

STUDY SESSION 14

PHILOSOPHY, SCIENCE AND TECHNOLOGY



14.1 Introduction

This study session will expose you to the role of science and technology in our contemporary world. You will be using the mindset of a philosopher in your appraisal of the role of science and technology. Consequently, you will first be learning about the critical nature of philosophy. Afterward, you will learn how to conceptualise science and technology, make a distinction between them and then establish a connection between them as well. You will finally be exposed to the merits the demerits of science and technology to mankind.



14.1.1 Learning Outcomes of Study Session 14

At the end of this session, you should be able to:

1. Distinguish between philosophy, science and technology;
2. Establish a relationship between philosophy, science and technology;
3. Differentiate between the general and the narrow senses of science;
4. Outline the importance of science and technology to human development; and
5. Enumerate the disadvantages of science and technology to humans.

14.2 Philosophy: A Conceptualization

Philosophy as a concept has been approached or defined from a number of different points of view. Indeed, as you have learnt in the previous study sessions, it is difficult offering a universal definition of philosophy. Etymologically, philosophy is derived from two Greek

words *philo* (love) and *Sophia* (wisdom) which means the love of wisdom. As an academic discipline, philosophy is a method of reflective thinking and reasoned inquiry. It attempts to train you on how to think through your problems and face all the facts involved.

Philosophy is a process of asking fundamental questions about the world, about human's place in the world, and about all aspects of human activity and experience. Philosophers from the ancient time to the present period have been concerned with critically examining the phenomena of human existence. They employ the tools of logic, ethics, epistemology and metaphysics to attempt a construction of some systematic, coherent and consistent picture of all that we know and think. Philosophy according to Omoregbe is essentially a reflective activity; to philosophize is to reflect on human experience in search of answers to some fundamental questions¹. As a human being takes a reflective look at himself or the world around him, he is filled with wonder, attempt to reflect on these fundamental questions that runs through the human mind is the beginning of philosophy. Thus, human experience is the source of philosophical reflection. Stanley Honer also defines philosophy as an activity undertaken by human beings who are deeply concerned about who they are and what everything means. Thus, he asserts that a philosopher is a person who perceives in some measure the ways in which the various experiences and awareness of existence form a pattern of meaning². C.B. Okolo also defines philosophy as a form of critical inquiry into things and their causes, human experience and man's role and prospects in it³. Philosophy is thus

¹. J. I. Omoregbe, "African Philosophy: Yesterday and Today" in P. O. Bodunrin (ed) *Philosophy in Africa: Trends And Perspectives*, Ile-Ife: University of Ife Press, 1995, P.1.

². S. Honer, *Invitation to Philosophy*, London: Wadsworth Publishing Co. 1999, P. 19.

³. C. B. Okolo, *African Social and Political Philosophy Selected Essays*. Nsukka: Fulladu Publishing Co. 1993, P. 3.

regarded as the highest form of inquiry that involves no presuppositions, not taking anything for granted. Philosophy questions everything including itself. In its wide range, philosophy tries to give a coherent, systematic account of the multi-faceted reality of all nature and how man knows and interprets them. As a method of reflective thinking and reasoned inquiry, philosophy adopts the method of learning how to ask and raise questions until meaningful answers begin to appear. It is learning where to go for the most dependable up-to-date information that might shed light on some problems. It is learning how to double check fact — claims in order to verify or falsify them. It is learning how to reject fallacious false-claims, no matter how prestigious the authority who holds them or how deeply one would personally like to believe them⁴.

This submission may make us assume that philosophy is reduced to a technical analysis of statement. But as Honer tells us, philosophy is more than a purely technical enterprise of analyzing words, concepts and logical thought processes. It also pays direct attention to the relentless efforts of human beings to achieve an organized view of themselves and the universe in which they live⁵. This attempt at achieving an organized view of the world could be in different segments of human community, be it economy, religion or politics, etc.

14.2.1 In-Text Questions (ITQs)

⁴. Christian, J. *Philosophy: An Introduction to the Arts of Wondering*, Chicago: Holt, Rinehart and Winton Inc. 1990, P. x1x.

⁵. S. Honer, Op. Cit. P.19.

Name the two Greek words that originate “philosophy”.



