

## MATHEMATICS EDUCATION: A PANACEA TO NATIONAL DEVELOPMENT

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### **Abstract**

Mathematic Education with the appropriate resources, curriculum and teacher can contribute to national development. Production of confident, adventurous and thinking citizens, who will have much to give their country, is one of the relevance of mathematics to the real world. In this present digital age, the achievement of any meaningful development must be largely depending on science and technology, which is also dependent on mathematics. The challenges of mathematics education were highlighted and suggestions given on the way forwards as science education is central to national development, in the present dispensation.

Education is central to development as it empowers people and strengthens nations. It is a powerful “equalizer”, opening doors to all to lift themselves out of poverty (<http://web.worldbank.org>; 2012). It is critical to Nigeria’s attainment of the transformation agenda of the present administration. Education also promotes economic growth, national productivity and innovation and values of democracy and social cohesion.

The fast development in Israel is due to the fact that a high number of highly educated Jewish immigrants from Europe and America moved from these nations and settled in their fore-fathers’ land after Israel was created after the world war II

with a high percentage of Jews of very high standard of education and a high technical skill coupled with a high patriotic zeal (Ndayako, 2001). They quickly changed the desert into a fertile land where food and fruits of all types are available to all.

Investment in education benefits the individual, society and the world as a whole. Broad-based education of good quality is among the most powerful instruments known to reduce poverty and improve the standard of living. With proven benefits for personal health, it also strengthens nations’ economy by laying the foundation for sustained economic growth for individuals and nations. It is the key to creating, applying and spreading knowledge and thus, the development of

dynamic competitive economies. Education is also fundamental for the construction of democratic societies. Development can be seen as a systematic use of scientific and technical knowledge to meet specific or requirements. It is the process of economic and social transformation that is based on complex cultural and environmental factors and their interactions.

Mathematics education in Nigeria has come a long way. In the traditional society, before the introduction of formal education, mathematics was used mainly in taking stock of daily farming and trading activities. However, the coming of the missionaries introduced formal (or western type) education to Nigeria (Aguale and Usman, 2007). In this system of education, mathematics occupied a central position in the school curriculum. This has remained the position in the Nigerian education system today. Ukeje in Aguele and Usman (2007) while acknowledging the importance and contribution of mathematics to the modern culture of science and technology stated that “without mathematics there is no science, without science there is no modern technology and without modern technology there is no modern society”. Mathematics education is therefore indispensable in building the nation and hence national development.

### **Relevance of Mathematics in Nation Building**

Mathematics is said to be the queen of all sciences (<http://malini->

[math.blogspot.com](http://math.blogspot.com)). It has been treated as the mother of all technologies in USA and now all other industrialized nations – G8 countries have also accepted this role of mathematics (Siddigi, 2008). Behind each major achievements may it be landing at moon, invention of television and fax machine, planning and designing of rockets and satellites, planning and determining strategies of war, manufacturing of sophisticated weapons and armors, invention of computers and their various variants, scanning of brain, manufacturing of powerful telescope, weather forecast, prediction of stock markets, there is a mathematical technology and a mathematical brain.

Today, an important field where mathematical logic reigns supreme in technological advancement is in the area of computation. Programming is mathematical logic in action. Scientific researchers are becoming more and more dependent on mathematics for important breakthrough in theories.

It is more realistic to think that it is the creating mastery and utilization of modern 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 nation. While science is the bedrock that provides the spring board for the growth of technology, mathematics is the gate and the key to the science (Aguale and Usman, 2007). In other words, it is the level of

mathematics that determines the level of the science and technological component of any nation. The foundation of science and technology, which is the basic requirement for development of any nation, is mathematics. Therefore, mathematics plays a vital role in nation building.

Mathematics presently is having an enormous impact on science and society. The influence may be silent and appear hidden but has shaped our world in many ways. Mathematical ideas have helped to make possible the revolution in electronics, which has transformed the way we think and live today. The information technology (IT) of today has transformed the world into a global village. These advances in sciences and technology were made possible by the numerous developments in pure mathematics.

Mathematical sciences have helped improve the ability to predict weather, to measure the effects of environmental hazards, project the outcomes of elections etc, the achievement of any meaningful economic development must be largely dependent on science and technology, which is also dependent on mathematics.

One may well wonder how mathematics could be associated with or used in other disciplines. As a sequel to this, it will be worthwhile to considering how mathematics is used in or with other disciplines or aspects of human endeavour like science, chemical and energy development, engineering and technology that has become a veritable and

indispensable tool in national development.

### **Mathematics in Human Daily Activities**

The use of mathematics in preparing pupil for useful living counting, notation, addition, subtraction, multiplication, division, weighing, measuring, buying, selling, are some simple and fundamental processes of mathematics which have got an immense practical value in life (Odili, 2008).

To be happy in life one must cultivate the art of economical living, Economy in the matter of money, time, speech and thought. The learning of the art of economical living is a byproduct of the learning of mathematics. Mathematics helps people to use scientific intuitive, deductive and inventive methods to investigate, interpret and to make decisions. This will help us to “raise a generation of people, who can think for themselves, respect the views and feeling of others” (NPE, 2004).

