
Mathematics Education for Technological Development of a Nation

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Abstract

The importance of mathematics in the development of any nation cannot be over emphasized. No nation can develop scientifically and technologically without proper foundation in school mathematics and its application in our labs in manufacturing and industrial method. Technology is the application of knowledge to practical tasks in industry. This research work is a descriptive survey, a four point Likert scale was used to elicit responses from respondents on the influence of mathematics on the technological development of a nation. Mean and standard deviation were used to compute the response of the research questions and t-test was used to test the null hypothesis at 0.05 level of significance. The study concluded that mathematics should not just be taught theoretically but with applications to modern technology to aid the technological development of our country. We therefore will not reject the null hypothesis and conclude that mathematics learnt' in school has a great influence on the technological development of a nation.

National and human capital development depends on the development of science and technology. It is important to note that mathematics and technology enhances the prosperity of any society without which the resource of any nation cannot be well structured for industrial growth and development, Oyedun (2005).

Adetula (2005) opined that mathematics is pervasive in today's world, competence is vital to every individual. Meaningful and productive life and outstanding ability is a precious societal resources needed to maintain leadership in the modern scientific and technological world.

No nation can develop scientifically and technologically without proper foundation in school mathematics. Nnadozie (2004) stated that mathematics is the science of quantity and space, Obado (2010) defines mathematics as a language that use careful concise symbolic representation which add precision to communication. Audu (2003), also defines mathematics as an indispensable medium by which and within which science expresses, formulate and communicate itself.

Mathematics is integral to every thing about life. Every occupation which one chooses to pursue in life are full of the opportunity and the need to apply mathematical

studies, it provides example of the power of free and rational thought, since it reflects societal thought, beliefs and actions.

Technological Development

The 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 technological development or innovations is the formation of a new curriculum. The second step is the mathematical formulation of a relevant and realistic theory of effort towards the selection and invention of the appropriate means to the end in view.

The development of technology must include knowledge of how to design, fabricate, produce modern tools of production and finance, then distribution.

Oyeyinka (2009) defines technology as the mode of utilization of manufacturing and industrial methods, systematic application of knowledge to practical task in industry.

The 2010 report of the United Nation Development Program (UNDP) on human development rated Nigeria as the 158 country in the world in terms of human development. One implication of the low human development rating given to Nigeria by UNDP is that her focus is on the theoretical aspect of the Western Curricular for most science based subjects taught at the lower level especially mathematics, rather than making the subject related to the society cultural background of the subject has resulted in a minimal level of human development.

Mathematics education is the key to success in our efforts to meet up with modern world of science and technology.

Adetula (2009) stated that mathematics is pervasive in today's world. Competence is vital and societal resource solely needed to maintain leadership in a technological world.

Mathematics is integral to everything about life every occupation which the students may chose to pursue in life are full of the opportunity and the need to apply mathematical studies. Therefore, its study is very important for self and national development.

According to Andu (2003), mathematics is an indispensable medium by which and within which science expresses, formulates and communicates itself, mathematics not only clarifies and makes workable concepts and laws of science but also at certain crucial instance becomes an indispensable constituent of their creation and emergence as well

The Place of Mathematics in Science and Technology Development of Any Nation

Jegede and Brown (1980) stressed that the catalytic effect of education on nation development emanate mainly from the areas of science and mathematics due to the impact of mathematics on both cognitive and psychomotor skills of the human capital of a nation.

Setidisho (1996) also maintained that mathematics is a fundamental science that is necessary for understanding of most other fields in education. He further emphasized that no other subject forms such a strong force among various branches of

science. This implies that the place of mathematics in school curriculum in Nigeria is paramount for scientific and human development as it serves as a tool for academic progress in a chosen career and as a tool for preparing the individual for useful living.

Iji (2007) maintained that any country that aspires for national growth in science, industries and technology must not neglect mathematics, this is in view of the multi-dimensional values of mathematics in virtually all facets of human development and experience.

Trends analysis and forecasting provide scientific approach for predicting future occurrences based on past and present state of affairs. According to Rosenberg (1997) trend in observed rates provide invaluable information for needs assessment, program planning, program evaluation and policy development activities.

Statement of the Problem

It is disheartening that of all the schools visited and interviews conducted, there is no school with a well equipped introduction to technology laboratory where manufacturing and production is taking place. The essence of the 6-3-3-4 system of education was to entrench skill acquisition and technological development in the curriculum and learning skills before moving on to the University for further Studies. But students of J.S 3 buy already made things and submit in school as if it was made by them.

Research Questions

What is the effect of mathematics learnt in schools on technology development?

- 1) Will the provision of infrastructure in our technology laboratory help in the development of technology in Nigeria?
- 2) What is the effect of mathematics learnt in school to the understanding of other subject?
- 3) Is there any application of what is learnt to the technological development of our nation?

Hypothesis

- i. There is no significant difference between male and female students view that mathematics learnt in school help in the technological development of our nation.
- ii. There is no significant difference between male and female respondents that the mathematics learnt in school will help in understanding of the other subjects and hence aid technological growth.
- iii. There is no significant difference between male and female students response that the provision and equipping of a technology laboratory in schools will aid technological development of Nigeria.