14.2.2 In-Text Answers (ITAs)

Philo and Sophia

14.3 Science: A Conceptualization

It is important that you should understand science in its general sense as well as its restricted sense. In the former, it is generally applicable to any organized body of knowledge; in which case, “scientific thinking” or “reasoning” generally refers to an organized mode of inquiry with an end in view and guided by laws of thought. In this general sense, every academic pursuit or discipline can be said to be scientific in its mode of enquiry.

In its narrow meaning, “Science” is generally restricted to those studies or disciplines carried out through hypotheses, experiments, and verifications by the use of instruments generally in laboratories. Such branches of knowledge as Chemistry, Biology, Physics, Biochemistry, etc. are classical examples.

Longman Dictionary of Contemporary English for instance defined science as the study of knowledge which can be made into system and which depends on seeing and testing facts and stating general natural laws⁶. This view corroborated that of S.S Chuahan who also defines science as a systematized body of knowledge which may be verified at any time by any

⁶ P. Procter (ed) *Longman Dictionary of Contemporary Ethics*, Essex England: Longman Group Ltd, 1978, P. 993.

number of individuals, under a given condition⁷. Science, therefore, is engaged in discovering those conditions and factors that determine or cause the occurrence of a particular event, using scientific method of experimentation and observation.

It does mean, therefore, that ordinary thinking or reflection is not exactly the same as scientific thinking. The one, as noted above, is carried out by all men, literate or illiterate, as a result of man being a rational animal and generally acts like one. The other, requires some form of formal education and training and is thus a mode of inquiry or knowledge acquisition by experts in their various fields of human endeavours and this, according to some rules or laws of thought. In its narrower sense, too, experiments, instruments, laboratories, etc. are made use of in scientific studies and discoveries.

14.3.1 In-Text Questions (ITQs)

In which sense of science is every academic pursuit scientific?

14.3.2 In-Text Answers (ITAs)

General sense of science

14.4 The Concept of Technology

⁷. S. S. Chauhan, *Advance Educational psychology*, New Delhi: Vani Educational Books 1998, P. 4.

Technology as a concept is derived from the Greek word “techne” which means “art or craft” and “logos” which means “word”, “speech” and in fact “study”. Dictionary definition states that technology is the scientific study of industrial arts, including the art by which, through the medium of materials, scientific knowledge and skills are transformed into practical use⁸. Similarly, Procter described technology as the branch of knowledge dealing with scientific and industrial methods and their practical use in industry, practical science⁹. The term “technology” may be interpreted in two ways. Firstly, it refers to the tools and artefacts which men use in daily activities to manipulate nature and the environment for their benefit. Such benefit may be for domestic purpose for example, technological artefacts such as spoons, knives, blender, washing machines, plates, needle, etc. Or industrial and commercial purposes, for example, office utilities such as pins, clips, typewriters, plants and machinery etc. Or even for communication such as radio, television set, printing machines, computers, telephones, etc. The point to note is that technology covers every aspects of human life. Secondly, technology refers to the study of these artefacts, tools, machines, etc. themselves. In a way, we can say that technology partly deals with intervention of artefacts and tools. It is the knowledge as well as the means used to produce the material needs of human beings. It is the application of scientific findings for the fabrication of gadgets, equipment etc.¹⁰.

⁸ F.B. Fashola in Adeniji Adaralegbe (ed.) *A Philosophy For Nigerian Education*, Ibadan: Heinemann Educational Books Nig. Ltd 1972, P. 203.

⁹ Paul Procter (ed.) Op. Cit. P. 1139.

¹⁰ Cited by M.O. Ogbinaka in J. I. Unah (ed) *Philosophy For All Discipline*, Department of Philosophy, University of Lagos, Nigeria 1998, P. 331.

Historically, technology was stated to have appeared first in English in the 17th century. It was used to mean a discussion of the applied arts only, and by early 20th century, the term embraced a growing range of means, process and ideas in addition to tools and machines. By mid-century, technology was defined by such phrases as the means or activity by which human beings seek to change or manipulate their environment¹¹. The implication of this is that human society survives on the basis of some form of technological devices, either to enhance productivity of labour or to make human existence meaningful and worthwhile.

14.4.1 In-Text Questions (ITQs)

The Greek word *Techne* means what?

