

ROLE OF MATHEMATICS IN ENHANCING GOOD GOVERNANCE IN NIGERIA

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Abstract

In many African Countries including Nigeria, the citizens are still looking forward to good governance as there is a clear absence of the essential attributes of good governance. Mathematics is a veritable tool for the solution for all human problems including problem of good governance in societies. This paper focuses on the concept of good governance, roles of mathematics in enhancing good governance, and the implications to the mathematics education in Nigeria. The paper recommends that the teaching of mathematics should not be isolated from the operations and needs of the society as this will help to motivate the students and teachers in the study of mathematics in schools. Nigerian mathematics education should prepare students to identify and analyse the applications of mathematics in addressing the social problems including the problem of good governance.

Keywords: *Good Governance, Mathematics, Mathematics Education, Roles.*

Introduction

The existence of mathematics started from the creation of man. Man used and developed mathematics in order to cope with the societal needs of survival in the environment. For example, man right from creation require mathematics to count, keep records and trade items with one another in various societies. Therefore, men of all ages need mathematics to live useful life. This could imply that whoever does not study, use and appreciate mathematics cannot live a useful life including having a good governance in any society. Mathematics has been described as the bedrock of any scientific, technological, economic and social development of any society. It has been asserted that without mathematics, there is no science; without science there is no technology; and without technology there is no modern development(Ukeje, 2002). Also, the gap between the developed countries and the developing countries is the gap in the teaching and learning of mathematics. This accounts for the reasons why Nations make the study of mathematics compulsory at the primary and secondary school levels and even set up centres for the study and development of the Mathematical Sciences. A case in point is the establishment of

the National Mathematical, Abuja in Nigeria by decree number 40 of 1989 and now by an Act number 58 of 2004.

While so much literature have been devoted to highlighting the importance of mathematics in science and technology, not much seems to be mentioned about its relative importance in good governance of any society. As a matter of fact, mathematics finds use in all aspects of human life in the society including governance. Governance is the tie that binds people in any society together and is expected to make them to live together in harmony with one another. A popular form of governance is democracy. Democracy is the government of the people and by the people, and it is based on numbers. In any democratic governance, decisions and policies are arrived at based on numbers and records of phenomena.

In every aspect of governance, mathematics is the veritable tool but this is hardly mentioned in our school curriculum at all levels. In our schools today, instructions in mathematics focus mainly on mathematical competency towards technological society. Also, mathematics is taught in abstract and isolated ways without connections to use in the society especially on tenets of good governance. It becomes imperative to discuss ways in which mathematics and mathematics education could contribute to the development of good governance in Nigeria

Concept of Good Governance

Governance deals with the structures and dynamics of making rule and action in the society (Akomoledede & Akomoledede, 2014). Governance is the manner in which power is exercised in the management of a Country's economic and social resources for development. It is the use of political authority and exercise of control over a society, and the management of its resources for socio- economic development(Kabir,2008). In any society, there is always the desire for good governance. Every citizen aspires to have a government that is able to cater and provide for the needs of the people of all socio- economic strata in the society. A country with good governance is expected to make all citizens happy with good food, clothing, health facilities, education and infrastructural facilities. Good governance is prerequisite for nation building and national development. It is ruling the people well within the tenets of the constitution and enabling legislations (Akomoledede & Akomoledede, 2014).

United Nations Development Programme (2002) defines good governance as "striving for the rule of law, transparence, participation, equity, effectiveness and accountability, strategic vision in the exercise of political, economic and administrative authority". All these make the citizens happy and comfortable in the society. Some of the attributes of good governance are that it is participatory, consensus oriented, accountable, effective and efficient, equitable and inclusive, and follows the rule of law. Also, good governance assures that corruption is minimized, the views of minorities are taken into account and all the voices of the

most vulnerable in the society are heard in decision making (Organization for Economic and Cooperation Development (OECD), 2000). Some ingredients of good governance are Citizens participation in governance, abolishment of corruption, accountability, transparency and separation of powers (Akomoledede & Akomoledede, 2014). According to Kabir(2008), “good governance depends on the extent to which government is perceived and accepted as legitimate, committed to improving the public welfare, responsive to the needs of its citizens, competent to assure law and order, deliver public services, creates an enabling policy environment for productive activities and equitable in its conduct”.

