

ROLE OF MATHEMATICS IN THE TECHNOLOGICAL DEVELOPMENT OF THE SOCIETY

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Abstract

The study aims at appraising the roles of mathematics in the technological development of the society. Basically, the questions which were raised were to examine the impact of mathematics in the society; the importance of technology in the society; as well as the relationship between mathematics and technology in the society.

The study employed the use of descriptive survey research method and administered questionnaire, which was giving to respondents, drawn from Ijebu-Ode Local Government Area of Ogun State. The items were used in the process of data analysis using Chi-square. While the reliability of the instrument was ascertained by using cronbach's alpha which gave the reliability coefficient of 0.82.

The result showed that there is impact of mathematics in the society; there is importance of technology in the society and also, there is relationship between mathematics and technology in the society. Based on the findings and conclusions of the study, it is therefore recommended that the government should encourage the commercialization of successful research in Mathematics and Technology in our society. The research concludes that there should be an increased awareness of the importance of Mathematics and Technology in the society.

Keywords: Mathematics, Technology, Development, Society

Introduction

Mathematics is a branch of science, which deals with numbers and their operations. It involves calculation, computation, solving of problems etc. Its dictionary meaning states that, 'Mathematics is the science of numbers and space' or 'Mathematics is the science of measurement, quantity and magnitude'. It is exact, precise, systematic and a logical subject.

The study of mathematics satisfies a wide range of interests and abilities. It develops the imagination. It trains in clear and logical thought. It is a challenge, with varieties of difficult ideas and unsolved problems, because it deals with the questions arising from complicated structures. Yet it also has a continuing drive to simplification, to finding the right concepts and methods to make difficult things easy, to explaining why a situation must be as it is. In so doing, it develops a range of language and insights, which may then be applied to make a crucial contribution to our understanding and appreciation of the world, and our ability to find and make our way in it. According to Ezeamenyi in Eze (2008) mathematics is the study of size, numbers and patterns. Mathematics is the most international of all subjects, and mathematical understanding influence decision making in all areas of life.

As it is rightly observed in Bajah (2000), no nation can make any meaningful progress in this information technology age, particularly in economic development without whose foundation is mathematics. Technology is the practical application of science. Technological development began two hundred years ago when teachers started to use abacus in their classes. After the development of technology, it impacts the lifestyle of people. For example, computer based systems help people to successfully organize their companies. The Internet helps people to reach information faster. Beside development in information technologies, new teaching and learning methods are being introduced to advance contemporary education. Technology supports global thinking in an educated society and provides information to adopt new teaching and learning developments. Technology also creates flexible learning environments in which students can easily construct and learn new information and store it in their long term memory. Technological developments enable teachers and students to acquire up-to-date knowledge and support critical thinking. Technology is a combination of hardware and software (Isman, 2002). It is important to determine appropriate technology to increase productivity based on students' and teachers' needs.

Potentially, technology increases productivity in educational activities and affects the quality of education in terms of meaningful learning and effective teaching. It offers the possibility to solve problems and enhance the stability and quality of learning in a coherent manner. Technology is not only electronic instruments; it includes new teaching-learning methods that can be used in a beneficial way in education (Isman, 2003). Rapid technological developments have impacted education. It can be said that the practice of teaching mathematics has been more traditional than any other curriculum area, yet technological developments have affected mathematics education also. Teachers and students have access to valuable resources via the Internet that includes: software, simulations, spreadsheet, and graphing calculators (Roblyer & Edwards, 2000). Students can learn mathematics using comprehensive mathematics tutorials. According to Oyeyinka (2009) defined technology as the mastery and utilizations of manufacturing and industrial methods, systematic application of knowledge to practical task in industry. The ultimate aim of any form of technological innovation is to raise the standard of living of the people. Thus the first step in any programme for massive technological development or innovation is the formation of a new

educational curriculum that should define a new and better life. The second step should be the mathematical formulation of a relevant realistic theory of effort towards the selection and invention of the appropriate means to the view. Mathematics provides the spring-board for the growth of technology, mathematics is the gate and key to the sciences. In other words, it is the level of mathematics that determines the level of the science and technological component of any nation. Today, it is a reality that it is the creation, mastery and utilization of science and technology that basically distinguishes the so-called developing from the developed nations of the world. That is to say that the standard of living of a nation is dependent on the level of science and technology of that society. Therefore, mathematics plays a vital role in nation building. Mathematics as observed by Abiodun (1997) is the major tool available for formulating theories in the sciences as well as in other fields. It is used in explaining observation and experiments in other fields of inquiry. Adeyegbe (1987) observed earlier that there is hardly any area of science that does not make use of mathematical concepts to explain its own concepts, theories or models. Mathematics is a science of the methods by which quantities sought are deducible from others known or supposed. Thus, anyone who neglects mathematics may not be able to go far in the sciences and in fact other things of the world. Practical work and observation of nature are the main source of scientific discoveries. Mathematical methods lie in the Foundation of physics, mechanics, engineering, economics, and chemistry and so on. According to Bermant in Harbor-Peters (2000), an important feature of the application of mathematics to sciences is that it enables us to make scientific predictions that are to draw on the basis of logic and with the aid of mathematical methods, correct conclusions whose agreement with reality is then confirmed by experience, experiment and practice. Thus mathematics is the bedrock of science and technology, which is the springboard of any society.

