

The Role of Democracy for Effective Mplimentation of Science, Technology and Sociology education in Nigeria

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ABSTRACT: This paper discusses the Role Democracy plays in the development of Science and Technology, education in Nigeria. The researcher considers what Democracy, Science and Technology are. It offers that Democracy is that institutional arrangement for arriving at political decisions in which individuals acquired the power to decide by means of a competitive struggle for the peoples' vote trying to determine the faith of the people in other to encourage the development of science and technology education. It went further to discuss how democracy has played her role in the area of policy formation, Infrastructural implementation, man power, budgetary provisions, industrial policies, educational policies, health policy and socio-economic policies and so on. It is usually common to say that science and technology education. Teachers are those laying the solid foundation for the country's future scientist, technologist and good citizens with moral standard. The paper recommends that in a democratic policy as in Nigeria, where the politics of what constitutes the majority carries the vote determines the winner, sometimes the decisions taking may be against the will of the people and will in turn affect the social and economic aspiration of that society. The knowledge of science, technology and society would be most relevant for a democratic balance.

KEYNOTES: Democracy, Technology and Society

I. INTRODUCTION

The linguistic roots of "democracy" are found in Greek Demos means "people" and kratos means "rule"; so literally speaking, "democracy" means "ruled by people". This conceptual clarification, however, raises two fundamental questions: what does "ruling" mean? And who are the people? "Ruling" can refer to "Legislative", but it can also refer to the actual process of carrying out discussions. In ancient Greece, the answer to the latter question was "free men"; slaves and women were not included. Democracy certainly refers to formal procedures for electing- being of a government or any other kind of ruling body, but it has also been emphasized that democracy is subject to the fulfillment of certain conditions: a fair distribution of social services and goods, equal opportunities and obligations for every member of the society to acquire education, opportunities for citizens to participate in discussions and decision making. Democracy is now generally accepted as a worthy form of government in the world because of its obvious attributes. In Nigeria, the failure of the democratic experiments is the first and third republics as well as the 30 years of military mis-rule which was characterized by human rights violation, lack of accountability and legitimized corruption, civil unrest, intimidation unlawful arrest, and general feeling of insecurity, left the country' in a state of political and economic disaster. On May 29, 1999 Nigeria was ushered into yet another democratic government headed by Chief Olusegun Obasanjo who was re-elected for a second term in May 2003. In 2007, there was a transfer of leadership in the present democratic era. Nigeria therefore, has tested democracy but not long enough to either experience democratic process in action or for the citizens to enjoying dividends of democracy of the development of science and technology in the society. This explains the recent concern for the consolidation of democracy in Nigeria and anxiously searching for ways and means of sustaining democracy to ensure that the military does not return for whatever reasons.

These include the conduct of free and fair election process, setting up of anti-corruption Agencies, Poverty Alleviation Programmes and so on, which at best could be described as window dressing and inefficient. One crucial area which has not been given sufficient emphasis is the implementation of science and technology education. The interpretation of democracy does not follow the line set out by Schumpeter; instead, it is inspired by the notion of direct democracy. From the earliest times, people have always been battled by nature. On earth, we see seeds germinate and grow into huge tree. Some soils germinate seeds and others do not. There are mountains and valleys, rivers and lakes, looking up we see stars apparently hanging in space. Some are

bright, others are dim. How did all these come about? What accents for the way observed natural phenomena behave? Science sought to understand nature. We ask questions and attempted to answer them in such a way as to satisfy ourselves and make sense to all of us. People produced by first observing natural phenomena and seeing whether they formed a pattern and then attempted to explain the form of the pattern. We can therefore define science as a universally regarded as an organized study of natural phenomena and may be presumed to have been a pursuits of man's ever since his first attempt to harness the forces of nature. There are different views of science by different people. The scientist views science as an intellectual activity through which man seeks to understand nature. The science teacher on the other hand may view science as an organized body of know-ledge in form of concepts laws and theories. A layman views science as a' more or less everything that has made life more comfortable and suitable. A more comprehensive definition of science is "activities calumniating into testable and variable body of knowledge Abdulahi (2012).

