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Literacy and Technological Development in Nigeria: A Philosophical Diagnosis

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ABSTRACT

Many challenges have occurred in society as a result of advances in sciences and technology. Some of these changes have been good while others have involved risks that were either not known or are faintly perceived. Science and technology touch the lives of all people in several basic ways on a daily basis, affecting the manner in which people obtain their food, transportation, clothing and housing. As science and technology play in creasing vital roles in the lives of people, it is important and imperative to develop a basic understanding of both faces in this technologically – rich society. The understanding of how technology shapes or is shaped by society is based on two fundamental principles. First, technology is an agent of social change. Technological systems have produced great increases in the speed of communication, made mass production possible, and have reduced dramatically physical labour for human beings. Also, technology has provided an abundance of products and services that requires individuals to make wise consumer decisions. Second, societies influence the source of technological development. This indicates the fact that social, historical and cultural factors determine if and how, a technology is used. More than ever before, the 21st century people are immersed in an environment shaped by human technology. Citizens' responsibilities in a technological age are defined as the exercise of democratic rights on issues that affect the direction to be taken by society and its technological developments. So, becoming technologically literate means coming to grips with the problems of living in, and exerting influence upon the constructed world. In this work therefore, we will make efforts to locate the place of literacy in technologically driven society. Also attempt will be made to show the correlation between literacy and technological development. To achieve these, our approach will be philosophical, while making Nigeria our focus of reflection.

INTRODUCTION

Globalisation and rapid technological change have made knowledge a critical determinant of competitiveness in the world economy. This has created a world that is highly dichotomized along two economic poles of "developed"

and "developing". The developed societies or nations are defined on the basis of their technological advancement and sophistication. It is also argued that the high level of technological development of these countries is anchored on the high literacy level or rate which is made possible through a sound educational system, policy and philosophic foundation.

Today the literacy level or rate of such countries like Britain, Germany, France, Japan and United States of America (USA) have become one of the major characteristics of development. Literacy here are massively promoted through the educational institutions. These educational institutions are established based on educational systems that have philosophic foundation that influences every spheres of their national life. Such philosophies like empiricism, pragmatism, existentialism and idealism have become the world-views and therefore shaped the educational and scientific outlook of these nations. The results of this influence have been the high literacy rate prevalent in these countries and their tremendous achievements in the area of technological development.

On the other side of the world economic pole, we have such countries like Ethiopia, Liberia, Niger, Ghana, Nigeria and others that are just developing. As a developing country, we see that the literacy rate or level in Nigeria is very low and there exist no educational system that is scientific oriented, technological driven, practical based and a sound philosophy of education that have the capacity to shape, influence and evolve a world-view that will enhance the effective operation and implementation of the fantastic policies formulated in Nigeria.

Despite this, we see that Nigeria and other developing countries still strive to develop technologically through the process of investing enormous resources into this vital aspect of man's effort to control and dominate his environment. The national wealth that has been put towards the attainment of technological development has yielded little or no evidence in Nigeria. The fundamental reason for this lack of advancement in the area of technology is largely due to the high illiteracy level or rate in the country. The government has not evolved a sustainable framework that will improve and promote literacy in the country. This affects the educational sector, which has been totally neglected by various governments. There exist no policy in the country that promotes mass literacy that is technology oriented or technological driven. As a country, Nigeria needs a philosophy that will promote mass literacy and the culture of "do it yourself". The citizenry needs to know the functions, relevance, values and impacts of technological development on the society and culture of the people. How technology affects the lives of the people needs be understood by all. This understanding can only be achieved through technological literacy, which is very vital in policy formulation, decision-making process and the use of technology. The lack of such literacy that is philosophic has hampered the developmental drive of the nation in terms of technology.

In this paper therefore, we are to look at how literacy that is anchored on a sound educational policy and philosophy can promote technological

development in Nigeria. Our approach will be basically philosophical and will include analysis, critique and evaluation.

A systematic effort will be made to see how literacy can aid technological development in Nigeria. Also, answers will be provided to fundamental questions that will emerge from this. We will attempt to establish a correlation between literacy and technological development.

