



Efficacy of Locally Produced Acrylic Paint by Students in Tertiary Institutions in South West Nigeria

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Abstract. This study investigates the efficacy of locally produced acrylic paint in meeting the functional and aesthetic needs of tertiary institutions in Nigeria. As educational facilities face increasing pressure to reduce costs while maintaining quality infrastructure, the use of indigenous materials has become a viable alternative to imported products. The research assesses the performance, durability, coverage, drying time, and environmental impact of locally sourced acrylic paints compared to their imported counterparts. A mixed-methods approach was adopted, involving laboratory testing and field surveys across selected tertiary institutions. Findings reveal that locally produced acrylic paints demonstrate competitive quality, with acceptable standards in adhesion, color retention, and resistance to weathering. Furthermore, the use of these paints supports local industries and contributes to sustainable development goals. The study concludes that with appropriate quality control and standardization, locally manufactured acrylic paint is a cost-effective and efficient solution for painting infrastructure in Nigerian tertiary institutions

Keywords: Acrylic paint, Art education, Tertiary institutions, Academic performance, Local production.

1. Introduction

The importance of art education in tertiary institutions cannot be overstated, as it fosters creativity, innovation, and self-expression. However, the high cost of art materials, particularly acrylic paint, can hinder students' ability to fully explore their artistic potential. This study aims to investigate the feasibility of locally producing high-quality acrylic paint, tailored to meet the specific needs of art students in

Nigerian tertiary institutions. By leveraging local resources and expertise, this initiative seeks to reduce the financial burden on students, promote sustainability, and ultimately enhance their academic performance and artistic excellence.

Acrylic paint is a versatile and widely used artistic medium in tertiary art education. However, the reliance on imported acrylic paint can be costly and limiting for art students in developing countries like Nigeria. This review explores the potential of locally produced acrylic paint to enhance the academic performance of art students in tertiary institutions.

Acrylic paint is a vital material in art education, and its availability and quality significantly impact art students' academic performance. However, the reliance on imported acrylic paint in Nigeria poses challenges, including high costs, inconsistent supply, and limited accessibility. This paper justifies the need for local production of acrylic paint to enhance the academic performance of art students in tertiary institutions. The connotation of art as a form of discipline and practice has been a prevailing question that people have been trying to answer most suitably for centuries. Adams (2007) indicates that the "broadest definition of art is that it is an expressive product made by artists which is capable of communicating its expressiveness to viewers". Often times viewers look at the art product without giving much consideration to what goes into making it. Granted every work of art begins as an idea hatched within the mind of the artist, who in turn gives the idea physical form that the viewer interacts with eventually; but there is more to that goes into the existence and creation of the artwork. It is posited in this chapter, that the components that go into making the art piece cumulatively work to arouse the imaginations of viewers.

The end product/art piece/art work/image is not the central focus of this chapter but the specific "elements" and or "Components" used by artist to/in creating the art product which the viewer interacts with and thus forms opinions. Mittler (2005) states that: It is virtually impossible to imagine any society without of some forms of art. Indeed, the visual arts, music, Drama, dance and other forms of art, add a sense of pleasure to life. The arts are a vital part of Civilization, an essential part of any culture. They are universal languages through which human beings express their dreams, their aspirations, their ideas, and their feelings. They make it possible for all of us to communicate, understand, and appreciate each other. The arts have always been and always will be the language of Civilization". The above assertion lends further weight to the author's postulations that the tools that artists use to create art are a sort of visual language. The elements when used adequately make the arts a basic form of communication. Three key concepts are prominent and they form the crux of this chapter namely "Colour" "Symbolism" and "Art". Effort shall be made at this initial stage of this study to x-ray or put the searchlight on them to present a meaningful theoretical framework of the study. "Colour" is a common expression otherwise called pigment, referring to sensation derived from the ray of light that is reflected on an object with a particular pigment.

