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Fostering Technological Advancement in Nigeria: The Crucial Link Between Visual Arts and Science Education

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ABSTRACT

This paper explores the critical intersection of visual arts and science education in fostering technological advancement in Nigeria. By examining how visual arts can enhance scientific understanding and innovation, it highlights the potential for a multidisciplinary approach to address Nigeria's technological needs. The integration of artistic methodologies into science curricula can cultivate creativity, improve problem-solving skills, and inspire new technological solutions. The study discusses various models and case studies where art and science collaboration has led to significant advancements, proposing practical strategies for implementing similar approaches within Nigeria's educational system. The aim is to demonstrate that a holistic educational framework, combining visual arts with science education, can drive technological progress and economic development in Nigeria.

Keywords: Technological, Advancements, Nigeria, Visual Arts, Science Education

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1. INTRODUCTION

Nigeria, a nation brimming with potential, stands at a pivotal moment in It technological journey. While the country boasts a wealth of natural resources and a burgeoning population, realizing its full potential requires a robust educational system that nurtures innovation and creativity, Traditionally, science education has been seen as the primary driver of technological advancement, but this narrow focus overlooks the crucial role of visual arts in fostering the skills and mindset necessary for a thriving technological landscape. This paper argues that integrating visual arts into science education is not merely a decorative addition, but a strategic investment in Nigeria's future. Visual arts with their emphasis on critical thinking, problem-solving and spatial reasoning, possess a unique power to complement and enhance science education, ultimate leading to a more robust and innovative technological ecosystem. By exploring the multifaceted benefits of this integration, we aim to highlight

its significance in addressing the challenges and opportunities facing Nigeria's technological development. (Brown, 2008; Oyebade, 2019).
The various economic problems besetting Nigeria could be traced to our educational system that has not been geared towards self-sustenance. Though some of our development plans contained provisions for the achievement of self-sustenance economy, our development plans have in most cases, not come to fruition due to our political system and lack of political will on the part of our leaders as stated in the national policy of education (1977)

> "the desire that Nigeria should be a free just and democratic society, a land full of opportunities for all its citizens, able to generate a great and dynamic economy and growing into a united strong and self- reliant nation cannot be over emphasized.

Obviously the present state of technological growth in Nigeria appears very slow, in spite of the huge amount of money that has been spent on the development of science and technology. For any nation to develop, it must have experienced technological advancement and sound education of the people. (Olalekan, 2023; Smith, 2021).

Many nations like Nigeria have recognized the importance of technology in the transformation of their socio-economic, political and industrial structures. However, the preferences of science over visual arts have caused the sluggish pace of Nigeria's technological growth. As a result of this reason, many art educators and scholars have suggested a technological education that has not emphasized science only but also the creative as well as the aesthetic aspects of education. In Sheba's (1993) assertion:

> "Creativity is thought of as being constructive, productive behaviour that can be seen in action or accomplishment. It does not have to be a unique phenomenon in the world it has to be basically, a contribution from the individual". Therefore, creativity simply means inventiveness; ability to bring something new into existence.

Lawal (1990) stresses that art science and technology are closely related and must form the vital component for technological education. Mbahi (1999 and 2000) is of the view that proper attention should be given to the development of creative thinking which enhances the development of creative skills and talents which enhance qualities for technological breakthrough. Okundaye, (1995) is of the view that we are yet to grasp the fundamentals of the first phase of industrial revolution which began in Europe in the eightieth century. What then are the critical instruments needed to solve the problem of Nigeria's under development? The answer to this is the roles art, science and technology. This is related to the Nigerian cultural policy among its mandates sought to promote creativity in the field of art, science and technology.

However, this has given room for the paper to focus on the approach to visual arts and science education integration as a tool for sustenance technology in Nigeria .(Adeyemi, K & Oyebisi T (2023);Mbadiwe, K(2023).)

2. METHODOLOGY

Methodology is a crucial aspect of any research, project or endeavor. It's the frame work that guides you on the right track and achieving your goals. But it can also be a source of anxiety. *Uncertainty; Will it work. Complexity; It can be overwhelming, Time: Meeting deadlines while being thorough is stressful. Bias; Every method has flaws. Criticism; Your work will be judged.

How to manage the worry;

Plan early; Don't wait until the last minute. *Seek guidance; Get help from experts. *Be transparent; Clearly explain your approach. *Focus on the process; learn and adapt. *Celebrate progress; Acknowledge your efforts; So, methodology; is a journey, not a destination. Embrace the process and learn from your mistake.

Objective

The objective is to advocate for the integration of visual arts into science education in Nigeria through technological advancement. This includes investing in digital tools, online platforms and teacher training to unl0ock the potential of visual arts for enhancing student engagement, understanding and scientific literacy.