Definition Of Relevant Concepts

In this section of the paper, we are to define and give specific meaning to the relevant concepts discoverable in our topic of discourse. The reason for this is to remove any form of ambiguity and escape the horn of dilemma in terms of interpretation. The concepts definable in this discourse are Literacy, technology, Technological literacy, Development and Technological Development.

Literacy

There seems to be a general misunderstanding of what literacy really means. People mostly think of literacy as simply the ability to read and write. Though this is included in literacy, a critical look at literacy will show that reading and writing are just a tip of the iceberg and beneath the surface are such things as comprehension and understanding. Simply being able to read the writes on the page of a book or newspaper does not mean that such a person is literate.

However, traditionally, the definition of literacy is viewed as the ability to read and write, or the ability to use language to read, write, listen, and speak. But in recent or modern contexts, it is refers to reading and writing at a level adequate enough for effective communication, or at that level that makes it possible for one to understand and communicate ideas in a literate society (Wikipedia 1).

To the United Nations Educational Scientific and Cultural Organization (UNESCO) literacy is defined as "…the ability to identify, understand, interpret, create, communicate and compute using printed and written materials associated with varying context. Literacy involves a continuum of learning to enable an individual to achieve his or her goals, to develop his or her knowledge and potential, and participate fully in the wider society" (UNESCO 1978)

Basically, there has not been a universally agreed definition of literacy. This disagreement in terms of meaning is largely due to historical dynamics, cultural differences and social factors that are both internally or externally imposed. This view is shared by Strcht (1978), when the made distinction between externally imposed literacy tasks from internally imposed task and so gave a definition of literacy skills needed to perform some task imposed by an external agent between the reader and a goal the reader wishes to obtain.

Ekanem (2006), asserts that the emergence of fundamental and need based approaches, has made the definition of literacy to become more dynamic due to changes (129). This is also discoverable in the works of Janathan Kozoi (1980) when he opines that literacy is "a word in search of definition". Following this trend, we have started hearing about "Literacies: as against "literacy", and so there is a campaign to promote computer literacy, media literacy, heath literacy, political literacy, technological literacy among others. In Nigeria, the emergence of new technologies, multigualism, multiculturalism and the resurgence of majority and minority culture and syndrome has pushed the meaning of literacy beyond reading, writing and numeracy skills in one official language. Under this circumstance, schools that are seen and defined in terms of reading, writing arithmetic could be said to be obsolete.

The new technologies have given wider access to ways of learning rather than printed books, lectures, and face to face discourse which has been the dominant techniques about six decades ago. Cultural pluralism has been the flagship that has made Nigerians to be aware of oral cultures and languages that are not strictly linked to the alphabet. Accordingly, Donald Leu (1999) declares that, if there is one thing that is certain in these uncertainties, it is that the techniques of information and communication will regularly and repeatedly change, regularly redefining what it mean to be literate. Linda Shohet (2002) accepts this position when she offer the explanation that electronic media are changing the nature of literacy and forcing a convergence of print, the visual, and oral. So, to her, literacy is "a complex set of abilities to understand and use the dominant symbol systems of a culture for personal and community development."

From the above analysis, we discover that we cannot capture a singular definition. However, in this paper, we will agree with Ekanem, S.A, Ekpiken, R.S. and Asira, A.E (2006) that literacy is "the ability and capacity to comprehend, appreciate, interpret and utilize socio-cultural dynamics of his or her environment and adapt same for his or her benefit(s) within the context of meaningful communication either in speech or in writing. It is the utilization of one's potentials acquired through a process of internalization for the development of the person and his society. This involves sufficient basis skills in reading and writing that enable a person to function effectively in every day situation (30-131).

However, it will be added here that literacy is the ability to functionally translate, and utilize cognitive acquisitions and process into meaningful activities that is beneficial to both the person and his society. This translation and utilization could be in the form of reading, writing or speaking.