Technology is a little easier to talk about because its effects can be seen everywhere. The clothes we wear, the houses we live in, motor vehicles, aircraft or even the simple tools such as hoes and machetes are all products of technology. In the section we saw that science helps to create knowledge through systematic study. Through science we understand the laws of motion, gas, electricity, magnetism and iron. The knowledge of these various natural phenomena has been used to build the motor car, the Jet aircraft, radio, and television and so many other modern conveniences. The use of knowledge to solve practical problems is the essence of technology. Technology is concerned with finding solutions to life problems. According to Ikoku, (2013). Technology is defined as the rational utilization of energy in process designed to satisfy a need. On the other hand, the Encyclopedia Britannica (2007) defined technology as the means by which man seeks to change or manipulate his environment, while, Awokoya (2015) contended that technology involves the systematic study of the methods and techniques employed in the industry, research agriculture, ICT, fuel, Biotechnology, chemical, constructions, military power, space and transportation and commerce to improve the life of man in his environment. Technology has changed radically in quantity and quality over the millennium. Beginning sometimes in the 20th century, science and technology enter into a new much closer relationship. Science and technology are to modern life what the hands are to the body. They are used to harness the forces of nature and to transform the raw resources which nature endows man into goods and services for better quality of life. The wealth, development and power in the democratic scene of any nation depend on her capacity and capability to utilize science and technology education. Science and technology did not come into existence by magic. They were created by human beings living in society.

A society is any collection of people living together in a defined area. Some or all of the social organizations and institutions of the sort you have studied exist in a society. A society therefore is made up of groups of people with a common culture or certain shared characteristics. Several societies with different cultures can unite to form a larger society with certain broad characteristics. A society represents a group of human beings bound together for self-maintenance and self-perpetuation and sharing their own institution and culture STAN (2010). The society is affected by development in both science and technology. It is therefore expected that the citizen recognizes the intricate relationships between science, technology and society. This act of recognition can be exploited to enhance sustainable development for the majority Olaopa O. R(2011). Thus, we also talk about a society embracing several countries provided such countries share certain common ideals. Thus by existence, we can talk about a world society in terms of modern science and technology because their aims are the same all over the world. The essential thing about a society is to fit into the individuals and groups within which they interact through various social organization and institution. Through the various forms of interactions, they become aware of the problems of their society and want to find ways of solving them for the benefits of the people. A society develops through such efforts. Science and technology play a crucial role in the development of any society or nation.

II. ROLE OF DEMOCRACY ON SCIENCE, TECHNOLOGY AND SOCIETY IN NIGERIA

The question to ask is what went wrong with our previous development plans and policy implementations. Is there any hope for the future, what can science technology and society do to sustain the life of the majority? The outline of our country's balance sheet can be grouped into problems of policy strategies, man power budgetary productions, implementation of instructional facilities to mention but a few. This can be summed up to the dependency syndrome. Due to the pervasiveness of human activities by science and technology and the fact that they constitute the major sources of change in society the federal government of Nigeria created in 1979 the ministry of science and technology to give leadership and direction to their development for socio-economic well-being. Specifically, the ministry was mandated to coordinate and undertake scientific and technological

innovation including integrating foreign technologies into our own culture and upgrading indigenous technology human resource development for the effective use of knowledge to create wealth and quality of life documentation and dissemination of related information and promotion of international cooperation in science and technology education. Prominent among the objectives of federal ministry of science and technology policy include:

1. increase public awareness in science technology and their vital role in national development and well-being.
2. direct science and technology efforts along identified national goals.
3. creating, increasing and maintaining an indigenous science and technologybase knowledgethrough research and development.
4. motivating a creative output in science and technology.
5. increasing and strengthening theories and practice of science base activityinthesociety andthe nation.

On the other hand,(STAN 2014) spelt out five importance of STS to include.

1. Solving our economic and social problems.
2. Acquisition of relevant concepts and processes.
3. Securing economic stability, preservation and provision of work places safeguarding the supply of energy and natural resources, adaptation of the quality of economic growth to the requirement of mankind and environmental protection.
4. Increase the efficiency of both science and technology education and fostering international relations and
5. Improve man's living and working conditions through the application of the acquired concepts and skills.

A. Agriculture development : Nigeria is a developing country hence the threshold of industrialization. It has a land of 930.000 square kilometers and an estimated population of 200 million. About 73 percent of Nigeria total land area is suitable for Agriculture including arable farming, forestry, animal husbandry and fisheries. Nigeria is blessed with a wide variety ofresources. For example: Fossil fuels, ferrous, non-ferrous mineral and industrial minerals.The problem is whether this opportunity is fully utilized to sustain life of the majority isthe issues. Over 70% of Nigerians estimated population live in the rural areas and subsiston agriculture before independence the country was able to feed itself and export cashcrops Cocoa, palm oil, coffee and groundnuts for foreign exploitation. The discovery andthe commercial exploitation of crude oil appear to have had a counter-productive effecton agricultural productivity. For several years every federal Government professes to puta premium and priority on agriculture. Powerful propaganda and slogan, such asoperation feed the nation (OFN) the Green Revolution and school to land programmed and the vision 2020.Our level of science and technology should be able to correct their ills.