Methods

The study adopted a descriptive survey design. The study examined students views on the influence of Mathematics education on the technological development of a nation.

A questionnaire was used to carry out the research, four schools were selected from Warri South Local Government Area of Delta State, the questionnaire was randomly given to students from SS 1- SS 3, 100 questionnaires were given out and only 20 respondents responded to the questions appropriately i.e if any question is skipped, that questionnaire is automatically rejected. A 4 point Likert scale questionnaire was used, the questionnaire was face and content validated by experts in Mathematics education and was found to be reliable at 0.72. Mean and standard deviation was used to analyze the questionnaire responses with a criterion mean (\bar{x}) of 2.5 and t-test used to test the null hypothesis at 0.05% level of significance.

Table 1:
Research Question 1: Mathematics learnt in school affects the technological development of a nation.

S/N	Items	Response Rate				X	Std	Remarks
		SA	A	D	SD			
1.	Is mathematics education relevant to the technological development of a nation	14	4	2	0	3.6	0.6	Accept
2.	Mathematics learnt in school have not been applied enough to aid the technological development of our nation	6	10	0	4	2.9	0.4	Accept
3.	Is the teaching of mathematics directly affecting technological growth	6	4	6	4	2.6	0.3	Accept
4.	The teaching of mathematics is just theoretical and therefore not affecting technological growth	10	6	2	2	3.2	0.4	Accept

Table 2:
Research Question 2: Mathematics learnt in school help in understanding of other subjects.

S/N	Items	Response Rate				X	Std	Remarks
		SA	A	D	SD			
5.	The mathematics learnt in class is it of advantage to you in your intro-tech class	6	14	0	0	3.3	0.6	Accept
6.	Do you apply your knowledge in mathematics in bead making and sewing in intro-tech classes	4	14	2	0	3.1	0.6	Accept
7.	The mathematics learnt in school does it help in understanding of other subjects	10	8	2	0	3.4	0.4	Accept
8.	Does your performance in mathematics have any effect on other science subjects	8	8	2	2	3.1	0.4	Accept

Table 3

Research Question 3: ICT centre are fully functional and hence aid the technological development of our nation.

S/ N	Items	Response Rate				X	Std	Remarks
		SA	A	D	SD			
9.	Is the use of ICT explicitly part of mathematics curricula	2	10	4	4	1.8	0.4	Reject
10.	Is there a functional technology lab in your school	6	6	8	0	2.9	0.4	Accept
11.	Do you manufacture any equipment in your intro-tech lab?	2	6	2	10	2.0	0.4	Reject
12.	Is there an ICT centre in your school with modern equipment	8	6	4	2	3.0	0.3	Accept
13.	Is the ICT centre fully utilized	8	2	4	6	2.6	0.3	Accept

Table 4

Responses of Male and Female respondents on influences of Mathematics in technological development of a nation.

Variables	No.	\bar{X}	t_{cal}	t_{table}
Male	12	3.2	1.60	1.96
Female	8	2.6		

Discussion of Findings

From research question (1), item 1 with a mean rating of 3.6 which is well above the bench mark mean of 2.5 set for this study, implies that mathematics education is relevant to the technological development of a nation. From the raw scores 14 students strongly agreed and 4 agreed giving a total of 18 out of the 20 respondents. Item 4 table 1 has a mean response of 3.2 with the raw data showing that 16 out of the 20 respondents agree that mathematics taught in school is theoretical therefore not affecting technological development, especially in the area of little manufacturing taking place in schools. For example applying the knowledge of mensuration in sewing, constructing circuit boards e.t.c

Also findings from table 2 item 7 shows that mathematics learnt in school can help in understanding of other subjects with a mean rating of 3.4 above the bench mark mean of 2.5 especially in the science, social science and even in the art subjects.

Findings from table 3 item 9 had a mean score of 1.8 which is less than 2.5 which is a negative response and was rejected. Also item 11 table 3, 12 out of 20 respondents disagreed that no manufacturing is taking place in their school since the laboratories are not functional from the response of item 9.

Students should be given the opportunity to apply the knowledge learnt from Mathematics class and intro tech classes in making simple gadgets like circuits bead making, sewing etc.

In all other items in the questionnaire, the mean score was above the bench mark i.e. 2.5 which indicates that respondents were in agreement with the null hypothesis that the mathematics learnt in school with provision of necessary infrastructure in the laboratory will aid the technological development of our country.

From table 4, $t_{cal} < t_{critical}$ we accept the null hypothesis on the issue that Mathematics aids the technological development of any country.

Conclusion

It is imperative to conclude that Mathematics Education is the key to the success in our efforts to meet up with modern world of science and technology. As rightly put by Adetula (2009), that mathematics is pervasive in today's world, competence is vital to every individual meaningful and productive life and outstanding ability is a precious societal resources needed to maintain leadership in a scientific and technological world. In essence, Mathematics is integral to everything about life. Every occupation which the students may choose to pursue in life are full of the opportunity and the need to apply Mathematical studies provides example of the power of free and rational thought, since it reflects societal thought, feelings, belief and action. Therefore, its study is very important for self and national development.

Recommendations

1. Our teaching and learning should be geared towards application.
2. Teachers should be encouraged and trained in use of technology.
3. Time for practical's should be part of the curriculum

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