TECHNOLGOY

Technology is a term with origins in the Greek word "technogis"., "techne" which means "craft" and "logia" meaning "doing". This implies a broad term that deals with the use and knowledge of humanity's tools and crafts

(Wikipedia 1). This tallies with the etymological definition given by Uduigwomen, which says that the concept of technology is derivable from two Greek words which are "techne" and logos". "Techne" means, craft or skills and "logogs" translate to understanding, study or a science of or logic. From this we see that technology can be taken to mean the "science of arts, craft or skills" (211).

Despite this etymological meaning of the concept of technology, several scholars and authors viewed it differently. Though there are divergent views on this, there exists a common element in all the explanations offered. This basic element evolves on the scientific. The implication of this is that there is no definition or explanation of technology that is devoid of this scientific element. To explicate this fact, it is imperative to examine some of these views.

The Federal Ministry of Science and Technology sees it as the method of dong things through the application of knowledge derived from systematic investigations of natural forces and materials. The emergence of the scientific element clearly emerged when we scrutinize the phrase "application of knowledge derived form systematic investigations of natural forces and materials". Patrick Enabudoso agrees with this view when he gives the definition of technology as the employment of acquired knowledge in field of science together with "earth's abundance which lead to a more comfortable life through planning and design development" (12). Sam Akpe explains this scientific element more graphically when he writes that technology is the theory or practice of applying scientific knowledge in such a way or pattern that it has the capacity of sustaining and creating human comfort (Ekanem 7).

Technology is generally seen as the application of scientific knowledge to arts or in doing things. This scientific knowledge cold be theoretical or practical. However, the practical application of this knowledge seems more imposing in the whole edifice. The goal or essence of this is the creation of a more comfortable life and the sustenance of human existence. From this perspective, some authors like Olusegun Obasanjo sees technology as "the art of know-how, which results in rational utilization of matter and energy in any process designed to satisfy a need (56).

To Marsden (1970), technology is the practical application of systematized knowledge, which is for the benefit of man and comfort of life.

The discovery from this analysis is that technology involves a body of systematic application of practical knowledge with the ultimate goal of enhancing human existence, and this, it could be inferred, is not one-way directional but rather multi-dimensional. The reason for this thinking is that there are several aspects of human existence that require improvement before we can really get to that point of "human comfort". Man as we know, is unarguably, a complex being with many aspects, which include his existence. It is on the basis of this that we can talk of the various aspects of technology which include building, agricultural, medical, military, marine, science, industrial and information technologies.

Technology from our analysis has several definitions hence; some see technology as a technique, which implies that technology is the current state of our knowledge that involves how humanity carries out the combination of resources to "produce desire products, to solve problems, fulfill needs, or satisfy want". In this sense therefore, technology includes the utilization of technical methods skills, techniques, tools and raw materials (Ekanem 129).

Also, technology is viewed as an object that includes tools, machines, instrument, weapons, appliances, that is, the physical performance of people. This implies that technology is defined as the technical means that people use to improve their surrounding or environments and making use of tools and machines to perform a task efficiently.

Here as maintained else where, we will view technology as the epistemological and practical application of scientific principles in a skillful and creature manner to bring about good sand ser v ices thereby adding value to nature's gift for the benefit of man.

Technological Literacy

Technological literacy can be defined as the intellectual processes, abilities and dispositions that are required by people or the citizenry to understand the link between technology and society in general. It involves developing people's awareness of how technology is related to the broader social system, and how technological systems cannot be fully divorced from the political, cultural and economic frameworks that shape them. In order to achieve an informed, balanced and comprehensive analysis of technological influences on their lives and then be able to act on the basis of their analysis, people need certain levels of knowledge, skills and abilities. These include:

- The understanding that technology include hardware, know-how, cultural need and desires, and economic and political decision making;
- The understanding of how technology shapes and is shaped by society;
- The understanding that technological issues involve conflicting assumptions, interpretations and options;
- Having the necessary data collection and decision making skills to make intelligent and sound choices;
- Having the ability and desire to take responsible actions on social issues based on sound analytic skills (Bee 96-98).

