THE PLACE OF SCIENCE AND TECHNOLOGY EDUCATION IN ACHIEVING SUSTAINABLE DEMOCRACY AND POLITICAL STABILITY

Engr. Sam I. Iwuoha

ABSTRACT

The paper discusses the role science and technology education plays in the development of political economy. It expatiates on the need for an in-depth knowledge of science and technology coupled with their implications in the approach to political issues, especially in such critical areas like oil exploration, industrial development, power generation, communication systems and financial borrowing from international organisations. Furthermore, there is a recommendation for the restructuring of the curriculum of the political science to encompass some core courses in science and technology education to make the recipients more prepared to utilize the knowledge so acquired in developing their political thoughts, anchored on pragmatic scientific approach to burning political issues that are always economic. It is reasoned that the knowledge of science and technology education will lead to mature policy making in politics, hence a good ground in this, is considered a necessary tool for the sustenance of democratic and political stability of any nation.

INTRODUCTION

The advances in science and technology have modified political thoughts right from the limes of Aristotle, Cicero and to Clinton era. Within these periods, wars have been fought, and peace accords negotiated thereafter, yet, the man's march in the quest for more knowledge and exploitation of the universe through the influence of scientific and technological innovations continue to create political instability. It is believed that political rancours that jeopardise development can only be eliminated if the politicians are adequately informed of the pros and cons of science and technology. Thus, the call for proper science and technology education for the political actors should be treated with the urgency it deserves. In view of this, this paper sets out to enunciate how this type of approach can create a conducive atmosphere for settling political issues that emanate from science and technology developments. As noted by Barbier and Giri (1974) the two main issues that should bother the Africa - Caribbean - Pacific (ACP) countries are technological developments and international relations. The way they handle these will determine the speed of their industrialization and Nigeria is no exception.

SCIENCE AND TECHNOLOGY ROLE IN DEVELOPING POLITICAL THOUGHTS

In the premedieval periods when science was still in its embryo, religion was supreme and politics depended heavily on the dictates of religion. It is on record that then some scientists suffered persecutions at the hands of church leaders. Galileo Galilei (1564 - 1642), according to Haliday and Resnick (1966), earned the displeasure of the leaders of the church for his support of the Copernician hypothesis of the solar system.

> Twice he was brought before the inquisition. He was ordered not to publish anything in support of the Copernican system and was compelled to publicly disclaim his belief in it.

For fear of reprisal by the church, Galileo had his *Dialogue on Motion,* which could have earned him the worst penalty, published after his death. This incident goes to illustrate how religion regulated the advance of science. Later on, however, technology provided a helping hand and proceeded to establish the validity of the scientific thoughts by bringing to fruition the labours of science by providing hardware, structures and machinery etc. that satisfy

human needs. The recognition of the potentialities of science and technology created awareness that compelled the politicians and priests to shift grounds on what they originally believed to nurse ideas that are in harmony with the scientific and technological developments.

Thus scientific and technological ideas formed the basis for the formation of modern political ideas. It is on this ground that the politics of the environment is being tackled with all severity. This also accounts for oil at its peak, and which is a very serious business amongst the developed countries. The apparent world peace existing now is anchored on the demise of the Soviet Union, otherwise the now forgotten "sky wars threats", the results of scientific and technological developments of military hardware, could have continued to loom over our heads. Thus, it is easily deducible that science and technology, at any material time, do obviously affect the political scenario. The best approach, therefore, to skillfully play the game of politics, is to be well tutored in the field of science and technology education, so that its operators be well prepared to tackle scientific and technological emanating problems.

SCIENCE AND TECHNOLOGY: SIGNIFICANCE AND POLITICAL IMPLICATIONS

Significance of Science and Technology:

Science is that branch of study that uses both deductive and inductive reasoning to explain the phenomena of nature. This may involve the putting forward a reasonable explanation or hypothesis and carrying out appropriate experiments to test it, which subject to the approval of others, yields what is called a theory, as reported by Ababio (1998). In the same vein, technology approaches its own field. The modification in this is that technology has to imbibe the knowledge of science supported with mathematical calculations provide a means of developing new products and controlling the use of the products, for the service of man. Thus, it is reasoned that science and technology are necessary tools for development and for formation of political ideas. Regrettably, as observed, by Dialogue, Obasanjo and Mabogunge (1991)

> **Science** and technology have had relatively little effect on the lives of citizens in Nigeria

This statement points to the fact that science and technology education has to be emphasised in Nigeria.

Political Implications of Science and Technology

Science and technology as noted earlier generate the enunciated advantages, but these have lots of political implications that have to be addressed squarely. In the exploitation of minerals such as oil explorations, lots of decisions have to be taken before the successfully execution of such projects.

