



Research Article

THE INTERDEPENDENCE OF SCIENCE AND SOCIETY: THE AFRICAN EXPERIENCE

Wokocho G. A

Department of Integrated Science Ignatius Ajuru University of Education,
Port Harcourt, Rivers State

ARTICLE INFO	ABSTRACT
Received 16 th March, 2015 Received in revised form 7 th April, 2016 Accepted 29 th May, 2016 Published online 28 th June, 2016	This paper attempts to examine the relationship between science and society. It sees society as a human setting in which scientific and technological enterprises operate. The characteristics of each society also affect the type of science and technology it will develop. This paper tries to examine the type of science and technological development in developed countries and concluded that they arrived there because of the type of society in which they find themselves their educational strips and their emphasis on science and technology. The paper observed that science is a universal enterprise and not only for the developed countries alone. The Africans can also reach that level if they change those parts of their culture that are inimical to the development of science and technology. The paper revealed evidence of degree of scientific, technological, and sociopolitics in Africa as regards to medicines, mineral exploitation, iron casting, sculpture, textile industries etc and concluded that intertribal wars, slavery, colonisation, absence of formal school system, lack of documentation of scientific knowledge and practices, dominance of magic and superstitions as having led to the apparent passivity with regards to the development of science and technology in Africa.
Keywords: Science, Society, Culture, Superstition, Developed, Developing.	

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INTRODUCTION

There is interdependence between science and society. Society does not function in isolation. Scientists belong to societies and are governed by the culture of the society they belong. Society dictates the pace for science to flourish.

At this point the author wishes to explain the meaning of science, society and look at the relationship between science and society and then the African experience.

Science

Science is a systematic process of obtaining knowledge through experimentation and empirical testing. Umoren (1996) opined that science is a dynamic activity concerned with understanding the working of our world. Ogunniyi (1998) indicated that science is an attempt by man to organize his experiences with nature into meaningful systems of explanations.

The experiences therefore refers to the discovery of regularities and discrepancies and their effect on nature, knowledge of human actions on things, events or situations, and the consequences of such actions and understanding derived from

the control of diverse phenomena in nature. The activities of science which is the process are supported and nourished by previously generated concepts which is the product of science. The products of science such as its classification, laws, theories, concepts etc are generated or revised by the process of science. It is through the use of products of science that regularities in nature are described, explained and predicted. The concepts of science are condensed meaning derived from massive reductions and synthesis of sense data about time, space, matter and their assumed relations and their consequences.

Concepts can be classified into empirical and theoretical. Empirical concepts are observable phenomena while theoretical concepts are unobservable phenomena. Just as facts are related together to form concepts so also concepts are related together to form generalization. Scientific laws are generalization about observable regularities in nature. Scientific laws are used to describe, explain, and predict events in nature, while scientific theories are generalizations requiring further experimental testing.

The process of science on other hand involves the processes by which scientific information are gathered, analyzed, synthesized and disseminated.

*✉ **Corresponding author: Wokocho G. A**

Department of Integrated Science Ignatius Ajuru University of Education, Port Harcourt, Rivers State

Process of science is the activities carried out by scientist during scientific investigations such as observation, classification, measurement, prediction, problem identification, collection of data, analysis of data, drawing valid conclusion.

Society

Society is a collective interaction of human beings at local, state and national levels. According to Umoren (1996) society is a human setting in which scientific and technological enterprises operate and the characteristics of such a society affect the type of science and technology it will develop.

Society can also be defined as a group of individuals with common culture and heritage living together in a place. Umoren (1996) observed that science is a cultural enterprise comprising two basic components. First, science is influenced by culture and secondly, science has implications for culture. Science is a social enterprise and the features of this social environment influences the practice of science. Scientists view points, ideas, process, skills, ethics or attitudes are by-products of their culture or society.

Gyruse (1982) defined culture as everything that is man-made in a society, this include technology, language, literature, music, arts, science, mathematics, attitudes and values. Umoren (1996) also defined culture as the sum total of knowledge, attitude and habitual behaviour which are shared and transmitted by members of the society. Ogunniyi in Umoren (1996) discussed the content of culture as speech, materials, traits, arts, religious practices, family and social practices, property, government and welfare. Notable characteristics of culture were also identified as avert, covert, super-organic implicit and explicit. It is avert in terms of observable artifacts, covert because it controls perceptions, sets attitude and beliefs about objects and events, super-organic because it exists before an individual exist and persists after his death, explicit in terms of readily explainable thought or action.