However, the United States Department of Education (1996) defines technology literacy as "computer skills and ability to use computers and other technology to improve learning, productivity, and performance". This definition by the U.S. Department of Education tends to be lopsided as it tilts more to computer technology which is just an aspect of technology.

To Grace Umoren, "technological literacy is the acquisition of a wide knowledge of technology both from school and environment with necessary attitudes (ethics), skills (process) and relevant physical abilities necessary to

apply the knowledge and skills gained in a safe, appropriate, efficient and effective manner" (2).

Technological literacy is often defined by certain characteristics, and to Dyrenfurth (1987) these characteristics are grouped or classified into distinct domains, which are the cognitive, the affective and the Psychomotor.

So, within the cognitive domain Umoren maintains that the characteristics of a technologically literate person should include:

1. Having the awareness of the key processes and the principles that govern them.
2. Possessing the understanding of the important relationship among key areas of technology.
3. Having the ability to conceptualize and know unfamiliar technological process or machine operation.
4. Have a form of personal limits, (that is know when to call in an expert).
5. Be familiar with technological effects on individual and society.
6. Have the ability to evaluate a technological process or product in terms of personal benefit as a consumer.
7. Have a slight relationship between career and the technological future.
8. Have the ability to project alternative future based on technological capacities and application.
9. Have a sound knowledge of technological information, accessing methods and sources.
10. Within the Affective domains, the characteristics she further explains have to be;
11. Comfort with basic technological hardware (that is the willingness to make use of tools, machines and materials).
12. Imaginative tendencies that could be applied to existing technology to tackle new problems or situations.
13. The ability to evaluate technological process or product in terms of personal benefits as a consumer.
14. The ability to make a choice among technological alternatives in daily living.
15. The ability to use technological artifact s such as tools, machines, materials and processes that commensurate with one's level of development.
16. The ability to use technological artifacts like tools, machines, material sand processes that commensurate with one's role in life (2-3).

From the above, we can see that technological literacy involves a complex network of cognitive abilities that translate into tangible realities that help to enhance human comfort and improve the human environment while preserving it. It is a web of human understanding or the best way of applying the creative energies inherent in man to bring about improvement that fulfills divine ordination.

DEVELOPMENT

Development according to the Webster's Comprehensive Dictionary of English Language means "the act of developing", and developing; to the same dictionary simply means, to cause to grow or expand, to elaborate" (261). There is a fallacy in this circularity of the explanan. To Ozumba, development implies an integrated social phenomenon that includes the economic, the political, environmental and physiological, which could be seen as the overall growth and expansion in all the social dimensions of life (202). Omoregbe shares in this understanding of development when he asserts that, there are several aspects of development when compared with an organism, which is multi-dimensional.

Based on Ekanem's analysis, these views direct the historical concept of development away from the economic standpoint. He posits that the development was grounded on the notion of an increase in the Gross Domestic Product (GDP). He explains in his work captioned, "Ethical Implications of Technological Development in Nigeria", that the re has been a shift in this definition which presently embraces other indicators of the quality of life. His view as is that, these inactions are social among mother facets of life (31-32).

This shows that, there is a radical change in what could be taken as development. The focus of the current definition has been on the human element. The implication as currently perceived, is the process that involves people's capacity in a particular area within a specific time-frame to manage and induce change. However, for this to be achieved there must be a "consciousness that is needed to plan, predict, understand, monitor and evaluate changes with the aim to either reduce or eliminate any unwanted change" (Ekanem 32,130).

What can be inferred from this is that development is time bound, and this could be attributed to the dynamism inherent in it. This time frame, therefore, makes it possible for the process to bring about modernization, improvement and change form what is obsolete to sophistication. It involves a value inducement process of change that requires consciousness to make achievement possible.

The element of consciousness discoverable here may have informed Omoregbe's living status of development which led to his organistic notion. As a living organism, he sees development as being multi-dimensional in nature and contains fundamentally the primary and secondary aspects.