B. Industrial development : The current trend in the Nigeria economy and consequent devaluation of the Naira by more than 1000% has forced many industries entrepreneurs and individuals to look to local sources for some of their machines. Equipment such as spare parts thus has been an upsurge in the activities of the local manufactures of these products on the other hand Nigeria industries are located not on the basis of the availability of raw materials but anyhow based on the political interest. In most eases the rural man is left out of touch with any item manufactured in the industries. There is need for STS to imbibe transfer of technology to cope with this problem.The Petro - Chemical industries in Kaduna, Warri and Port-Harcourt should be expanded to cater for the societal demand of fuel and petroleum products like kerosene, Gas, fertilizer, plastics, organic solvents, Lubricants, to mention but few. This can go a long way to sustain the standard of living of Nigerians.

C. Health development : Health is wealth is a popular saying in the society. The importance of health cannot be over emphasized. The problem is how to take this medical care to the rural population which constitute over 60% of the continue population, if life is to be sustained. Through science and technology education people should have to fully realize the value of health and the potential consequents of health hazards to which they are exposed and beinvolved in controlling diseases to promote health in order to attain a sustainable health development should be organized by communities on nutrition, safe drinking water, basic sanitation, maternal child health, infections and locally endemic diseases,from the forgoing, it is clear that the association between sciences Technology is very strong. Also that development for the majority is really the solid foundation on

which all round self-sustaining natural development should built. The most severe health problems we have are malnutrition, lack of good health, education, infections and parasitic disease, all this are illnesses associated with poverty, ignorance and poor sanitation. To sustain life of majority, our resources and cultures should be developed by STS. Any policy statement made in this democratic dispensation in the fields of Agriculture, Health., Industry, Education, Transportation, Communication, Housing, clothing to mention but a few will go a long way to sustain the life of the majority in the society. Finally, the teaching and learning of Science and Technology should be geared towards sustainability for both the individual and Government and the entire society in general.

C. Budget on science and technology : Perhaps the greatest problem militating against meaningful access to science and technology education in Nigeria is the problem of funding, although this administration has repeatedly declared its commitment to give science and technology education priority attention. Science and technology in reality has not received much attention from the present administration this is why for instance free and compulsory primary education has not been instituted effectively. It also explains why Universities would be allowed to remain close only to industrial action for about six to eleven months, if we recall back. It is regrettable and a sad commentary that budgetary allocation of the federal Government to science and technology education sector has continuously degenerated since the assumption of President Olusegun Obasanjo administration in 1999, Science and Technology education was allocated 11.12 percent of the budgetary provision this plummeted drastically to 5.9% in 2002 and 1.83% in 2003, later move to 2% in 2008, the late president, Musa Yar'adua during his administration has promised the Nation that Nigeria will be amongst one of the developed Nation of 20,20,20. Now we are in 2021, of the present government of President Mohammed Buhari, nothing has been done much, to encourage the Science and Technology sector, because of the political mess we found ourselves called democracy and the insincerity of the administration. As noted by a commentator, little wonder schools have remained and ill-equipped, laboratories lack of adequate facilities and reagents, and students still study under the most deplorable conditions in many places in the country. Until the Nations tries to reach at least the minimum standard of budgetary allocation, to education, of 25% as prescribe by UNESSCO'S as minimum standard. Commenting in this problem Nwagu N. A (2010) has this to say: funding education has increasingly become problematic in Nigeria. Unfortunately, good education is expensive and any government that tries to starve its education systems is most likely to vitiate the quality of education most of the strikes by teachers, insecurity and students are associated with inadequate funding. It is obvious that when there is no sowing there can be no reaping. This is an immutable law of nature. If there is no meaningful funding and good legislation by our political class for education the problem of inadequate access to science and technology education cannot be wiped away, it will continually be a mirage to the citizenry

D. Manpower development : The Journey so far in High-Level Manpower Development in Science and Technology in Nigeria in the Recent Time According to Awokoya (2001:24) the Science was not taught in Nigeria schools prior to 1859, when Christian Missionary Society (CMS) sited a grammar school at Lagos where Arithmetic Algebra and Geometry as well as general science were taught. Tremendous change in Science education started when in 1969 curriculum conference was held and after the conference so many science and technology subject project committee were set up. Daramola S. O (2018:12) acknowledged the success of the project committee to the efforts of organizations such as CESAC, STAN, AND UNESCO. And through the project we had most science textbook such as STAN Integrated Science, STAN Chemistry, STAN Biology, STAN Physics, and so on, and today so many individual authors now write books on Science and Technology education. According to Olatunji M.O (2017:159) the enrolment list of Science students has changed in higher educational level. He slated that, the total number of Science students in all 152 colleges of Education in Nigeria both state and federal as at 2019/2020 session were 26, 745 science students, when they graduated they filled up, the manpower demand of primary and junior secondary schools as teachers.