In reality the significance of science and technology can be summarised as these:

(i) Provision of means for sustenance of life in the planet.

(ii) Control of the environment to preserve the seven ecosystems principles enunciated by Willard (1974). (iii) Provision of support systems such as communication systems, power generation sources, and infrastructure to sustain civilization.

(iv) Increase food production.

(v) Preservation of the eco-systems by the use of Environment Impact Assessment (EIA) as suggested by Obioma (1999) before drilling to be through (Oil exploration areas).

It is to be emphasised that so as to achieve the enunciated advantages of science and technology, the advice by Dialogue (1989), be heeded, which part of it reads,

> The government should take steps to appoint a presidential adviser on science and technology, so that the president can be

informed of the current state of science and technology, and
enabled to determine the policies it ought to pursue.

This statement if given adequate attention will provide some recognizable solutions but the writer is of the opinion that politicians in general should be groomed in science and technology to enable them perform effectively in their own interest. The issues of resolving all conflicts associated with the oil explorations have several political undertones: such as deciding on how much to be tapped at any particular periods, the amount to be paid per barrel, storage and control of the products so as to avoid overproduction, which erodes profits etc. The ability to balance these factors is the challenge of politics. What has been said of oil exploration also applies in such other issue such as industrial development which may entail the participatory contributions of other countries. It is a known fact that the establishment of nuclear plants any where in the world is always a matter for political tussles. In the same vein communication systems, power generation, and more financial borrowing have all political implications and are usually executed after due considerations are given to the advantages and disadvantages, that accrue from such exercises. Thus, viewing science and technology principally on their set values without considering the political attributes amount to chasing the shadow. Without politics, it is not possible to effectively harness the potentialities of science and technology. Based on this premise, therefore, it is essential to enunciate how the political science syllabus can re-structured so as to incorporate some elements of science and technology education to beef up the programme. It is reasoned that this approach will make politics more relevant in harnessing science and technology innovations, by boosting productive venture by ensuring stable electricity supply, provision of fuel and other petroleum products Osubor (1999).

RE-STRUCTURING THE POLITICAL SCIENCE SYLLABUS TO EMBODY SCIENCE AND TECHNOLOGY EDUCATION

In the traditional setting, political science is principally associated with political issues -how the people will be governed at optimal level using the resources available and deciding on how these are to be distributed amongst them using an agreed method, which may or may not be at the consent of the people. The types and mechanics of capturing power, the main objective of politics, are not the concern of this paper. This section of this paper merely suggests what additions are to be made in the existing political science syllabus to make it more relevant in the wake of the rapid science and technology advancement. The recommendation is presented thus:

Year One: Degree in Political Science (Per term/semester)

(1) Political Science courses 18 hours
(2) Introduction to Science and Technology _3 credit hours
21 hours

Year Two: Degree Political Science (Per term/semester)

(1) Political courses 18 hours
(2) Science and Technology

3 hours **21 hours**

Year Three: Degree in Political Science (Per term/semester)

(1)	Political courses	18 hours
(2)	Science and Technology	3 hours
		21 hours

Year Four: Degree in Political Science (Per term/semester)

(1)	Political courses	18 hours
(2)	Science and Technology	3 hours
		21 hours

SUMMARY Total number of hours for 4 year programme (Per term/semester)

Core courses 72 hours

Total number of hours for 4-year programme

Science and technology courses 12 hours. These courses can be broken up into units involving some periods to be spent in mathematics and technical courses. From the above computation, it is recommended that science and technology courses should form about 17% of the time for a degree programme. Rationale for this percentage is to ensure that throughout the periods of the recipients political science degree programme, the affected is continuously informed of the new advance in science and technology to enable the person improve on his political ideas. By this approach, it is possible to produce a well-blended political scientist, that can withstand the vagaries of international politics. Political science as one of the known social sciences, defined as "an interdisciplinary approach to the study of human beings in group inter-relations with both their social and physical environment" Obiolo (1998) should also be available to the scientist and engineers to make for equitable human development in this country.

IMPROVEMENT OF HUMAN THOUGHTS AND VALUES THROUGH SCIENCE AND TECHNOLOGY EDUCATION

As stated in the previous section, there is the need for improvement of the political science syllabus to provide at least 17%, science and technology content. It is reasoned that the scientists and engineers should be given the same opportunity. As informed by Mechanical Engineers (1975) "there is an increasing apprehension about the future of civilization as we know it, probably due to an uncontrolled rise in the population". The solution can only be achieved if there is harmony between political science and technology. Technology, the after-effect of science has added to the comfort of man, but it created problems. Cultures have been abused in its wake, environmental degradations have posed major problems, several countries have been marginalised because they can no longer keep custody of their natural resources, due to lack of money and technical manpower. The human thoughts have been subjected to various changes and in some cases, the people have been greatly disillusioned as a consequence of the intrusion of science and technology in their lives. Yet, science and technology should be saluted for providing the means for advancement of ideas in the positive sense. It is now common to talk of human rights, the right to democracy and freedom of worship. These things are now readily applicable because science and technology have succeeded in breaking the barriers of ignorance and their attendant problems. Any country that is to survive the international influences as illustrated in Fig. 1, according to Dunn (1978), should have its politicians groomed in science and technology