Oshita is in tacit agreement with this view. He opines that, development is a multi-dimensional concept that includes structural and super-structural aspects. When this is better applied, the result becomes progress, advancement and improvement. It generates changes and helps in making life emjoyable and devoid of boredom. It involves innovation in several aspects of life. It is the positive application of cognitive ability to introduce change and adds value to a thing thereby improving the condition of such a thing. Development is a process that enhances the quality of a thing. It strives to

establish the enhancement of several things or facets of life. It involves the process of transformation that is only achievable through change (64-65).

To Ekanem, development "involves a systematic and conscious process of change, that is, innovation and advancement. It indicates an improvement on what it is, it plays a metabolic role involving sequential processes geared towards achieving a goal" (130).

However, in this paper, we want to posit that development is a dynamic process that brings about value to any aspect of human life based on rationality which is imperative in its functionality.

Technological Development

Technological development to Ekanem is the translation of research results into goods and services, which also have improvement on technologies that are already in existence as a major component. This involves Improvement, advancement and progress in the practical application of scientific knowledge geared towards a more comfortable life (37;131b).

The above analysis shows that when there is progress or improvement on the technologies that are already in existence, we can refer to such changes, progress and improvement as technological development. The reason for this line of argument is because man is never static, but rather a dynamic being that strives for improvement and change, and as a result of this dynamism, man is always making new discoveries of things. He constantly makes innovations and changes in various spheres of life so, when such changes, innovation and discoveries are achieved in the sphere of technology, we refer to it as technological development.

Modern technology is a portent weapon of social, political and economic values. As a concept, it has development within it. The reason for this is because we cannot effectively carry out a discourse in technology, without seriously reflecting and referring to the multi-dynamics of it social impact and influence as a social phenomenon. So, to Akpe, technological development is,a conscious and systematic improvement, change, growth and advancement in the practical application of scientific knowledge and man's resourcefulness so as to improve the life of man and brings about comfort (19).

Literacy and Technological Development

Literacy as we know involves a complex set of abilities to understand and use the dominant symbol system of culture for personal and community development. The need and demand for these abilities vary in different societies.

In a technological society, the concept is really expanding to include media and electronic text that includes alphabets and numbers. So, it becomes imperative that individuals be given life-long learning opportunities to move along the continuum, which includes reading, writing and the critical

understanding and decision-making abilities they require in their communities.

Several policy analysts consider literacy rates as a crucial measure of a country human capital. This chain is established on the ground that literate people can be trained less expensively than illiterate people. Also, literate people generally have a higher socio-economic status and enjoy better health and employment prospects. Policy makers equally argue that literacy increases job opportunities and access to education upon which creativity, innovation and sustainable development can be achieved, especially in the sphere of technology.

Technology as we are aware, enriches and eases daily life, but can carry with it unanticipated side effects. It is therefore very essential to consider the benefits compared with the costs, in terms of resources, value and money before and during the development of a technology. There is always a degree of risk involved, because of the difficulty in predicting all the effects of a particular development. So, as technology is at the heart of several critical issues facing today's society, people need to develop an understanding of both the benefits and the risks inherent in any given technological innovation. So, in order to make intelligent decisions on technological issues, it is vital that people understand how technology and society influence each other and then be able to use this knowledge to shape public policy in a democracy as we have in Nigeria. Here, the essence of literacy in technological development emerges naturally.

Dyrenfurth (19874) captures this essence graphically thus:

Technology is the essence of the economy of what we call "developed" countries. Absence of technology leads to our euphemism of "developing" countries. Not only does technology play a pivotal role in our economic world, it also determines the extent to which we can defend our selves and in a large part, the level of our significant focus of the recreational activity of millions and the cornerstone of a healthy future. Because of its acknowledged importance, technology carries with it considerable responsibility and even threat, misuse of technology are well known to even lay persons and more than a few knowledgeable experts have forecasted doom precipitated by mankind's use/abuse of technology. Therefore, it would seem that the hope, for a future in which people are in control of their environment lies in universal technological literacy or the ability to do and to use technology not just to be aware of it. Technology feeds on imagination, impudence, science and most especially on technology itself. In order to accomplish human resource development, a large proportion, if no tall of our societies need to be relatively competent with technology. Technological literacy is the foundation for such competence.