E. Policies formation : After independence in most African Countries, the need for the acquisition of STM as the very vehicle of rapid national development emanated from the 1963 United Nations Conference on the application of Science and Technology for the benefit of Third World Countries and also from the 1998 UNESCO International Conferences on Research and Training in Africa. As a follow-up, the Nigerian government in 1967 engaged the services of a UNESCO Science Policy Adviser to reassess the status of Science and Technology in the country and advise it on adequate policy measure. This resulted in the establishment of the Nigerian Council for Science and Technology (NCST) in 1967. It will be noted that similar interest and innovations were introduced in other countries of Africa wishing to adopt the pivotal role of science and technology in National development. Successive governments in Nigeria realizing the importance of science and technology have done a lot to popularize them. Among the many steps already taken according to Okoye (2010) are:

1. The introduction of science fairs and science clubs in schools. In the larger society, there are trade fairs where new products arising from the applications of new technologies are displayed;
2. The introduction of Junior Engineers and Scientists (JETS) competition in secondary schools;
3. The establishment of special science secondary schools in some States of the Federation;
4. The pegging of the approved quota for admission into Nigeria Universities at sixty percent (60%) for Science and Science related subjects and forty percent (40%) for Arts;
5. The establishment of specialized institutions in the areas of science and technology by the Federal government of Nigeria e.g.
 - a. Federal Universities of Agriculture
 - b. Federal Universities of Technology

It will be noted that in keeping with this high premium placed on STM education, some State governments also established their States University of Science and Technology

6. Award of scholarships to students studying science including science related and technology subjects;
7. Establishment of Polytechnics, Technical Colleges and Colleges of Education (Technical) in many States of Nigeria; and
8. Organization of regular annual in-service and short term training to enhance the competence of science, technology, and primary science teachers across the country.

A combination of these efforts and investments has gone a long way in promoting the growth of science and technology in Nigeria.

- A. Educational development policies :** In 1977 Nigeria came out with a New National policy on Education. This was revised in 1981 to cater for some of the things that were not induced in the 1977 policy and now revised again in 2013 which was seen very necessary.

In the philosophy, the Nation aspires that the education should make Nigeria a United strong and self-reliant nation. In the national aims, the country wishes that its citizen be trained in the understanding of the world around and the acquiring of skills abilities and competences both mental and physical, as equipment for the individual to live in and contribute to the development of this society. While pre-primary education should include the spirit of enquiry and creativity through the exploration of nature and local environment, the primary school to lay a basis for scientific and reflective thinking science and technology is foreign to the pupil who lived in the rural areas in most of these sailors there are no well trained teachers to teach science, no textbooks and materials for teaching at both primary and secondary school. At the level of the ECCE, government objective is to inculcate in the child the spirit of inquiry and creativity through the exploration of nature and the local environment. While at the primary school level, it is incorporation into the Basic education programme. The free Universal Basic Education (UBE) Act 2004 was readjusted to redress flaws so that it becomes more realistic and enforceable. It allows for federal intervention in Basic Education to be truly needs-based, which coincidentally is a watchword for science. There are major education policy reforms geared towards entrenching 6-3-3-4 education policy. Government intervened in education with a new reform that has recently spelt as 9-3-4 system, though; the guess is yet to be clearly understood by all. The policy focuses at purposely enhancing quality, ensuring balance national development and accelerating the attainment of the globally acclaimed Education for All (EFA). The year 9 Basic Education curriculum is such that provides that Nigerian children will be in school for 9 years of continuous schooling made up of 6 years of primary education and 3 years of junior secondary education. The programme is targeted at improving relevance, quality and efficiency in education, reducing school dropout and promoting the acquisition of functional, literacy, numeracy, life skills and values for life long education and useful living. (NERDC, 2007). It lays emphasis on communication and entrepreneurial skills. The place of science and technology in this programme is amplified in the lower basic education class (Primary' 1-3) where basic science and technology is one of the core subjects. At the middle (primary 4-6), and upper (junior secondary 1-3) classes, computer studies and ICT are compulsory. The programme stresses that instructional strategies that are activity based mid ICT driven will be adopted. (NERDC, 2007)