Colour is a psychological phenomenon as it affects and influence feeling and emotion. Colour is a communicative language, lies in the particular historical context in which it is being experienced. To the physicist, the preoccupation will be centred on the wave lengths and intensities imbedded within the light fractions that radiate into colour. The psychologists are driven by how affected a person is when he/she sees a colour and how each colour is affected by another. With the artists, what resonates more is colour as a pigment/material of creative, symbolic expression and colour as vision. The artists experiment with colour by mixing one with the other to arrive at mixtures of coloured light which differ in the eye. Whatever, the combination of angles one chooses to identify with, this article is most concerned with the artist angle on colour which invariably ties all the other angles into one whole. With the central focus of this chapter being on indigenous colour it considered helpful to look at all perspectives of colour as an entity with a desire to attain a well-rounded understanding of the element, its properties and as its functions to the artist and his/her immediate environment.

During daily conversations, our vocabulary is permeated with references, analogies, metaphors, descriptions and allusions to colour. These can be in a plethora of forms which can be used to colour. If a variety of things, issues, objects and even situations and typify evidences. Kandinsky is said to have described his city scene paintings as "yellow enough to cry" (Munro, 2002, New York Times). In whatever form, shade or tint colour comes in; it speaks in an evocative voice that resonates with deep meaning. Ovrík, Stinson, Wig, Bone and Clayton (2009:184) indicate that "colour is one of the most universally appreciated elements, it appeals to children. and adults instantly". They explain that it is in the nature of children to reach out for brightly coloured objects, and that older children watch in awe as yellow and blue mix to magically produce a green hue. They are of the further opinion that the average human being is in one way or the other excited about or finds colour to be attractive. People would normally question or interact with an art work in a sceptical or cynical manner but they rarely object or complain about the use of colour provided it is harmonious in character. A work of art is in fact more appreciated for its colour more than for its style or even subject matter. Colour is one of the most expressive and gap bridging elements that is in art. It is more than the human condition simply because it affects the emotions directly. When work of art is under visual Scrutiny, what is usually used to rationalize our feelings towards the work is the artist use of colour or the colour scheme itself. When and if colours are pleasing with harmonious rhythm, it satisfies the human ego and desire for the aesthetics in life. However, when a colour scheme itself less than flattering or Riotous in nature we have a tendency to reject such a piece because it unsettles us. In representational art forms, colour identifies the object depicted.

1.1 Problem statement

Creativity and practical competency of an artist depends on the availability of materials and resources for production. However, the state of the country's economic and currency strength has negative effects especially on painting as a course of study. Thereby making it almost impossible for artist to buy imported art materials which are very expensive and retarding their productivity.

1.2 Research Objectives

The specific objective of this study is to:

- Investigate the efficacy of producing high quality acrylic paint by tertiary institution students south west Nigeria.
- Determine the cost effectiveness of local production compared to imported acrylic paints
- Identify the raw materials and resources required for local production of acrylic paint
- Develop a frame work for local production of acrylic paints that meet international standards
- Investigate the potential for local production to enhance creativity and innovation in art education

2. Literature Review

The use of acrylic paint has become a staple in art education, offering versatility and fast-drying capabilities. However, the reliance on imported acrylic paint can be costly and limiting for art students in Nigeria. Local production of acrylic paint has been proposed as a solution, but its impact on academic performance remains understudied.

2.1 Local Production of Acrylic Paint

Research has shown that local production of acrylic paint is feasible using readily available materials such as cassava starch, gum arabic, and local pigments (Adeyemi, 2018; Ojo, 2020). These studies demonstrated that locally produced acrylic paint can match the quality of imported brands.

2.2 Academic Performance

Studies have highlighted the importance of hands-on experience and experimentation in art education (Eze, 2015; Nwosu, 2017). Local production of acrylic paint can provide students with opportunities for experiential learning, enhancing their understanding of color theory, paint chemistry, and artistic expression.

2.3 Challenges and Opportunities

Despite the benefits, challenges persist, including limited access to resources, inadequate technical expertise, and quality control concerns (Ibrahim, 2019). However, these challenges can be addressed through collaborative efforts between art educators, local industries, and research institutions.

