MATHEMATICS EDUCATION AS PANACEA FOR GLOBAL SOCIETAL CHALLENGES IN NIGERIA

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ABSTRACT

This study examined the various definition of Mathematics education, the past, present and future trends in Mathematics Education. The environmental challenges such as economic environment, political environment, social environment are also considred while Mathematics education as a panacea for global environment challenges is discussed along side the usage of Mathematics in medicine, politics, population census, health care delivery system, experimental Biology and for a better understanding of epidemiology patterns and disease control. Suggestions were made on how mathematics could be applied to environmental issues in order to obtain optimality in every option of solutions.

INTRODUCTION

Mathematics is often defined as the study of topics such as quantity, structure, space and change. These topics provide the major sub-division of mathematics into; Arithmetic, Algebra, Geometry and Analysis. These major disciplines within mathematics arose out of the need to do calculations in commerce among others. Urutetskii (1976) and Ihejieto (1989) argued that Mathematics is the ingredient for the effective articulation of the science elements that give impetus to the development of technologies. Ali (1994) stresses that Mathematics is indispensable because it has substantial use in all scientific activities. While, Ezeilo (1975) has corroborated this by arguing that, there can be no real development scientifically and technologically without the corresponding development in Mathematics both as conceived and practiced. Therefore, it is not a surprise to discover that most accomplishment of human being are found in his effort to utilize his mathematical reasoning (Kline 1988). Aminu (1995) posited that mathematics is not only the language of science, but also essential nutrient for thought, logical reasoning and for sequencial patterns.

The importance accorded mathematics in the schools curricular from nursery to secondary levels reflects accurately the vital role played by the subject in the contemporary study of science and technology. It is in realization of this that many countries now resort to making special, comprehensive and well programmed effort towards effective teaching and learning of Mathematics. This serves as prerequisite and solid background for understanding and applying scientific knowledge. Mathematics could be said to be the science of numbers and shapes. People's ability to reason distinghished them from other lower animals. One of the attributes of

mathematics is its ability to make people come into logical conclusion from the given phenomena. It is pertinent to know how and when mathematics actually started, the subject emerged some six centuries before Christ (600 B.C.) It was developed in response to the needs of the people of old. Human beings learnt how to count early in their development. Tally marks were found on cave walls which indicated that even while still living in caves, people knew how to count where tally marks respresented the numerals. In the 18th century, education as a whole was brought to African countries through the missionaries which could be regarded as the time of formal education. Though some education and even the teaching of Mathematics have been going on in the homes where the elders and parents around educate their children by teaching their own culture so as to be able to pass it to the coming generation. Our forefathers started by counting 5s, 9s etc. and as a way of easy remembrance, they usually use charcoal for making lines on the wall. One line to them means one while two lines means two and so on. Besides, they also make contributions in either 5 days interval or 9 days interval for easy counting, they use either fingers or stones. Moreover, mothers taught the female ones how to count the number of yams to be prepared for the family. As a way of advancement in counting, they started counting in 100's meaning half of a bag, 200's meaning one bag and so on (Ojo and Omodara, 2005).

Present objectives of Mathematics include both computational skills and mastery of ideas. They also include broad concepts such as understanding of structures and the ability to solve problems. Significant increase in the attention and effort directed towards the integration of related sub units of Mathematical sequence that emphasize the structure of the number system, logic function and other countemporary topics. A lot of materials are being used models, slide rules, overhead projectors, drawing instruments, graphs, measuring instrument and some enrichment pamphlet and books. Standardized tests are being used for measuring achievement. Exercise are built in many textbook and continuous assessment is being emphasized.

Future objectives are likely to become broader. These could include creative positive attitude and values. Since knowledge will continue to expand. We will need to become proficient in learning. Use of computers as auxiliary memories and for information retrieval will increase. The subject matter will include new topics to be introduced; classified topics may be taught at a level. Topics from analytic geometry, linear algebra and calculus will be integrated into secondary school mathematics. There will be increased availabilty and use of mathematics, production and invention of instructional aids will increase. As objectives change, new tests will be needed to measure creativity, attitude and values. Lot such as performance test reading tests and problem-solving test would be devised.

SOME MAJOR CHALLENGES FACING THE GLOBAL ENVIRONMENT

Environment: Man created physical environment. In his effort to adjust to the environment created by nature, man has over the years created his own physical

environment which have become essential components of man's contemporary physical environment. In these categories are transportation and communication networks, urban settlement, rural settlement, industrial establishment etc. The physical structure created by man in his effort to improve his way of life are increasingly occupying a large population of the earth's surface (Onokerhoraye, 1994a)

Economic Environment: Man, has always sought for a means of livelihood right from time immemorial. Man has lived as a nomad, that is, his existence was largely based on his search for sustenance by hunting, gathering and fishing. Today the situation has changed and man is now associated with a particular locality at least for a reasonable period of time. Within the physical environment in which man lives, he is involved in various activities through which he makes a living. The various institution and relationships concerned with the way man makes his means of livelihood is the economic environment.

Political environment: Man carried out a variety of activities within a political set up which can be described as the political environment. Politics has been discribed as who gets what, where and when. This implies the power to take decisions, allocate reasources and distibute them within a particular defined territory. The nature of man's political organization has remarkable impact on how he carries out his other socio-economic activities. This indicates that the political organization of man is an important component of his environment without which a complete understanding of man and his environment is impossible.