Again, literacy in relation to technology can be taken as the basis for flexibility in the future. It helps people in the control accessibility to technology, and thus enhances the adaptability of man to the dynamism of society and so contributes to the advancement of its capabilities. Technological literacy promotes entrepreneurial capacity, aids and enables

individuals to make more informed and rational choices, as it brings about better citizenship and increases efficiency.

To Umoren, scientific and technological literacy are "Twin components" that are essential and necessary for production of "a very attentive" and "well informed" citizenry that have the capacity to make rational decisions as it concerns "science and technology related social problems". She opines that, since scientific literacy has been discovered to be "necessary for the growth of the individuals and nations, technological literacy as an adjunct to scientific literacy is seen as the embellishment capable of producing an all-round development of the citizenry" (3-4).

Indeed, the conceptual framework for technological literacy provides the definition for the aim of technology in any given society based on knowledge, which is the product, skills, which involves the process, values, which is the ethics.

A comprehensive evaluation and assessment of the framework provides for us a programme that is designed towards personal and social goals of science and technology education.

From this we see that the goal of acquiring knowledge and the purpose of technology literacy will be to help individuals develop an understanding of issues and be motivated to acquire knowledge and develop skills and values. A sound knowledge of science and technology make it possible for individuals to be confident in assessing and researching into issues that hinge on personal, cultural and civic.

Here, we see that literacy plays vital role in the evolution or development of any kind of technology. Again, as a social and cultural activity, Ekanem argues that technology is designed, developed and pioneered by literacy which is embedded in education. So, the type of education that exists in a particular society determines the type of technology that is prevalent (133). It is on the basis of this that Grace Umoren advocates for a massive education of the citizenry in the sphere of science and technology. Her argument is that, it is only through a sound education that Nigeria as a country can make any meaningful advancement or progress in the area of science and technology (6).

This position becomes more meaningful and relevant when we realize that science and technology have been integrated into culture in today's world. As a fundamental social process, science and technology have become very vital in our society. So, the social justification for their development has been both intellectual and material.

Indeed, science is supposed to provide man with a better understanding of nature, environment and society. It is also supposed to give man a total liberation form the chain of superstition and ignorance. Technology that is derivable from science is to provide us with absolute control over the material world hence, man attainment of total liberation from hard work, hunger and poverty, (Umoren 45). Despite the promises of science and technology, Nigeria has remained more of a spectator in this vital sphere of human endeavour. This problem in Nigeria is actually linked to the high rate

of illiteracy in the country. The educational system cannot produce the required number of technical, scientific, professional and managerial personnel that can implement programmes that will steer the nation through the path of technological growth. Subsequently, the country based on Umoeren's analysis is at risk, because the educational foundation of our society is seriously being eroded by a rising tide of mediocrity, which posed a fundamental threat to the future of the nation. Accordingly, she argues that Nigeria is producing scientifically and technologically illiterate populace; hence as a nation, Nigeria cannot attain technological progress, (46).

This situation will lead to what Umoren has termed ignorance for fear of science and technology. So, for Nigeria to suffer form this is in the 21st century will lead to the production of technology peasant citizens who based on Prewitt's argument as quoted by Umoren are those that are bewildered, dazed and intimidated by the new technique and languages of science and technology. The implication of this situation is simply that, Nigerians will be out siders in their own country. This is because without a scientifically literate or educated citizenry, Nigeria cannot make the necessarily expected and reasonable technical based political decision on issues such as nuclear energy, atmospheric pollution due largely to lack of the rudimentary tool to graps the various arguments. So, teaching the young people science is to educate the society's future scientists. And to attain technological development, Nigeria needs mass education of the citizenry. This mass education of the citizens should as a matter of basic need include technological literacy. It is only on the basis of this that Nigeria will be reposition for development and become the real giant of Africa.

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