MATERIAL FLOW
Exports Imports

POPULATION FLOW
Emigration Immigration

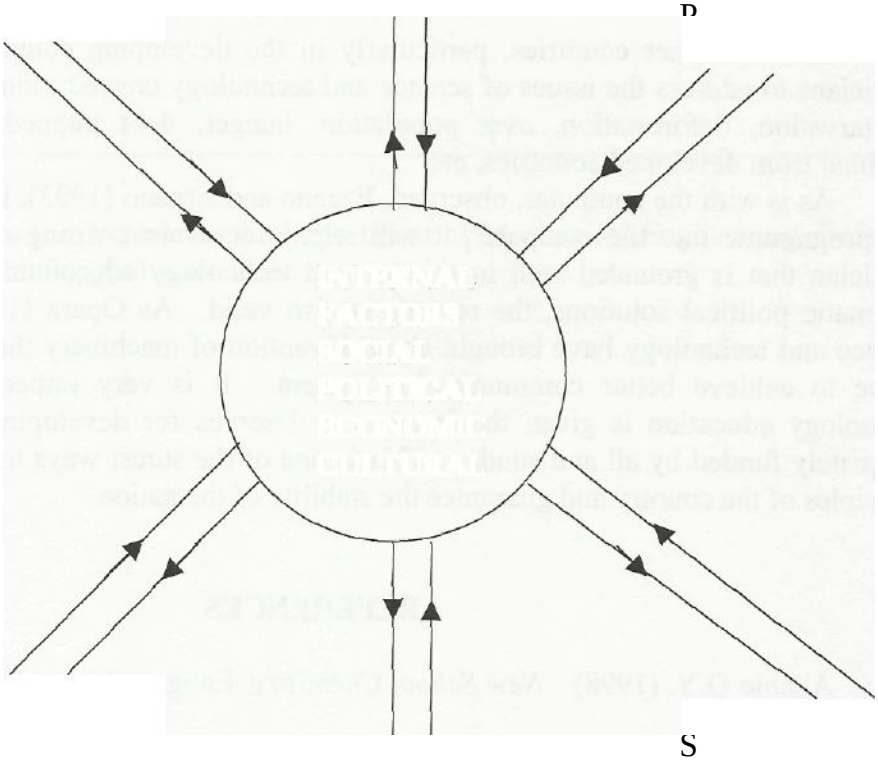

FIG. 1 INTERNATIONAL INFLUENCE AND EFFECTS AFTER P. DUNN (1978) APPROPRIATE TECHNOLOGY MACMILLAN, LONDON P.25

CONCLUSION

In fairness to politics, science and technology, it can be reasoned that the three are interwoven as in a football game. In the analogy, politics is liked as the "footballer", while the football leather represents "technology" and the air inside the leather represents "science'. When the leather (technology) is inflated with air (science), the ball is ready to be played by the footballer (the politician).

He aims at the goal (the objective, which is power). From this illustration, it is readily deduced that no power can be grabbed if there is no player (the politician), no leather (technology) and air (science). Thus it is observed that the three are very crucial for the fulfillment of any meaningful political ambition. By implication, science, technology and politics have to work harmoniously to achieve any worthwhile objective. Conclusively, it has

to be stated that a good knowledge of science and technology education is a fitting prerequisite for enduring political policy formulation. While, as Florman (1983) right observed, engineers do not share a common political outlook, some of them relate effectively with others in other fields, and these find some politicians good bed follows. The result of this type of cooperation has helped in the formulation of political ideas that have been very beneficial to some countries.

In some other countries, particularly in the developing countries, the failure of the politicians to address the issues of science and technology created monumental problems such as starvation, deforestation, over population, hunger, debt trapped from the borrowings obtained from developed countries, etc.

As is with the computer, observed, Ezeano and Ezeano (1993), if one enters wrong data and programme into the computer, it will release equivalent wrong output, vice versa, so a politician that is grounded well in science and technology education will obviously provide pragmatic political solutions, the reverse is also valid. As Opara (1997) observed, modern science and technology have brought about invention of machinery that can assist man in his desire to achieve better communication system. It is very imperative that science and technology education is given the impetus it deserves for developing the people by being adequately funded by all and sundry. This is one of the surest ways to uphold the democratic principles of the country and guarantee the stability of the nation.

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