Social Environment: Man has various types of social relationships with the immediate group around him as well as individuals which are not immediately around him. The various types of social relationship which man has include those relating to his family, education, health care, work place, ethics, origin, religion, membership of various associations etc. These constitute the social enviroment of man. Again a knowledge of man's social relations is essential to the understanding of man. This explains the importance of social environment in the study of man.

PANACEA FOR THE CHALLENGES

Over few decades, Mathematics has broken out into a whole new range of applications in the Social Sciences, Biology, Medicine, Management etc. This is because Mathematical techniques now play an important role in business and economics. As a response to global demand, Mathematics is used to solve real world problem because.

- The Mathematical language is more efficient and less bulky than the written word. It is more difficulty to cheat conclusion with Mathematical arguement.

The results of a Mathematical debate are precise and depend only on the initial assumptions, for a given set of assumption, the mathematical conclusions are accurately expressed and their results cannot be argued.

- With a mathematical description, it is possible to arrive at optimal solutions which would not be obvious without analysis (Taha, 2006).

The first formal activities of Applied Mathematics called Operations Research (OR) were initiated in England during World War II, when a team of British scientists set out to make scientifically based decisions regardings the best utilization of war material. After the war, the ideas advanced in military operations were adapted to improve efficiency and productivity in the civilian sector. Since the advent of industrial revolution, there has been remarkable growth in the size and complexity of organisation. Management has resorted in one way or the other to resolve problems facing the organization. One of such applications is the Applied Mathematics called Operations Research responding to global environmental challenges. For a slow elevator service in a large office building, the Mathematicians perceived the situation as a waiting-line problem that might require the use of Mathematical queuing analysis or simulation. After studying the behaviour of the people voicing the complaint, the psychologist on the team suggested installing full-length mirrors at the entrance to the elevators. Miraculously, the complaints disappeared, as a people were kept occupied watching themselves and others while waiting for the elevator. In a study of the check-in facilities at a large British airport, a United States consulting Mathematicians used, queuing theory to investigate and analyze the situation. Economically, the longer a machine stays in service, the higher is its maintenance cost and the lower its productivity. When a machine reaches a certain age, it may be more economical to replace it. The problem thus reduces to determining the most economical age of a machine.

In Politics, we have experimented what is regarded as the West Minster Parliamentary System and we failed. The failure here was not due to the model. We violated the underlying assumption about this model. In the model the party that has a majority is supposed to form the government of the day. A party will have a majority of seats allocated in the parliament if that party wins. Winning again has an underlying assumption that the election is fairly conducted and not much massive rigging. West Minster Parliamentary System is still in operation, even in India since 1947, because that country allows the model to work for the people of India or the decision makers did not violate the assumptions with which the system works.

For instance, in early '70s' the late Indian Gandhi was defeated in her own constituency and her party lost to the opposition party. She accepted her defeat and that of her party because she did not want to violate the assumptions of the model her country was operating. In Nigeria and in many other African countries, there would be nobody to dare to challenge her in her own constituency let alone the incumbent government losing an election. She was supposed to return "unopposed" even when it became obvious that the people wanted a change. However, we now

have good examples which include Dr. Kenneth Kauda in Zambia and Dr. Banda of Malawi. So parliamentary system that failed in Nigeria was not that the model was not good for us, but that the decision makers deliberately violated the condition or the assumptions with which the model is based. The presidential system may not appear to be working in Nigeria again because of violations of its assumptions.

In medicine, problems that can be tackled using mathematics include; the conduction of electronic signals by nerves, flow of blood, calculations of radiation, treatment of patients with diffusion of radio-active tracers and other chemists in the body. In the health care delivery system, both the doctor and the patient will be in problem without the knowledge of mathematics. For instance, to say that the temperature of the patient is high or the blood pressure is low, the doctor has to have premise measurements in degree celsus for the temperature and millimetres of mercury for blood pressure from diagnosis of diabetes through paternity testing using Deoxyribonucleic acid (DNA) to testing HIV status, minor surgery of an ulcer to a major brain surgery or organ transplant mathematics has a place especially with regard to precision of Measurements. According to Akensode (2000) and Adetula (2002), Mathematics in ecological studies which assist in better understanding of epidemiological patterns and disease control is demonstrated in the simple mathematical model of epidemic spread formulated by Aron (1989). This formulation which was applied to measles in England and Wales relied heavily on a system of differential equations such as: yy, $x + y + z = N$ where x, y and z denote three different epidemiological classes and N denotes fixed total population size.

CONCLUSION

To addrress global challenges in Nigeria, assumptions must be made in mathematical models. When an individual goes to bed in the evening and suppose to go to work or travel the following day, it is assumed that he or she will wake up the following day alive. If one plans to be in a particicular place in a given time, it is assumed that whatever mode of transport he or she is using will not be faulty. Once this assumption is violated, the plan cannot be materialized. It is more difficult to cheat conclusion with mathematical argument. The results of a Mathematical debate are precise and depend only on the initial assumptions. For a given set of assumptions, the Mathematical conclusion are accurately expressed, and their results cannot be argued. It is the assumptions that can be and should be criticised. Hence, the use of Mathematical language is more efficient and less bulky than the `written works. With a mathematical description, it is possible to arrive at optional solutions which would not be obvious without analysis.

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