Interdependence

Science on Society

Science and society are inter-related. The scientific knowledge, thoughts and processes are used to develop the society. According to Aikenhead (1985), science is a social phenomenon which transforms the society and makes the people perceive the world in a way different from what existed. When people within the society are scientifically literate, their knowledge will influence decision making in the society.

Science is a foundation of all social change. It helps to liberate man from bondage of superstition, and other false beliefs. In science, the process of inquiry is used. This includes empirical observation, identification of problems, formulation of hypothesis, designing and conducting of experiments, interpretation of data etc.

Science now has social organizational effect. Experts can achieve more power and advances in communication. Messages can now travel fast thereby influencing the social organization with government now having power to enforce law and order.

Again, according to Bybee (1986), science has developed a new pragmatic philosophy based on utility rather than on truth which could have disastrous consequences for society. Science not only modifies our physical environment but also colours our perception and influences our decisions.

Society on Science

Problems of the society set directions for scientific research whose priorities are influenced by request for proposals, grants and funding by public or private sectors. Societal values and social norms affect the reception of new ideas and social factors in the society set the pace for research undertaking, discovery and findings. According to Dixon (1976), military spending, national prestige, economic prosperity, political advantage and commercial profit motivates funding of scientific research.

A lot of social forces that impact on scientific communities include prestige of the proponent of the theory, its aesthetic appeal, the cohesion it brings into the study of science and the age of the scientist involved.

The African Experience

Science by nature is a universal human enterprise, a public property of the entire human race. Though that western world had contributed to the development of the modern science than others, does not imply that science is inclusive to the West. Science is the main stream of ancient thoughts and belief; that is mythology, metaphysics, astrology, cosmology used to explain man's experiences with nature. According to Wokocha (2014), the Africans were concerned with nature of matter, general principles governing the universe, the sequence and regularities of cause and effect relationships in nature, the problem of change and stability in nature, the need to control nature for human welfare, the development of preventive and curative medicare, the folklore, songs, code of conducts, oral tradition, beliefs, form the library.

There are two types of alchemy in Africa. One has to do with the herbal medicine, the other to pseudo-magical prescriptions of medieval alchemy developed to a degree of reliability such as conjuring, preventing rain, termination of pregnancy, personal protection, success in trade and anti-theft.

Archeological findings, oral traditions and sociological studies revealed evidences of degree of scientific, technological and socio-political in different areas of the world including Africa as regards to Medicare, mineral exploitations, iron castings, sculpture, textile industry, urbanization and political system. Like China, it is possible that inter-tribal wars, slavery, colonization, absence of formal schooling system, lack of documentation of scientific knowledge and practices, the dominance of magic and superstitions led to the apparent passivity with regards to the development of science and technology.

Ogawa (1986), proposed a new rationale for science education in non-western society noting that the science-society scheme proposed in western societies does not bring out a clear rationale for science education in non-western society. According to him, the concept of society need to be replaced

with the concept of culture so that it will be clear that science education as it is practiced in western societies does not represent a standard for science education. Characteristics of science as a culture should be compared with those of the traditional culture, and science as a culture should be seen within the context of students' traditional culture.

This is because according to Ogawa (1986), no matter what stage of scientific and technological development a country or society is, the major aspirations, expectations, values and conflicts people have are the same in nature as those that dominate the highly sophisticated technological societies.

CONCLUSION

In conclusion, Japan's entry into the scientific and technological age is not an accident but a result of a well planned and implemented science education programme inspired and sustained by an intellectual tradition and an enlightened political leadership. In 1947 a new constitution was promulgated in which lone-range science education programme was given a prominent place.

A programme that emphasized scientific literacy and application of scientific knowledge to solve practical problems. These facts were made possible because of science education existing in a society and the socio-cultural context in which it exists. Nigerians can also attain the same feat if Nigerians are ready to borrow a leaf from the developed countries like Brazil, India, Korean, Mexico, USA etc that share the same history.

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