Unfortunately, in many African Countries, good governance seems to have eluded the citizens. In Nigeria today, the talks of the day are poverty, unemployment, lack of power, lack of water, nepotism, bribery and corruption, marginalization of some minorities, pipeline vandalization, insurgency, political instability (Adeniji& Ibrahim, 2010). To an average Nigerian, there is high desire for good governance which we are yet to attain. Education in general and mathematics in particular is expected to prepare the citizens for good governance in any society. Some of the key factors in good governance include technical and management competence, organizational capacity, reliability, predictability and rule of law, accountability, transparency and open information system, and participation which involves consultation in development of policies and decisions making, elections and other democratic processes(OECD,2014)

Roles of Mathematics in Good Governance

Mathematics is an indispensable tool for good governance in any society. Mathematics enhances good governance in the following ways:

(1) Criteria for the Appointment of Politicians for Governance

Nigeria is a multi -racial society with so many ethnic groups. Good governance demands that the appointment of politicians from various ethnic groups has to be equitable, fair and transparent. For instance, in Nigeria we set the criteria to elect one Governor per State, three Senators per State, house of Representative members per State depending on the size of the State. In all appointments in Nigeria the Federal Character is put to play to determine the number of people appointed per State. All these have mathematical underpinnings using numbers as criteria. It is only when these mathematical criteria are met that any appointments in any government could be seen to be fair, equitable and acceptable by the citizens in the society. Appointments into political offices are expected to be reasonably equalized among the various ethnic groups or evenly distributed for acceptability by all. This could be achieved by proportional distribution using ratios or percentages. For instance, this principle was adopted in the selection of delegates for the last Nigerian

National Confab to ensure that all strata of the Nigerian society were represented. This enhanced the acceptability of the composition of the members of the National confab and the report of their deliberations. Thus, mathematics helps to ensure equity and fairness in all appointments which are essential ingredients for good Governance.

(2) **Determination of the Resource needs for Various Communities to Promote Socio-Economic Development.**

One of the ingredients of good governance is fairness in the distribution of the wealth and infrastructural facilities among the ethnic groups in the Country. Mathematics could be used to determine the Resource needs(Hospitals, Schools, Electricity, Water projectsetc) for the various Communities that make up the Country. For instance, we require data of the population, schools, hospitals water projects etc in Communities to enable the Government to plan and provide the Resources. This also helps to ensure that all Communities have a fair share of the resources to be provided by the Government.

Mathematics therefore plays important role in shaping the social reality of any society and ensures good governance by helping to determine the Resources needed anysociety. An example of this is the “marginalization Index” used in Mexico (Sanchez, 2009, 2010). This is a measure based on mathematical model used by the Mexican Government to define the Municipalities in Mexico that are in need of resources to promote development. It is used by the Mexican government to determine which the Mexico’s most marginalized municipalities are. This measure is calculated using a mathematical model. The mathematical model measures nine socio-economic indicators for each municipality. The nine indicators are: percentage of illiterate population, percentage of population without complete primary education, percentage of population without toilet or drainage, percentage of population without electricity, percentage of population without access to piped water, percentage of private homes with a level of overcrowding, percentage of population living with a floor made of soil, percentage of population in localities with fewer than 5,000 inhabitants, and percentage of the employed with income less than or equal to twice the minimum wage. The marginalization index helps to describe the welfare level of Mexican municipalities and it also indicates where the resources for social development should be targeted. One of the Socio-economic indicator models helps to indicate the percentage of employed population with incomes less than or equal to twice the minimum wage. This indicator is calculated using the following formula

$$I_{i9} = \frac{p_i^{sm \leq 2}}{p_i^0} \times 100$$

Where

$p_i^{sm \leq 2}$ is the part of the employed population who receives less than two minimum wages

p_i^0 represents the total of the employed population

This model if properly carried out would help the Government in determining the socio- economic state of any community with a view to helping in the provision of facilities. There is need for such a model for the Nigerian case.

(3) **Legitimization and Justification of Political Decisions in Governance**

In the governance of any society, there is always the need to take decisions on issues concerning various groups in the society. Most times, there are divergent views and opinions of people on issues without consensus. In meetings of Senators, House of Representatives members and National Executive Council members etc, different views and opinions are raised by various interest groups. Usually when there is no consensus opinion on any issue, the last resort is the application of mathematics. Mathematics topics such as percentages, ratio, and fractions of people with various views are used to resolve any divergent views of people at any conference, referenda or proceedings where political decisions affecting governance are taken. For instance, in 2016 in Nigeria, the Nasarawa State house of Assembly had 18 members that voted for the suspension of 6 other members who were alleged to have disrupted the proceedings of the house. The fraction of 18 out of 24 was high enough for the suspension to be upheld and implemented. On 3rd of May 2016, 16 out of the 24 members of the Edo State house of Assembly sat and impeached the Speaker and the deputy Speaker in Benin and appointed new Speaker and deputy Speaker. This decision was upheld based on the number of members in support of the motion. In the 2016 Area Council election in FCT, Abuja Nigeria, the elections in Kuje, Gwagwalada, Abuja Municipal and Abaji Area Councils were declared inconclusive because the number of cancelled votes were more than the gap in the number of votes obtained by the party that scored the highest number and the second highest scorer in the election. Also the number of registered voters were less than the total number of votes casted. Therefore, mathematics can be used to legitimize and justify political decisions that directly and significantly affect the socio - economic dynamics of Communities and the lives of the inhabitants(Bhatnagar, Jha& Singh, 2010)

(4) **Socio-Economic Planning**

Good governance requires effective planning in the economic, social and technological spheres of the society. To effectively plan for the future, the Government requires numerical data of human and physical resources in the society. Also, the Government needs to budget for the Physical and human resources required by the society. The annual budget of Nigeria and that of the States are prepared using numerical figures. All these require the use and applications of mathematics. Any plan by the government without sound Mathematical underpinning is bound to fail.