Concepts of Visual Arts and Technology

The creative process leads to the development of a physical or material pattern which becomes the object of perception, admiration and utilization. Creativity, therefore as a human cognitive reaction, implies conceptualization, inspiration and innovation. It will be safe, however, to say that the creative process particularly in visual arts amounts to transformation of life into things and of things into life. As an obvious and practical approach to communicate with the environment, the artists resort of the use of symbolic expression or design elements. It is the combination of these symbolic forms that gives meaning to the environment for the artist and society. Mbahi (1997) defined technology as "the systematic knowledge of technical method of achieving practical purposes". Nuhu (1999) perceived it as "the procession of tools, machines, devices as well as gadgets".

On the other hands shepherd (1989) sees it "as all manufacture materials, machines, devices and systems which help people to extend their capabilities in order to survive more easily and affectivity". Bugiluvello (1979) emphasizes on the relationship between visual arts and science by defining "technology as that art concerned with the application of the sciences and acquisition of a body of knowledge that is of practical value. Technology can therefore be seen as the production of utilitarian objects for peoples' uses and to help them live more effectively and comfortably in the society. Architecture, sculpture, painting (stained glass and mosaic inclusive) and manuscript illumination dominated the visual arts of the Middle Ages (about 500-1500AD). The seizure and the control of the, Mediterranean Sea by Islam after the collapse of Rome meant that new elements were introduced in European art. This marked the beginning of a complicated, decorative art of the East in Europe by Islamic influence. Whereas the interior decorations of Christian churches were filled with Christian

themes or motifs, those in Mosques had foliage and or geometrical decorations devoid of Christian iconography.
The concept of art in the Middle Ages was dualistic. It created beautiful things as well as those of utility. (Naswen, 2006). Gomwalk (1992) defines technology as a systematic study of techniques for making and doing things. It is the means and activities by which man seeks to change or manipulate his environment. The definition suggests that the history of technology is in essence, the history of man himself. Due to the changing patterns of the world, man can think systematically and creatively about techniques. He can therefore innovate and occasionally modify his environment in a manner no other terrestrial species has achieved.

The educational process must therefore be such that enable people acquire technological skills for national development. Umar (2000) observes that industrial designer and artist too have their methodological approach to design or produce utilitarian products such as cars, plastic wares, furniture, ceramics wares, fabric items and so on. As supported by Adedokun and Ikponmwosa (1997) who opined that the models of the technological industries are done by artists. However, if visual arts are utilized appropriately in technology, it will be able to facilitate technological development in Nigeria as a whole. It is therefore suggested that programmes as well as curricula embracing visual arts and science education in the development of technology should be emphasized for all levels of education.

3. DESIGN, CREATIVITY AND TECHNOLOGICAL INVENTIONS

Design indicates an arrangement or composition of some are elements, motifs and symbols into a unified piece or pattern (Banjoko 2009). Design could mean a representation in drawing or other media, the idea an artist intends to execute. It is a mental plan scheme purposefully to arrive at the motivated aim. The multifunctional being displayed by the engineer and artist involve the use of the following elements such as lines, motifs, forms, colour, texture and space. Nuhu (1999) refers to design as an arrangement, scheme or composition. He further sees it as a plan for arranging separate materials into a unified pattern.

Shepard (1989) also assert that designing is the process of using or adapting technology to provide the things that are needed; developing possible ideas and making them happen for the purpose of improving the qualities and progress of human beings within the society through educational technology. To make life easy for the people it is pertinent to acquire some basic skills through the development of visual skills in the school system. To enable an effective design requires a good amount of creativity. Odesanmi (2000) stresses that the visual art and science are two inseparable bed mates whose products of their romance is inventions, innovations and breakthrough. He strongly believes that the Nigerian educational programme cannot afford to have a lukewarm attitude towards the visually creative, gifted and talented. All of these are the foundation essential for technological development in the country. According to Lowenfeld and Brittan (1975). all artists are not necessary creative people. They also argue further that there are a lot of jobs that are certainly art related that calls for mere Tehnical skills on the other hand there are lots of other fields of creative endeavour in the tecente, medicine, mathematics and so forth that lay claim to the need for creative thinking. This

therefore makes it clear that the word "creativity" is not concerned with artistic expression alone but with whatever one can mediate upon at the peak of one's experiences.
For Sawa (2000) "creativity is the higher order of thinking". He equally sees it as the capacity to originate, invent reflect, analyze and synthesize. On the other hand, Olorunkoba (1991) sees creativity as a process by which something new, be it an object in a form-arrangement is produced. It therefore implies that creativity is a tool employed to create, analyze and synthesize new and original designs and products. It is a valuable tool for technological breakthrough; inventions as well as innovation. Consequently, the creative ability of professional teachers seem to lie in the hands of teacher with visual arts training because of their creative ability.

