the cost of brick is considerably cheaper to concrete cement, hence they advised that clay should be maximally utilized to achieve local content desire. In the latest bulletin of Nairaland Forum (2022), where the cost of building with clay is stated to be lesser than block shows economic potential of clay especially in this hard time. Raymond Enenmoh public relations officer, Nigeria Institute of Quantity Surveyors (NIQS), Lagos State chapter, in a paper he presented at the inaugural sitting of Lagos State tribunal on building collapse, stressed that “the growing housing needs of low- and mid-income earners could be significantly met through the use of alternative building materials and methods, citing red bricks as viable alternative to sand concrete blocks” (Nairaland Forum, 2022). Mention must be made that the cost of a conventional size of perforated clay brick is ₦125.00 (Jiji, 2022) as against the same size of cement perforated block of ₦250.00 per copy.

7. Methodology

This study adopted studio exploratory (practice-based) and descriptive analysis was employed to achieve the production of clay-kerbs.

7.1. Population of the Study

A total population of 700 participants was pulled from all the six Area Councils of Abuja. Below is the distribution of population in accordance with the area councils.

S/N	Names of Area Councils in Abuja	Population
1.	Abuja Municipal Area Council (AMAC)	300
2.	Bwari Area Council	100
3.	Gwagwalada Area Council	100
4.	Kuje Area Council	100
5.	Kwali Area Council	50
6.	Abaji Area Council	50
	TOTAL	700

7.2. Samples and sampling procedure

This study employed purposive sampling technique to select location for pilot study at the Dei-dei Building

materials market while, FCT College of Education Zuba, Abuja served as the production site. Also sample clay was collected from Giri Community Gwagwalada Area Council, Abuja, while total population of the study was 700 and sample size was 250 according to Kriecje and Morgan (1970).

7.3. Instruments for Data Collection

The study employed structured interview, unstructured oral interview, participatory observation and questionnaire to collect data regarding procedural steps in the production of concrete kerbs. Meanwhile, the use of digital camera and video recording were made possible to record production activities. Apart from the primary sources, the study extracted data also from secondary sources (internets, journals, and exhibition catalogues), while research informant play the role of negotiating for the clay site.

7.4. Method of data Analysis:

Data collected in the objective one were analyzed descriptively and qualitatively using the ordinal scale for normative description and analytic assessments. After breaking down the responses under the four-scale Likert structure; Strongly Agree, Agree, Disagree, and Strongly Disagree, data were trans-loaded to percentage rating. The simple percentage formula below was used for percentage conversion and data analysis:

$$\frac{\text{No of Respondents} \times 100}{\text{Total No of Responses}} = 1$$

Objective two was analysed through production procedure using descriptive analysis to explain production steps.

8. Data Analysis

8.1. Objective one: To investigate whether quality clay deposit will be available abundantly for making hand-crafted clay kerbs in Abuja.

Data frequency and percentage distribution showing availability of abundance quality clay deposit in Abuja (n=250).

Table 1.

S/N	Option Statements	SA F (%)	A F (%)	U F (%)	D F (%)	SD F (%)
Availability of abundance quality clay deposit in Abuja						
1.	Clay dominate all area councils of Abuja city	48 (19.2%)	21 (8.4%)	10 (4%)	123 (49.2%)	48 (19.2%)
2.	Quality clay deposit exist in Giri and Tungamaje community Gwagwalada Area Council	202 (80.8%)	30 (12%)	13 (5.2%)	3 (1.2%)	2 (0.8%)
3.	Quality clay deposit exist in Kwali and Abaji Area Councils of Abuja	6 (2.4%)	4(1.6%) 2 (0.8%)	2 (0.8%)	110 (44%)	128 (51.2%)

4.	Kuje Area Council has the largest clay deposit in Abuja	2 (0.8%)	6 (2.4%)	30 (12%)	210 (84%)
5.	Kuje Area Council has the largest clay deposit in Abuja	15 (6%)	16 (6.4%)	4 (1.6%)	147 (58.8%) 68 (27.2%)

In the table 1 above shows that 19.2% representing 48 respondents strongly agreed to the point that clay dominate all area councils of Abuja city. 21 respondents with 8.4% agreed while 49.2% of 123 respondents disagreed. Meanwhile, 48 respondents representing 19.2% strongly disagreed. And 4 % of 10 respondents are undecided. The implication is that clay do not dominate all area councils of Abuja city. On the second statement option, which states that Quality clay deposit exist in Giri and Tungamaje community Gwagwalada Area Council 202 respondents strongly agreed representing 80.8%. 30 respondents merely agreed, representing 12% while 1.2% of 3 respondents disagreed. 0.8% of 2 respondents strongly disagreed, as 13 respondents are undecided representing 5.2%. This reveals that Quality clay deposit exist in Giri and Tungamaje community Gwagwalada Area Council, Abuja.