It is important to note that students learn the habit of clarity, brevity, accuracy, precision and certainty in expression. Mathematics also demands hard work from the learner. Hardworking citizens are very much needed in our country today.

While preparing a delicious meal, measuring the ingredients and calculating the time it will take to cook involve mathematics. Knowing how to measure can make the difference between a great meal and a horrible one.

**Mathematics in Sciences**

The study of computer science, which demands the knowledge of mathematics, is another way of producing gainfully employed individuals in the society. A good knowledge of mathematics is required for the study of chemistry; particularly a learner may not be able to make a head way in both organic and physical chemistry without an adequate basic knowledge of calculus and mathematical analysis. Consider the case of physics, it has been noted that no other subject is as close to mathematics as physics hence any person who wants to study physics must have a good grade in mathematics otherwise he will not be able to study physics with confidence without exaggeration, Mathematics is highly essential for the study of Agriculture, where activities, such as measuring area of land, calculating average investment or expenditure, cost of labour, manure rate, seed rate etc.

**Mathematics in Engineering**

In the area of engineering, mathematics plays, perhaps, one of the most vital roles in terms of national empowerment. Mathematics in the area of engineering can be as simple as the geometry of cones or become decidedly complicated when it comes to structural analysis in building bridges, roads or for situations involving heat transfer or process design. Engineering encompasses a surprising breadth of areas such as forestry and surveying, not to mention electronical and mechanical engineering and thermodynamics, such mathematics

used herein can be used to solve engineering problems in all phases of dimensional analysis.

**Mathematics in Politics**

Mathematics also plays a significant role in the area of politics. A politician may wish to know the relationship between the age of civilians and their participation in an election, the percentage of individuals who voted in that age group, those who did register but did not vote and those who did not register.

If one is planning a political campaign, therefore would be interested in the percentage of each age group among registered voters. Similarly comparisons and statistical methods can be used for relating the income of national households to the educational levels as a predictor of how a certain population of a town will be likely to vote. In this way, mathematics serves as an accurate predictor of important elections and therefore, a driving force behind the elected leaders of powerful nations.

**Mathematics in Law**

A lawyer who cannot reason logically cannot implement the tools of his trade. He cannot effectively solve his case, let alone prove it beyond a reasonable doubt to his peers and opponents. Hence, a good knowledge of mathematics can help a lawyer solve his case. Gemignani in Odili (2006), shows that a prospective law student with mathematics background would perform better. Areas like ownership, right, power, justice, crime,

guilt, trial, conviction, evidence, suspect, office etc are now defined with mathematical precision in law.

Mathematics can indeed be found in all aspects of human endeavour. The above mentioned areas are just few sampled. Others not discussed include, economics and finance, management, businesses enterprise, agriculture and natural resource etc. It is a course that contributes towards achieving the national goals and objectives of education in Nigeria and the world at large.

### **Challenges and Suggestions for Improvement of Mathematics Education in Nigeria**

Through it may sound unbelievable to some people; studies have shown however that rapid national development can be achieved through application of mathematics on the national economy. Statistics have shown that mathematics is closely knitted and has a key role to play in areas like leadership, economics and finance, management, brand export and natural resources (Isaac, 2012). Unfortunately, this course is faced with quite a number of challenges. Those challenges as follows;

To learn the essential mathematics for transformation of the Nigerian economy, 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, models, calculators and computers. Students need modes of instruction that are suitable for the increased emphasis on problem solving, applications and higher order thinking skills. In order to thoroughly incorporate new developments in mathematics into classroom instruction, serious re-examination of the entire mathematics curriculum will be required. This usually takes time as it is not an easy process. The problem of over crowdedness inadequate period allocation to mathematics, learning mathematics as a second language, insufficient teaching aids and misuse of those available among others should be addressed when the curriculum is re-examined. Computer should be supplied to schools to assist both teachers and students.

The problem of lack of qualified mathematics teachers and low enrolment of students in mathematics and other mathematics related courses at the tertiary level of education can be addressed when continued professional development of mathematics teachers is made critically important by the government and private sectors. These include refresher courses, workshops, study leave and conferences etc. Quality teachers implement the curriculum with quality and hence quality development.

Other challenges have to do with the students. The problems that teachers encounter with students include: poor background, fear of the subject, lack of

interest, lack of concentration and motivation and constant discouragement (Ale, 1981). Students, complain of excessive calculations, too many formulae, lack of skills and talents and non-experimental nature of mathematics. Teachers should use a variety of teaching strategies and should employ a broad range of examples. They should also be given the opportunity to participate in mathematical discourse to build their confidence using mathematical clubs and societies. Teachers should be able to approach the teaching of mathematics culturally.

The above challenges call for multiple yet consistent responses from teachers, administrators, government, policy makers, students and others concerned with education in Nigeria. These, if done can put Nigeria into one of the leading mathematically literate nations.

### Conclusion

This paper has looked at the importance of education to development, relevance of mathematics education to national development. The paper also reviewed the place of mathematics to science education, society and many other areas that help in national development. Challenges confronting the teaching and learning of mathematics and suggestions for improvement were discussed. Mathematics occupy an important position in the school curricula as a result of its role in scientific and technological development a necessity for national development, hence its teaching and

learning should be given the due consideration it deserves.

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