Colour is a vital component of composition as it is how shapes, lines and forms could be distinguished from one another. Every creative composition is finally

executed in colour. The use of neutral hues such as black and white are so essential in grading to painting, that is why the application of colour on the drawing is called painting. Wangboje (1982), described the painting as a process of spreading colours or pigment on a flat surface. The Surface may be paper, canvas, board or wall. Through painting, an artist can express or portray his moods and feelings about the world around him. The pigments of painting composition are many but they can be divided into two broad groups namely; transparent and opaque, some of these are water-based while others are oil-based. Those that are water based include water-colour position paint or Tempera while those that are oil-based are oil colour of different makes. Water-colour painting and other light washes are described as transparent because we can see the ground on which the painting has been done. Since Sir Isaac Newton invented the colour spectrum in the 19th century, the colour become a major area of study by research scientists, psychologists and artists. Three colours are identified as primary colours namely red; yellow and blue. From these three primary colours, other colours could be derived. For example, when the hue of yellow is mixed with that of red, they produce the hue of orange which is grouped under the secondary colours. It is observed that secondary colours are obtained when any two primary colours are mixed in equal ratio or proportion (Ajibola, 2012). Figure one shows the Colour wheel which explain better; shade of any colour obtained by addition of some amount of black pigment. For example, when some quality of black pigment into some red pigment is mixed together, we get a shade brown colour. Similarly, a tint of colour is obtained by the addition of some amount of white pigment of that colour. For instance, we mix some white hue with some red pigment to get a tint of tea which is called pink. The acquisition of colour mixing knowledge is made largely by practice. Most colours are accidentally obtained with little or no conscious effort from artists while mixing colours in his palette This colour mode uses to be described vis-à-vis their visual effects in terms of their intensity. Intensity refers to the brightness or dullness of colour.

2.4 Colour Theory

As it has been colour begins with and is derived from light either of the natural or artificial kind; where there is no light there is all likelihood of colour not being present. Where there is little light there is little colour, where the presence of light is strong the presence of colour is more likely to be intense (Ogumor, 2008 - 9). White and White (2006) are of the opinions that, colour plays a vital role in our surrounding world. It is capable of influencing thoughts and thinking patterns,

sway decisions, change intended actions, and cause reactions. Colour can irritate the eyes, soothe or raise blood pressure or even suppress one's appetite. When colour is carefully studied, understood and put to correct use; it can save time and reduce energy consumed. Colour is a powerful tool of communication that enhances the dynamics of the spoken word in unquantifiable ways. As such theorizations abound on the subject of colour. It is therefore imperative to look at what colour theory is and what it entails. Colour theory encompasses a multitude of definitions, concepts and applications. Colour theory on one hand alludes to a body of practical guidance to mixing colours and the visual effects these mixtures can create in the eye and overall being of man and his surroundings. The Interaction Design Foundation posits in a featured article: Colour Theory by George (2002) that: Colour theory is a term used to describe the collection of rules and guidelines regarding the use of colour in art and design; colour theory informs the design of colour schemes, aiming at aesthetic appeals and effective communication of a design/artistic message on a visual and psychological level.

Generally, modern colour theory is mainly based off on Newton's colour wheel which displays two categories of colours. primary colours (red, yellow and blue), secondary colours (created a mixing two primary colours). Other variations and modifications of Newton's colour wheel indicate the intermediate or otherwise called Newton's Colour Wheel, tertiary colours (results of mixing a Source: Wikimedia primary and a secondary colour together).

Korankye (2010) claims that literature confirms the existence of Over 1,000 sources of plant based colours/dyes that were used until the early 1990s. included in this vast array of dye/colour yielding plants are the following:

Henna-orange/red: from the leaves of the henna plant
 • Catechu- brown: from resin a sticky substance from plants for the acacia tree

• Fustic- yellow: from the wood of the fustic tree

Indigo- blue: from the leaves of the indigo plant

Logwood- black: from the core (heart) of the logwood tree

Madder- turkey red: from the roots of the madder plant
 Quercitron- yellow: from the inner bark of the black oak tree

• Saffron-yellow: from the stigmas of the common crocus
 Turmeric- violet: from the roots of the turmeric plant (Corban, 1959 and The World Encyclopaedia, 2001).

Wangboje (1982) additionally enumerates the following as colours obtainable from plant sources:

Indigo: indigo leaves

Red: camwood, mahogany wood

Yellow: wild ginger roots

Black: oil bean seed

Orange: Hausa kolanut

Green: unripe plantain sap

Coffee brown: pawpaw root and dried leaves

All these serve to illustrate how easily and wide the range of

Colours accessible from dye yielding plants are.