National Policy on Information and Communication Technology (ICT) : The policy on science and technology (revised, 2013) is prepared for a 25-year time frame with a provision for revision at 5-year intervals. Its basic philosophy emphasizes Nigeria's commitment to the creation of an independent, integrated and self-sustaining economy. The policy declares that education shall emphasize science at all levels. Government initiated the National Policies on Science and Technology, Information and Technology, Biotechnology, Space and so forth. In addition, there are research institutes like the African Institute for science and Technology (AIST) and the Centre for Space Science and Technology Education (CSSTE), policy making bodies and curriculum development agencies like the Centre for Comparative and Adaptation Study (CESAC), and the Association for Supervision and Curriculum Development (ASCD), We also have National Councils like Nigerian Academy of Science (NAS), and the National Council on Science and Technology (NCST), boards on Technical and Science education like the National Board on Technical Education (NBTE), associations like the Science Teachers Association of Nigeria (STAN). They all contribute immensely towards Science and Technology education development. ICT offers access to information globally, thus creating enabling environment for development in science and technology. This is of great value to a country like Nigeria and in recognition of this, the Nigerian computer society emerged. This is a society for Nigerians around the world in the IT industry ranging from students to professionals. The aims of the society are robust and geared towards global development. (NSC, 2007). ICT is regarded as a strong weapon for sustainable development empowering people for global competitiveness. This culminated in the development and propagation of ICT policy in Nigeria and for the Nigerian University system. To this end, the National universities commission (NUC) in 1994) initiated efforts to put in place a National ICT network with full internet connectivity in Nigerian universities (Gusen, Ramson & Ugwuanyi, 2009). Quite a number of information technology and electronic networking associations and organization further emerged in the bid to strengthen the capacity of Science and Technology education in Nigeria

III. RECOMMENDATIONS

The ICASE has provided global and factual perspectives that can halt the challenges facing science and technology education even in Nigeria. The key reasons highlighted by ICASE at the 2007 world conference are germane and peculiar to Nigeria too, hence the recommendations above apply to stakeholders in the business of Nigerian science and technology education without any alterations. There is an urgent need to join hands to build a strong and formidable Science and Technology education network. In addition, the following crucial suggestions would be useful in bringing revival to the system: Government should revitalize science and teacher education programmes across board. Productive links with industries should be established.

- A. Some employers have poor perceptions of university graduates in the area of Science and Technology based programmes on the idea that the higher institutions are not well equipped. In this regard, government should respond to the needs of the higher institutions.
- B. The curriculum should be reformed and targeted to be competency-based, interactive, problem-base and problem solving.
- C. Government and stakeholders should be sensitive to gender issues in Science and Technology and should strive to ameliorate the problems.
- D. Government should make adequate and sufficient financial allocations available to schools and agencies
- E. Employers should endeavour to encourage employee on the job training, so that their workers would be opportune to update skills and knowledge.
- F. Educators should not the rapid changes taking place in science and technology and their applications and reflect such in the planning, teaching and learning of Science and Technology.
- G. Government can provide scholarships for students in Science and Technology disciplines and also reward institutions that meet the target of the Science to Arts enrolment policy.
- H. Teachers should be sensitive to new trends and techniques in Science and Technology education.
- I. Educators should not ignore the local environment. This will stimulate the learning of Science and Technology education.

IV. CONCLUSION

Science and technology are avenues through which man interacts and explains the universe, seeks to understand the world and make it a better place. They are key drivers for socio-economic and educational transformations which must focus on innovation and invention. Unfortunately, these cannot be achieved if our democracy is dwindling and when the required human resources are unavailable. Science and Technology is the instrument that sustains advancement and there is a global race in which neither Nigeria nor any other country should lag. All stakeholders should seek practicable and responsive systems that will pave way or the implementation of

policies and entrenching reforms. Saints, Harnett and Strassner drew attention to the World Bank data in which, Nigeria though one of Africa's largest country, has only 15 scientists and engineers engaged in research and development per million persons compared with the 168 in Brazil, 459 in China, 158 in India and 4,103 in the United States and expressed fear in the chance of Nigeria in participating in the emerging globalknowledge economy (Saint, Harnett and Strassner, 2003). This is a strong indication that the challenges are not to be played down on, while the recommendations and suggestion required urgentconsideration.

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