4. ROLE OF VISUAL ARTS IN TECHNOLOGICAL DEVELOPMENT IN NIGERIA

Art is a global activity which encompasses a host of disciplines as evidenced by the range of words and phrases which have been invented to describe its various forms. Example of such phraseology include fine arts, liberal arts, visual arts, decorative arts, applied arts, design, craft, performing arts and so on. The term "art" commonly refers to the visual arts as an abbreviation of creative art or fine arts for example the history of art is described as the history of visual arts of painting, sculpture and architecture. It is the history of one of the fine arts, other of which are the performing arts and literature. It is also one of the humanities. The term sometimes encompasses theory of the visual arts including aesthetic.

Visual arts is considered to be very valuable in developing the creative potentials needed for technological breakthrough. Mbahi (2000), stresses that science is the "knowing" and art, the "creative mind" involved in the formation or production of objects while technology is the skillful hand involved in "doing" the craft the artist or the industrial designer creates. The aesthetic quality of an industrial product. It is therefore imperative to recognize in Nigeria that the desire to make things beautiful must be as the desire to make them useful. According to Adeyemo (1972) memory is the power of the mind to hold, to bring back and to recognize past experiences. It refers to the past and thus includes recognizing a thing in its entirety. Memory is therefore essential to all knowledge of art as it occurs in general education. Sieber (1962) on his own part postulates two basic aspects of art as its aesthetic or presentational context comparing of forms, skills and embodying style and its meaning context comparing subject and symbolic association.

Kirkpatrick's (1983) view pertains to the practice of any or all of the applied sciences that have practical value and industrial use. Fashola (1969) shares the same view in his definition of technology as the scientific study of industrial art, including the arts (i.e. visual arts) by which through the medium of materials scientific knowledge and skills are transformed into practical use. From the definition given above it can be deduced that technology involves the utilization of the skills acquired from scientific study to manipulate available resources to develop new design and systems towards the improvement of the living conditions of the people and also solve their problems. Sawa (2000) observes that of all disciplines that exist, visual arts is the only one that has helped in shaping the human personality even before the arrival of science. His reference to arts here is not as a product of

leisure alone but a valuable agent for technological development undoubtedly, visual art has contributed significantly to technological development today.
Also, all objects of daily use show a recognizable style in art and this can be seen in the design element of modern architecture television, fridges, chairs, clocks, cars and other house utensils. Many manufacturers have realized that though technology may enable the industries to produce items fasters, it is the artist that captures the market. It goes to show that a well-balanced education for technological development must include visual arts in Nigeria. The utilization of the various aspects and resources in visual arts and adapting them to the production of products, like automobile, electrical appliances, electronic gadgets, furniture etc. has become highly imperative in Nigeria. If Nigeria as a productive and products more competitive in the international market, there is need to adapt our artistic creativity and innovation to technology.

Technology should not only be seen as acquiring the technical knowledge but also in developing the ability to assess, choose and adapt such knowledge to local situations. This has indicated that, science; visual arts and technology are interrelated and must form the vital components for technological development. In view of this statement one would realize that there is need to improve the practical component of the Nigeria educational curriculum at all level of education, by integrating visual arts, science and technology. Lawal, (1990) observes that the fact the visual arts is identified with the creative imagination Sand the not utilitarian or something which is meant for aesthetic decoration alone while science and technology is associated with scientific and utilitarian products of human endeavour has greatly obscured the generic relationship between visual arts and technology. If this technology could be achieved there is need to establish this relationship in the educational system so that visual arts, science and technology can be taught in the schools.

4. Conclusion and Suggestions

To give training and impact necessary skills for the production of technicians, technologist and other skilled personnel who shell be enterprising and self-reliant as related to the national policy on education in Nigeria. The technology as envisioned in this paper refers to science and visual arts integration as a body to promote adequate knowledge in the three cognitive domains such as the affective, the cognitive and the psychomotor domains which are the blooms of taxonomy of education. It is noted that all the domains emphasized are interdependent as being mentioned but one should realize that all of them are geared towards the technological development of the nation for self-reliance.

There must be therefore, public enlighten and employment of teachers with knowledge of visual arts, science and educational technology to boost the ego of Nigerians in order to capture and improve our productions to meet the international market. There is no challenge to any nation to be greater than improving her productivity. Government and industries should be entering into partnership with international organizations that are ready to promote visual arts, science and technology transfer and research cooperation to foster sustainable development.

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