14.4.2 In-Text Answers (ITAs)

Art or craft

14.5 The Merits and Relevance of Science and Technology

A look at the history of scientific development reveals the extent to which human beings have been greatly influenced by science and technology for the enhancement of human life. We begin with the discovery of the mariner's compass which opened the way for exploration by land, sea and air and led to the early travels between different continents. This brought together different nations and cultures into greater contact and thus resulted in exchange of ideas for mutual benefit and increased knowledge.

¹¹. J.O. Urmson & Jonathan Ree, *Encyclopaedia Britannica*, New York: Unwin Hyman Ltd. Vol. 16, 1975, P. 440.

The age of the steam engine for example, marked the beginning of the industrial revolution and automation. Transportation was much facilitated by the introduction of the railways. The industrial revolution brought about increased productivity and reduced costs of production. Another important landmark in the development of science and technology is that of electricity, telephone and television. The importance of electricity is enormous; it is used to light our houses, pump water, refrigerate food, power the washing machines etc.

The telephone has made communication easy; the distance between two persons is no longer a barrier in communication. It enables Abuja to contact Lagos, Ondo, Sokoto, Kaduna, Calabar, London, USA and other far distant places within a matter of a few second/minutes. The electronic media like radio and television as well as the print media like newspapers, magazines and so on also keep us informed about current happenings in the society as well as the aims and accomplishments of government establishment, of new ideas and products, of community problems and solutions as well as attitudes and actions of the governments and peoples of other nations of the world.

Science and technology has helped to preserve the rural life and its setting, especially in the developed countries of the world, it has improved facilities and amenities and has reduced migration from rural areas to urban areas. Amenities like electricity, pipe-borne water and medical facilities; the establishment of industries and hospitals has also improved the living conditions in the rural areas considerably. Even in Nigeria, the extension of an electricity supply to the rural areas has become a reality. Science and technology has put at our doorsteps the necessary tools and equipment with which to carry out our daily routines with ease.

Improved communication and transportation networks have greatly enhanced business transactions and tourism. This has directly fostered better relations among peoples of different countries. Transportation and communication, we must note, are the life-blood of

commerce and industries upon which economic progress rests. Communication networks have become so complex but new methods and techniques are being developed to give more efficient service. It has brought people of distant places together.

All the effects of science and technology outlined above are based upon developments in the physical and chemical sciences. But the biological sciences have also made great impact on human beings. The influence of the biological sciences is likely to have a far reaching effect on human beings than that of the physical sciences. This is because most of the basic problems of human beings are of a biological nature; for example, over-production and under-production of foodstuffs, biological sciences and technology have enabled mankind to increase his food production. It has enabled man to bring under cultivation lands which were non-arable before; it has enabled man to produce crops in areas which are not their habitat.

In the area of medical sciences, application of medical knowledge and scientific techniques has relieved mankind of pain by using antibiotics, anaesthetics and other medications; it has lengthened the life-span of mankind, it has helped in kidney transplants and other heart diseases, it has also enabled mankind to plan the size of his family.

Health is wealth. The economic wealth of any nation depends largely on the well-being of its people. The people must be physically and mentally fit to carry out their daily activities. In this respect, the roles of science and technology are emphasized by the advances made in medicine and public health care¹².

Nigeria is principally an agricultural country blessed with natural vegetation, good soil and a relatively predictable climate. These natural resources must be harnessed for the betterment of its peoples. All that is required is a scientific approach to farming or what is sometimes referred to as mechanized farming. Various equipment and machines have been developed for clearing and cultivating the bush while others are used for harvesting as well as storage

¹² F. B Fashola, "The Role of Science and Technology in National Development" A. Adaralegbe (ed), A Philosophy for Nigeria Education, 1972, P. 207

purposes. A planting operation which would normally take several weeks to be carried out by the primitive methods could now be executed in a matter of days. The increasing use of fertilizers and insecticides has brought better yields. We are thus able to produce more cash crops and food crops as a result of our studies in soil chemistry. This, in our view, constitutes one of our major sources of national wealth. Harvested crops which do not go for immediate processing could be preserved by the use of chemicals that are not harmful to human health and stored away in a controlled storage facility, thereby ensuring the continuity of food supply any season of the year.