(5) **Use of Mathematics in Political Discourse in Governance**

Mathematics is used by politicians to support and justify arguments with respect to issues on governance. In any political discourse, mathematical figures are needed to direct and justify the stand of the Government on the issue. For instance, the Government requires the percentage of the population in each state with HIV to enable it take a stand on it, guide the Government on how to tackle it and guide the citizens of the Country towards it. For instance, if State A has 30% of its population with HIV and State B has 5% of its population with HIV, these will help the Government in discourse on the issue in the States and direct Government actions towards it. In 2016, a member of senate while presenting a motion for the ban of the importation of second hand tyres to Nigeria stated that between 2010 and 2015, over 5000 deaths from road accidents were as a result of busted second hand tires. This helped in supporting his arguments for the motion. Also, the mathematical representations in percentage or graph of the prevalence of any disease can help the Government to track and legitimize the outcomes of the intervention efforts by Government in fighting the scourge of the diseases. Politicians and Government Institutions use mathematics to underpin their proposals, arguments and in decision making related to social problems (Sanchez & Blomhoj, 2014). Another example is the record of various rates of crimes in States. This helps the Government to plan to tackle it and tracks the success of the efforts to solve the problem. Also, various agencies of government such as Police, Federal Road Safety Corps, and Custom Service use mathematics to record and indicate the success of their agencies in the pursuit of their mandates. This enables the society to track and evaluate the activities of such agencies.

(6) **Use of Information Communication Technology (ICT) in Governance**

The revolution of ICT has its root in mathematics. ICT is used in governance to communicate to the people on any issues, for monetary transactions, issuing of international passports, Identity cards, License etc. All these information

are necessary for good governance. Also, ICT promotes good governance in the following ways: (1) by increasing transparency, information and accountability; (2) by facilitating accurate decision making and public participation; (3) by enhancing the efficient delivery of public goods and services. The citizen's right to gain access to public documents is supported by Government's computerization programme and availability of these documents through the internet (Magno&Serfica, 2014). Other applications of ICT in governance include economic monitoring, planning and intensive data management relating to elections, census, tax administration etc. The Government can use ICT to provide integrated governance, reach people faster, provide efficient services, and citizens' empowerment through access to information (Bhatnagar, Jha,& Singh, 2010)

(7) Use of Mathematics in Conduct of Elections

Free and fair election is a prerequisite for good governance as election of credible and acceptable leaders is very important. Mathematics plays central roles in elections as numbers are very essential in election processes. In any election, there is need to determine the number of elective positions, number of prospective voters, number of people seeking elective positions and number of votes per Candidate or political party. Mathematics is used by the returning officers of the election to determine the winners of any context in elections or to declare an election inconclusive. In the last general election in Nigeria in 2015, the APC was declared winner of the presidential election based on the number of votes obtained by the party and this was accepted by Nigerians. The use of mathematical figures in elections brings about the acceptability of election results and election of leaders for good governance.

Implications to Mathematics Education

The teaching of mathematics in our schools should include the role and functions of mathematics in the society including good governance. It has been asserted that mathematics teachers should be able to teach mathematical modeling to students in such a way that the role of and functions of mathematics in the society is demystified (Roskilde University, 1975). In many Countries, mathematics is taught in an abstract and isolated way especially at the secondary school level without connection to the use of mathematics in the Society. There is need to change this trend. Mathematics education research should focus on the roles and functions of mathematics including good governance. Mathematics education should pay attention to the socio political uses of mathematics.

There are consequences for the lack of connection between the teaching of mathematics and the society. First, there is the risk of making students to interpret mathematics as a school subject that exists and is only relevant within the school.

This situation tends to produce a poor image of mathematics in students resulting to lack of interest and poor attitude towards the subject. Secondly, the school curriculum does not encourage teachers to relate mathematics to other subjects. This creates a restricted image of mathematics (Sanchez & Blomhoj, 2014). Mathematics teaching that has strong links with the social reality may be more attractive for the mathematics students. This would be interesting and motivating for mathematics students and teachers. Generally, mathematics teaching that is detached from the social reality experienced by the students in a country can appear de-motivating for the students. For mathematics teaching to contribute to general education, good governance and for democratic development, mathematics teaching needs to take the role of mathematics in society including good governance more seriously.

Conclusion and Recommendations

It has been revealed in this paper that political leaders and government institutions use mathematics to underpin their proposals, arguments and in decision making relating to governance in any society. The use of mathematics helps to certify the attributes of good governance in any Society. Therefore, mathematics education should take the responsibility of providing mathematics students background information which could enable them to take active and critical participation in good governance of the society. Mathematics education should prepare students to identify and analyse the applications of mathematics in addressing the social problems including the problem of good governance in nations with Nigeria not an exemption.

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