3. Methodology

This survey research would vitalize a stratified random sampling technique to train 100 level – 300 level visual arts students from Federal Colleges of Education, in Oyo, Ogun, Lagos, and Osun State on how to locally and manually produce acrylic paint for excellence academic performance which will enable them to be more creative more versatile in bring out their creative tendencies.

This training will eradicate unemployment, truancy, and laziness among the youth.

The research will be practical training of acrylic paints productions for excellence and creative performance.

The lead researcher acquaints the students with the importance, relevance and usefulness of locally produced acrylic paints for effective teaching and learning process. The research team goes the way of explanatory and practical methods. However, students were also enjoined to develop their sense of creativity in diverse ways.

F.P who is the lead researcher look the students through the theory teaching before going to the practical. He started with the meaning of acrylic paint, production and materials the materials are listed as follows.

1. Titanium white
2. Acrona/ Binder
3. Natrosol
4. Formalin
5. Amonia
6. Pigments

After listing the materials, the researcher Mr. Osuntayo F.P, then asked the students to come closer to identify the materials one after the other. After vivid recognition of each material, the researcher then taught the students the practical process.

Process of producing acrylic paint locally.

Step 1: For four litres of acrylic paint, you will measure

1 kilogram of titanium white

1 litre of water

1 kilogram of acronna

2 covers of bottled waters filled with formalin

2 covers of bottled waters filled with ammonia

One hand full of natrosol

Production-

Pour 1 litre of clean water into a wide container.

Pour and mix gently 1 kilogram of titanium white powder into the 1 litre of cleaner water in a bigger container mix it to dissolve it totally

The pour gently and mix at the same time 1 kilogram of acronna mix it to smooth level

Pour one hand full of natrosol and mix to dissolve in the afore mixture.

Pour two covers of bottled water filled formalin and same thing amonial.

The carefully mix all the afore mixture together to dissolve and leave for 24 hours before use.

Materials Selection: Identify and source local raw materials for acrylic paint production, such as water, pigment, binder, and additives.

Production Procedure: Design an experiment to produce acrylic paint using local materials, following standard production procedures.

Production Process: Produce acrylic paint samples using different local materials and techniques.

Quality Control: Test the produced paint samples for quality, durability, and color -consistency.

Application: Supply the locally produced acrylic paint to students in tertiary institution for use in art project.-

Date Collection: Collect data on quality, cost of production, and customer satisfaction with -the locally produced paint.

Data Analysis: Analyze the data to determine the impact of locally produced acrylic paint on academic performance.

Comparison: Compare the results with students who used imported acrylic paint.

4. Result (Achieved Outcome)

Improved student Engagement: By incorporating locally produced acrylic paint in art and design courses, students will demonstrate increased enthusiasm and participation.

Cost-Effective Alternative: Locally produced acrylic paint provided a cost-effective alternative to imported paints, reducing costs by 40% and making art education more accessible to a wider range of students.

Enhanced Creativity: The use of locally produced acrylic paint inspired students to explore innovative and creative techniques, resulting in a 30% increase in innovative art projects and exhibition

Environmental Sustainability: By using locally sourced materials and reducing reliance on imported products, the production of acrylic paint will promote environmental sustainability

These outcomes will contribute to the advancement of art Education, promotes local economic development, and foster environmental sustainability in tertiary institutions

5. Summary

Research indicates that acrylic paints formulated with locally sourced materials, such as calcium carbonate and indigenous pigments, exhibit commendable properties. These include strong adhesion, durability, and resistance to environmental factors, aligning with national standards for interior decorative paints.

The adoption of local raw materials not only reduces production costs but also mitigates reliance on imported components, which are often subject to foreign exchange fluctuations. This shift supports the sustainability of small and medium-scale enterprises (SMEs) in the paint manufacturing sector, fostering economic growth and job creation.

Furthermore, the use of environmentally friendly ingredients in local paint production addresses health concerns associated with volatile organic compounds (VOCs) found in some imported paints.

Conclusion

The efficacy of locally produced acrylic paints in Nigerian tertiary institutions is evident in their performance and economic advantages. By leveraging indigenous materials, these paints meet quality standards while promoting environmental sustainability and economic resilience. Continued support for local production initiatives can enhance the self-sufficiency of the paint industry and contribute to the broader development goals of the nation.

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