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IMPROVING TRADITIONAL TECHNOLOGY: A CONSTRUCTION OF ELECTRIC POTTER'S WHEEL FOR TEACHING AND LEARNING PRODUCTION OF CERAMIC WARES

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Abstract
Educational system in Nigeria is gradually drifting towards pragmatic system of education that encourages acquisition of functional skills that will make an individual to be useful to himself / herself and the society he /she belongs. Inherent in visual art education, is ceramics as a vocational course. It is obvious that, most of the needed equipment for the teaching and learning it are not locally made in Nigeria. To acquire such equipment like; electric potter's wheel, requires a lot of money since dollar has appreciated so-much above naira to import it into the country. The high cost of the equipment has become a problem to the teaching and learning ceramics because only few schools can afford to import it. Consequent upon this, this research seeks to improve on the traditional technology of pottery and ceramics production by fabricating electrically propelled potter's wheel for the purpose of encouraging entrepreneurship, enhancing teaching and learning, and reducing the cost of importation of the machine.

Key Words: Potter's Wheel, Importance of Potter's Wheel, Advantages of Electric Potter's Wheel, Significance of Fabricating Electric Potters' Wheel and Fabrication and Construction Processes.

Introduction

In the past, the system of education in Nigeria was purely 3Rs (Reading, Writing and Arithmetic). The system was more of theory, and was geared towards developing skills for reading and writing (Osimabale, Bazza and Lawal, 2016). However, the present day Nigeria educational system has evolved through different phases of curriculum development over the centuries for the purpose of nation building and development. For this reason, Ceramics as a study area in Applied Arts is geared towards empowering the students to become self-employed and also an employer of labour as a result of the skills acquired. To this end, students are equipped to become useful to themselves and the society.

It is obvious to note that, due to global and economic melt-down, there is a sharp hike in the prices of goods. Consequent upon this and increase in the rate of unemployment in Nigeria, abject poverty, prostitution, joblessness, kidnapping and ritual killings to mention but a few are equally on the increase (Lawal, 2011). For such crime rate to be minimized, there is a need to encourage ceramic education to bequeath jobless individuals with some relevant skills that will make them to become self-reliant and employers of labour. For the fact that effective teaching and learning ceramics are not possible without availability of the needed equipment and materials in place. Procurement of equipment for ceramic production is expensive because of hike in the prices of goods due to rise in the value of dollar against the value of naira. Consequent upon this, importation of electric potters' wheel is expensive and that it has become difficult for people to import it into the country. To realize the effective teaching and learning ceramics, therefore, requires that indigenous technology be developed in this regard to enhance the fabrication of electric potters' wheels locally in Nigeria.

It is to this end that, developing an indigenous electrically propelled potters' wheel that will enhance effective teaching and learning ceramics education is intended. It is worthy of note that, the construction of indigenous potter's wheel will reduce the importation of expensive foreign potters' wheel that seems difficult to acquire for use because it is expensive.

Potter's Wheel

According to Otimeyin (2015), Potter's wheel is a machine that has a rotating wheel head on which clay could be manipulated and transformed into any desired shape. Similarly, Onuzulike (2009) notes that, the potter's wheel is a tool for generating basic clay forms which are like plain canvasses awaiting the painter's orchestration of colour to create concept(s). being that clay could be manipulated and transformed into any desired shape; its plastic nature warrants the use of potter's wheel (Otimeyin, 2015). Some examples of potter's wheel are: kick wheel and electrically propelled wheel. The kick wheel is pedaled by the

individual throwing clay, while electric potter's wheel is powered by electric current. In this case, the individual does not need to exert force on the machine to throw his clay.

Importance of Potter's Wheel

The importance of potter's wheel is that; it enhances mass production of wares through quick forming methods now obtainable in the ceramic industry. Otimeyin (2015) posits that, using potter's wheel is faster in modeling ceramic wares. Lawal, Okechukwu and Sanusi (2011) assert that, potter's wheel reduces fatigue when used for creating clay wares, and throwing on a potter's wheel enables the potter, the use of the fingers in skillfully opening up the revolving ball of clay mounted on the wheel, and forming the wall, more quickly than using the manual method. With this method, even wall is formed to make the thrown ware have even thickness.

Advantages of Electric Potter's Wheel Over Kick Wheel

Electric potter's wheel is faster than using kick wheel in spinning clay. Therefore, the potter can throw more clay wares when electrically propelled potter's wheel is used. The average difference in the quantity of wares thrown is put at ratio 8:3. Though, this is subject to the individuals throwing clay in terms of expertise.

Practice shows that, fatigue is less in using electric potter's wheel than when kick wheel is used. The reason is that; electric potter's wheel does not require the potter to exert energy or force on the machine before the wheel head rotates. Whereas in the case of kick wheel, the potter is required to make several kicks on the machine at regular interval for the wheel head to keep on rotating before vessels are formed. Similarly, Alasa (2015) discloses that, machines release man from drudgery and muscle power tasks. Since electric potter's wheel requires little or no energy to throw ceramic wares unlike the kick wheel, one would prefer the electrically propelled potter's wheel.

Significance of Fabricating Electric Potter's Wheel Locally

The current price value of imported electric potter's wheel is about Three Million Naira only while the locally fabricated electric potters' wheel is three times cheaper than the imported ones. Alasa (2015) posits that, potter's wheel as one of the equipment that are needed for ceramic wares production in Nigeria, need to be developed and fabricated locally. Consequent upon this, if electric potter's wheel is mass produced locally, there may be no need for the importation of electric potter's wheel. Hence, the economy of Nigeria will be improved. David (2003) justifies that, when a nations import is less than her export, the gross domestic product (G.D.P.) will be on a positive note. Alasa (2015) further notes that, attempts towards achieving fabrication of ceramics tools and equipment locally will be the right step in the right direction if technological development and growth must be attained.