Statement of the Problem

The roles of mathematics in science cannot be overemphasized as mathematics is seen as the bedrock of all sciences. Therefore, there is need to juxtapose the indispensable role that mathematics plays in the technological development of the society in Ijebu-Ode Local Government Area, Ogun State.

Purpose of the Study

The purpose of the research is to:

1. Examine the impact of mathematics in the society.
2. Examine the importance of technology in the society.
3. Examine the relationship between mathematics and technology in the society.

Research Questions

1. What is the impact of mathematics in the society?
2. What is the importance of technology in the society?
3. What is the relationship between mathematics and technology in the society?

Methodology

The descriptive survey research design was adopted for the study. Questionnaire was administered, which was giving to respondents, drawn from Ijebu-Ode Local Government Area of Ogun State. The items were used in the process of data analysis using Chi-square.

Population/Sample and Sampling Techniques

The population of the study comprises of the students in the Senior Secondary Schools in Ijebu-Ode Local Government Area, Ogun State. Forty students were randomly selected from five schools in Ijebu-Ode Local Government Area using proportionate stratified random sampling comprising males and females from each of the participating schools.

Validation of Research Instrument

The instrument was validated using face as well as content validity while the reliability of the instrument was ascertained by using cronbach's alpha with the coefficient of 0.82.

Data Analysis

Q₁: What is the impact of mathematics in the society?

	Observed N	Expected N	X ² _{calculated}	X ² _{tabulated}	Residual	Sig.	d.f
SA	40	50.0			-10.0		
A	66	50.0			16.0		
D	7	50.0	71.480 ^a	7.82	-43.0	.000	3
SD	87	50.0			37.0		
Total	200						

The Chi square analysis above showed that chi square calculated is 71.480^a while tabulated value is 7.82. Therefore 71.480 > 7.82. Hence, there is significant impact of mathematics on the society.

Q2: What is the importance of technology in the society?

	Observed N	Expected N	X ² _{calculated}	X ² _{tabulated}	Residual	Sig.	d.f
SA	115	50.0			65.0		
A	64	50.0	152.520 ^a	7.82	14.0	.000	3
D	17	50.0			-33.0		
SD	4	50.0			-46.0		
Total	200						

The chi square analysis above showed that chi square calculated is 152.520^a while tabulated value is 7.82. Therefore, 152.520 > 7.82. Hence, there is significant importance of technology in the society.

Q3: What is the relationship between mathematics and technology in the society?

	Observed N	Expected N	Residual	X ² _{calculated}	X ² _{tabulated}	Sig.	d.f
SA	33	50.0	-17.0				
A	92	50.0	42.0	47.800 ^a	7.82	0.000	3
D	34	50.0	-16.0				
SD	41	50.0	-9.0				
Total	200						

The chi square analysis above showed that chi square calculated is 47.800^a while tabulated value is 7.82. Therefore, 47.800 > 7.82. Hence, there is significant relationship between mathematics and technology in the society.

Conclusion

In view of the fast growing technological and scientifically engineered society of today, students need a non-threatening environment in which they are encouraged to ask questions and take risks. The learning climate should incorporate high expectations for all students, regardless of sex, race handicapping condition, or socio-economic status. Students need to explore mathematics using manipulative, measuring devices, model calculators and computers. They need to have opportunities to talk to each other about mathematics and also need modes of instruction that are suitable for the increased emphasis on problem solving, applications and higher order thinking skills.

As a result of this, it is very important to note that mathematics and technology enhances the prosperity of any society and without them, the resources of our nation cannot be structured for industrial growth and development (Oyedun 2005).

Recommendation

Based on the findings and conclusions of the study, it is therefore recommended that:

1. Government should encourage the commercialization of successful research in Mathematics and Technology in our society. This will lead to innovations and inventions and create technology incubation centers near people in the society.
2. The dynamic nature of Mathematics and Technology must be appreciated by the government at all levels. Teachers should therefore be exposed to regular training to keep abreast with current trends.
3. Government has a major role to play in order to achieve this paradigm shift. Education must be looked at holistically. Education should be adequately funded. Institutions created to support mathematics and technology and necessary equipment's should be provided with the wherewithal to perform these functions.
4. There is need to keep the learners firmly anchored on a set of human values; to teach young teachers how to process the vast variety of information so that they pick up mathematical knowledge that are qualitative and functional to themselves and the society at large (Abubakar, 2010).
5. There should be an increased awareness of the importance of Mathematics and Technology in the society. This awareness could be done through seminars and workshops.

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