The option of quality clay deposit exist in Kwali and Abaji Area Councils of Abuja had a paltry 6 respondents having strongly agreed, representing 2.4%. While 4 respondents with 1.6% agreed, 44% of 110 respondents disagreed. 128 respondents representing 51.2% strongly disagreed. 2 respondents are undecided representing 0.8%. It means that Quality clay deposit exist in Kwali and Abaji Area Councils of Abuja. On the question of Kuje Area Council has the largest clay deposit in Abuja, 2 respondents strongly agreed, representing 0.8%. 2 likewise the number merely agreeing, but 12% of 30 respondents disagreed. 210 respondents representing 84% strongly disagreed as 2.4% representing 6 respondents are undecided. This shows that, Kuje Area Council do not have the largest clay deposit in Abuja.

The option AMAC and Bwari Area Councils houses abundant clay deposit shows that 15 respondents strongly agreed to the question representing 6%. 16 respondents with 6.4% agreed while 58.8% of 147 respondents disagreed. 68 respondents representing 27.2% strongly disagreed. However, 1.6% of 4 respondents are undecided. According to the question and responses, AMAC and Bwari Area Councils do not house abundant clay deposit.

8.2. Analysis of production

8.2.1. Tools and Materials for Production

Clay, Kaolin, Grog, Plastic bowl, Mesh screen, Plastic drum, Jigger, Shovel, Hand trowel, Plastic drum, Sketch paper, Modeling spatula, Modeling stand, Roller, Soft wood, Polythene nylon, Sand paper, Nails, Hammer, Mallet, Screen mesh and water.

8.2.2. Site identification: The researcher visited the clay site to collect relevant clay materials around Tungamaje Community, Gwagwalada Area Council of the FCT, Abuja, which is noted for abundant deposit

and proximity to the production site. The research informant was used to negotiate the clay site with the district head and chiefs for hitch-free clay collection. To get pure clay, we needed to remove the top soil, also referred to as clay unsoiling. The clay was dug from underneath the ground up to a depth of about 200 mm for quality confirmation.

8.2.2. Clay collection and preparation: The site was dug as planned using digging implements, to remove the top soil first. Subsequently, the clay was dug out and heaped up in layers above the level ground. Afterward, the clay was conveyed to the FCT College of Education Zuba, Abuja for clay preparation. After that, clay was soaked inside a plastic container with adequate water to form a homogenous mixture in order to soften the solid particles in the clay for five days (fig. 1a & b).



Fig. 1(a); (b). Clay preparation process by the researcher and the students of the Department of Fine and Applied Arts FCT COE Zuba, Abuja

It was time to clean off particles such as vegetables, twigs, stones, and other physical impurities. This was one of the tedious process in clay preparation as rigorous stirring of clay using long turning wood to allow for thorough mixture. This was done consistently for about 30 minutes inside 40 litres of plastic container (fig. 2a, b & c)



Fig. 2(a); (b) & (c.) Stirring of clay to soften solid particles

By this time, a screen frame was used to sieve out the impurities resulting at clean clay slip. A sizeable quantity of soaked clay is poured onto the surface of the screen mesh and thoroughly stirred to force the clean slip out of the mesh. This gradually continue until desirable result is achieved (fig. 3a, b & c).



Fig. 3(a); (b) & (c). Process of sieving clay

Subsequently, the clay slip is poured on a wide spread clothing material to allow for evaporation to take place in order to form clay, and this in turn, increases pliability and strength of the clay. This was done inside the sun, and adequate check was constantly made on the slip not to overstay, resulting at dry leather hard (fig. 4a, b & c).



Fig. 4(a); (b) & (c). Preparation of clay slip to form clay ball

The next stage is to improve the quality of the clay by adding other materials such as kaolin, and grog.

Subsequently the clay balls were kneaded by subjecting it to pressure in a bid to blend all materials and give it a smoother feel, while the clay was ready for casting.



Fig. 4. Kneading of clay

8.2.3. Casting of Kerbs: It must be noted that, there are several plastic moulds to making conventional concrete kerbs in the market (fig 5a & b). Hence, the research adopted conventional mould to cast several copies of kerbs.