Procuring electric potter's wheel will be affordable by indigenous potters if is fabricated locally in Nigeria. to an extent, it will encourage the establishment of both small scale and medium ceramic industry in the country. If this happens, the rate of unemployment will be reduced. Sequel to this, it will reduce social menace like; prostitution, armed robbery, child trafficking and kidnapping, to mention but a few.

Since fabrication of electric potter's wheel will enable institutions of higher learning where ceramic is offered as a course of study and skillful potters who may wish to go into pottery business to be able to afford the machine cheaply. Thus, teaching and learning ceramics will be more effective. As a result of this, students and apprentices will have industrial work experience during their schooling or apprenticeship period.

Fabrication and Construction Processes of Electric Potter's Wheel

The construction of an electric potter's wheel was carried out in the following stages: Working Drawing, Metal Construction and Fabrication of the Potter's Wheel, Installation of Accessories and Parts, Cabinet Work on the Potter's Wheel, Electrification of the Potter's Wheel, Painting of the Electric Potter's Wheel and Test Running of the Electric Potter's Wheel.

Working Drawing: The interpretation of conceived idea on how to construct the electric potter's wheel was first interpreted in drawing.

Metal Construction and Fabrication of the Potter's Wheel: For stability of the potter's wheel on a stationed position when throwing clay on it, weighty angle irons were welded together to form the skeleton of the machine. The base frame was constructed to accommodate axle bearing the pulley, connector, wheel butt and wheel head. On the motor roller is a pulley fabricated and welded on it. A metal clay bath was also fabricated to fit into the metal body framework. Round the metal skeleton of the machine is adequately perforated metal sheet that will proper ventilation into the axle bulk and motor roller.

Installation of Accessories and Parts: The fabricated axle bulk and the motor roller were carefully installed with the use of some 17cm bolts and nuts to ensure that they are tightly fixed. The choice of fabricating a pulley with a smaller diameter on the motor roller while a wider diameter pulley is fabricated on the axle bulk is hinged on the speed required for effective throwing of clay on the potter's wheel.

Cabinet Work on the Potter's Wheel: Wooden two leaved opening of equal size were created to enhance internal security of the machine and to avert accident that could lead to cutting away ones' finger or cause electrocution.

Electrification of the Potter's Wheel: The wiring of the machine was done with some yards of 2.5mm copper cable with a capacitor connected parallel to the motor roller. In the wiring is a main control switch that will ensure a total short down of electric current in the potter's wheel. Connected to this, are two terminals to speed breaker switch through which the speed can be regulated when throwing clay on the machine.

Painting of the Electric Potter's Wheel: To add to the external aesthetics of the electric potter's wheel, it is painted with auto based paint in black hue. The choice of black pigment is because it can absorb dirt. Though, black colour generates more heat than other colours, the regulation of heat was adequately being catered for by creating proper ventilation outlets on the body of the machine.

Constructed Electric Potter's Wheel: Below, are visual representations of the constructed electric potter's wheel in plates I and II

Plate I: Front, Side and Top Views of Electric Potter's Wheel

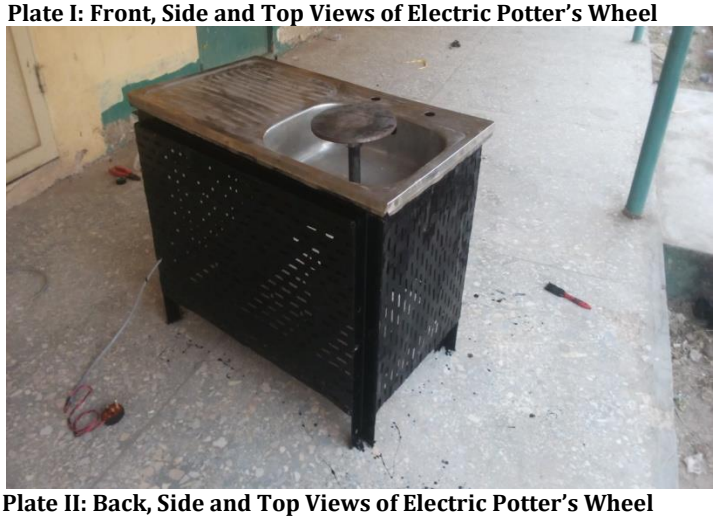

Plate II: Back, Side and Top Views of Electric Potter's Wheel

Test Running of the Electric Potter's Wheel: The machine was connected to electric current, some vases were thrown on it and the following observations were made:

1. That, the electric potter's wheel is safe and void of causing electrocution on the user.
2. That, the machine has the capacity of being used for several clay throwing for ceramic wares production and
3. That, it does not warp when throwing vase on it.

Conclusion

The successful construction of electric potter's wheel has contributed to the development of ceramics education in modern Nigeria, has added value to indigenous technology. Sequel to this, the quest for importation of electric potter's wheel will reduce drastically. There is an expectation that this research will enhance the establishment of small scale and medium ceramic industries in Nigeria.

Recommendations

The following recommendations are made amongst others:

1. The government of the Federal Republic of Nigeria should encourage the mass production of this machine in the country.
2. Because of the problem of power outage, future researchers should develop a study on how solar power can be used as a source of electrical energy for the machine.

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