Fishing in the high seas can now be carried out by scientific methods. Fishing trawlers are gradually replacing the manually paddled canoes. Because of the facilities for storage and cold rooms, the trawlers are capable of operating in the seas for long periods and their catches are usually measured in kilos and stored in refrigerators in the trawlers. In this way, fresh fish no longer constitutes any problem to people in the society, who are thus able to get the most desired amount of protein with their food. All these changes are made possible by advancements in science and technology.

Quite a number of the working population are engaged in occupations bearing on science and technology, the tools, machinery and other aids being employed in industry are products of science and technology. The burden of uninspiring and repetitive routine work is gradually being removed by the introduction of mechanized methods. In the highly industrialized countries shorter working hours at no expense to quality and quantity of products are thereby made possible, and this constitutes a great saving in national manpower.

Unemployment in a developing country such as Nigeria is one of the factors responsible for discord and disunity amongst its people. Disparities in the location of industries create a lot of

divisions. These could only be eliminated by directing our energy and resources towards rapid industrialization, which is made possible by the advances in science and technology.

There are other forces which battle against man for survival. He has to protect himself against hazards from natural causes like floods and earthquakes. The weather forecast which gives the advance warning of cyclones, the building of levees or embankments along the courses of rivers to contain flood waters and earthquakes, have been evolved through the application of science and technology.

From the foregoing account, it is evident that all wealth is created by human labour and this labour is guided by the level of education and acquired scientific skills. The richer and more skilful countries attained their affluence through the advances made in science and technology. The younger nations of the world must therefore take a cue from the experience of the bigger nations in directing their energy and resources towards a balanced economy, a state which could only be reached through scientific and technological advancement.



14.5.1 **In-Text Questions (ITQs)**

Name four areas of human endeavour that science and technology impacted on.



14.5.2 **In-Text Answers (ITAs)**

Agriculture, communication, health, transportation

14.6 On the Demerits of Science and Technology

The above represents impressive details of the usefulness of science and technology to us. However, it is worrisome to note the bad effects of the application of science and technology

in this contemporary world. Almost every discovery in science and technology has its good as well as its bad side.

The introduction of AK47 for example has increased casualties in the society, it has brought about child soldiers in many war ravaged countries especially in Africa. The marine science and compass guided European powers to the African continent which made them play a powerful role in the colonialism and imperialism¹³ of African states. The introduction of machines brought about industrial revolution and productivity; it has however made people to work in factories for long hours and under hazardous conditions. The use of telephone has made communication easy but it has, to a large extent, crippled initiative and the independence of individuals. People in distant places have to seek directions from their superiors, or a wife calling her husband for direction on matters that could have been resolved on the spot due to the availability of the telephone for easy communication.

Television has also aided the transfer of western values and civilization to Africa. This has reshaped African modes of thought, have led to the disruption of African traditions and value system. Modern medicine has enabled mankind to live longer and this has increased the percentage of the aged among the population and in some countries has led to over-population. Science and technology have produced such weapons of mass destruction and annihilation as the hydrogen and atomic bombs; weapons which are capable of destroying our world in a few hours.

From what we have said so far, conclusion may be drawn on the fact that science and technology are very good in a number of ways; however, their applications may be good or evil.

¹³ T. A. Balogun, *The Role of Science and Technology in National Development*" A. Adaralegbe (ed), *A Philosophy for Nigeria Education*, 1972, P. 192



14.6.1 **In-Text Questions (ITQs)**

Name two weapons of mass destructions.



14.6.2 **In-Text Answers (ITAs)**

Hydrogen and atomic bombs



14.7 **Summary of Study Session 14**

We have attempted to use the temperament of philosophy to interrogate science and technology in this session. To this end, you have been taught the critical nature of philosophy. This prepared you for a critical discussion on how to distinguish science from technology. Finally, your attention was directed at the paradoxical nature of science and technology as advantageous and disadvantageous instrument for human use. Indeed, the session reminded us of some of the achievements of science and technology as related to mankind, especially, in the enhancement of productivity of labour. We are, for instance, reminded of:

- i. The impact of science and technology on human resources, such as land and water from which life is nourished.
- ii. In the area of medical research, it has helped mankind to live longer, because most of the terminal illnesses of ancient times are now curable.
- iii. The impact of power, nuclear and solar energy on human existence.
- iv. The impact of mechanized agriculture on food production.

14.7.2 **References / Suggestions for Further Reading**

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