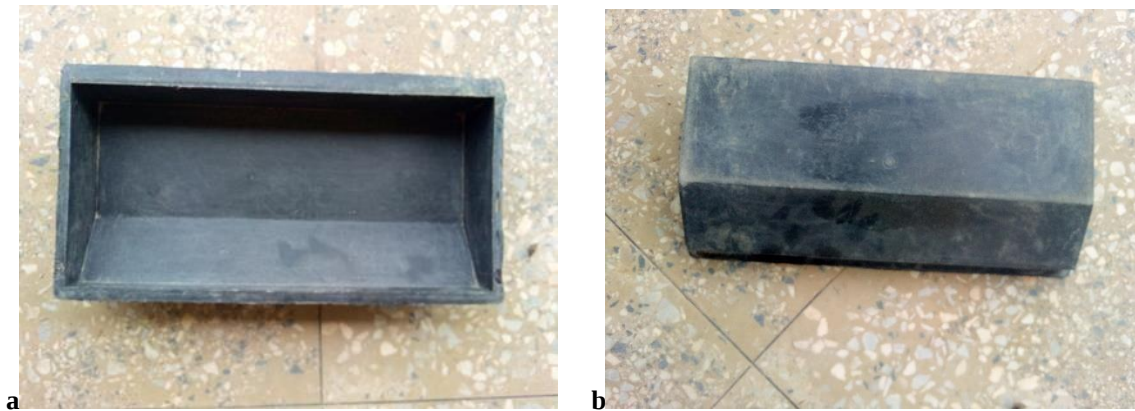


Fig. 5(a) & (b). Conventional plastic kerbs mould

The research adopted used engine oil to lubricate inside of the mould and achieved even spread (fig 5c). Sometimes polythene nylon is applied inside the mould to allow for easy removal of cast. Thereafter, the clay balls were poured inside the plastic mould, pressed and covered by a flat wood (fig. 5d & e), while mallet was slammed on it to pressure the clay for even distribution in the mould (fig. 5e). Thereafter, the cast is removed from the mould, while the process continue to produce multiple copies (fig. 5g & h).



Fig. 5(c) Application of lubricant inside the mould



Fig. (d) & (e): Casting process



Fig. 5(f); (g) & (h): Casting process

8.2.4. Drying: The casts were arranged on the floor under a roofing structure, left to dry in a low humidity environment. This involves spreading them in uniform columns in an open space, ensuring that there is an ample air circulation between clay kerbs for optimal drying. Meanwhile, the drying took between five to seven days (fig.6).



Fig. 6. Drying of clay-kerbs

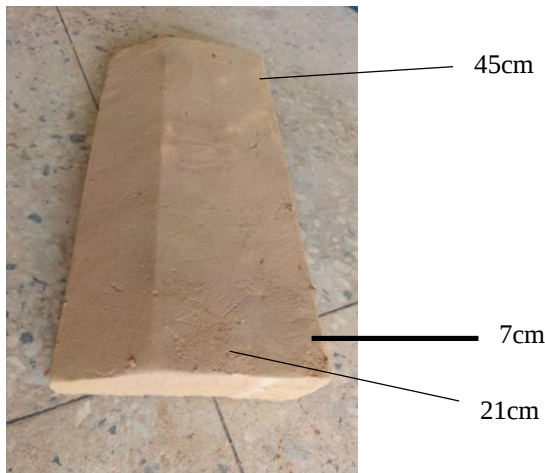
8.2.4. Measurement/dimension: Length - 45cm; Breadth - 21.5cm; Height - 7cm

Fig. 7. Clay kerbs dimension

9. Discussion of findings

The study is based on the practical exploration of clay to produce hand-crafted clay kerbs. The objective one of this study was realised due to quality clay collected from Tungamaje Community, Gwagwalada Area Council Abuja, being abundant clay deposit site for the production of hand-crafted clay kerbs. Meanwhile, sample clay was collected from Giri Community also at Gwagwalada Area Council, Abuja. In an attempt to achieve objective two step by step procedure of making hand-crafted clay kerbs was explicated in this study. It suffice to mention that it is a method of teaching and skills acquisition approach which can be replicated through studio explorative technique.

10. Recommendations

1. The study recommend town and gown arrangement where collaborative effort of both the craftsmen/mason and academic institution of learning directed at improving the students practical skills.
2. There should be consideration for students-based research grants by the Government through relevant agencies to develop students toward research discoveries

11. Conclusion

The need to diverse methodology of teaching in the field of arts is sacrosanct as today's knowledge is interdisciplinary in nature. Such is the approach to making clay kerbs in this study. Nigeria is going through a lot lately which consequently affects the quality of graduate our educational institutions now produce; therefore, they apparently find it difficult to compete in the labour market. Yet, there are no steady jobs in the labour market, hence, every student should have quality vocational education that can help withstand economic

hardship. The use of clay as medium of expression in the production of clay kerbs is a new method of instructional teaching and learning ceramic education which can add value to the individual students in fulfilling NCCE Minimum Standard as well as securing job after graduation. It must be noted that, the production is yet to finished, until firing and installation are achieved which will be in the subsequent publication.

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