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# Mathematics Literacy: An Agent of Poverty Alleviation and National Development

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**Abstract**
The phenomenon of poverty has been affecting societies of the world from time immemorial and currently the disturbing trend of its menace is quite worrisome; as a result of which societies are committed to see to its alleviation to some level if not completely eradicated. To do this, the paper looks at the duo of mathematics literacy and poverty to see how the former, if acquired by individuals could be used to address the latter. Mathematics literacy enables individuals to be acquainted with basic mathematical skills so as to handle effectively well the aspects of local trading, business and entrepreneurship. Quite a number of views as advanced by scholars and some world economic policy agencies were discussed in the paper and their bearing to national development. The role of mathematics in the reduction of poverty and national development was also highlighted. The paper in the end recommended how mathematics literacy could be applied in alleviating poverty and the sustenance of national development.
**Keywords:** Mathematical literacy, Poverty, Alleviation, National Development

## 1. Introduction

Part of the targets of Millennium Development Goals (MDGs) is to eradicate extreme poverty and hunger so as to rid people of its menace and ensure that everybody is made accessible to basic human necessities; food being one them. Poverty is a social phenomenon affecting virtually every community in the world. In this regard, poverty cannot be given a static definition that is peculiar to a particular part of the world. Its definitions depends on so many factors; socio economic, geographical, income generation, standard of living etc. Quite a number of contributions and arguments have been advanced by academics and notable organizations worldwide as to the actual meaning the concept of poverty is portraying. For instance, UNESCO (2007) defines poverty as a denial of human rights which is believed to be of concern to all societies in the world. When rights of people are denied which is supposed to be made available to them, such people can be said to be living in a poverty-driven society. Socio-economically, poverty was also given a definition as advanced by Townsend (n.d) as follows:

> "When people lack or are denied the income and other resources, including the use of assets, and receipts of goods and services in kind equivalent to income, to obtain the conditions of life – that is, the diet material goods, amenities, standards and services to enable them to play the roles, participate in relationships and follow the customary behaviour which is expected of them by virtue of their membership in society, they can be said to be in poverty. They are deprived because of their poverty"

In this regard, people could be said to be in poverty if what is suppose to be provided for them, in terms of social amenities is not forthcoming and if the level of their income generation may not accord them the opportunity to afford diet and other sundry needs that are capable of making their life and standard of living worthwhile.

However, this makes the concept of poverty to be multi-dimensional in nature, with each person trying to offer what he deems as an acceptable definition of poverty depending upon the circumstances. There has been a great deal of belief held by people that poverty especially in Nigeria is an artificially-induced phenomenon whereby government deliberately subject citizens to abject poverty despite the wealth of the nation so that they could be made subservient.

On the other hand, mathematics literacy is the ability of an individual to address complex mathematical problems whether academic, utilitarian and personal and the like. The need for mathematical literacy was born out of the need for people to function effectively well in the society. In this regard, Doyle (2005) maintained that functioning in the society could hardly be attainable without the instrumentality of mathematical literacy. Because of the fact that society today is bedeviled with quite a number of needs, problems and opportunities, students have to be groomed to be well acquainted with how best these needs could be achieved, problems could be solved and opportunities explored. To do this, students have to be taught to develop models that are mathematics-based and that are capable of addressing such societal issues. This was captured by Lesh and Doerr (2003) that students need to be taught to think mathematically so as to function effectively in todays' society. According to them, this could be done through mathematical modeling which is a problem solving process that

requires students to interprete information which is narrative, expository and graphic in text to reflect real life events. Mathematical modeling as such helps students to elicit main ideas from texts and organized the information to be meaningful so that it could be predicted, explained, described, manipulated and shared. This would enable the students to; among other things address quite a number of problems in the society whose origin is traceable to poverty using mathematics as an instrument.

Lastly, the paper will make available the interconnection and linkages between mathematics and how it could be used to address poverty in our poverty-stricken society and subsequently enhance peoples' productivity level and national development.

## 2. Mathematics Literacy

Having the ability to address complex life puzzles one is confronted with depends entirely on how mathematically-inclined an individual is. A lot of daily routine in the society today has one or two things to do with mathematics ranging from businesses, education, entrepreneurship, trading, agriculture, health care delivery and a host of other topical issues. The reason being all these phenomena, as they unfold in the society rely to a greater extent on statistics as to their happening; which is an aspect of mathematics. For people to interact and complement one another in this respect, they have to have mathematical ability to handle life transactions with efficacy. This is perhaps what informed the need for mathematics literacy. Even though academics are of divergent views and opinions regarding what could actually be termed as mathematical literacy. This further attracted the attention of some countries around the globe to look for the possibility of incorporating mathematics literacy in their curriculum because of its importance to everyday life and national development. In this respect, the following was captured to be used as the reason why mathematics literacy was introduced.

> Mathematics literacy provides learners with an awareness and understanding of the role that mathematics plays in the modern world. Mathematics literacy is a subject driven by life-related applications of mathematics. It enables learners to develop the ability and confidence to think numerically and spatially in order to interprete and critically analyze everyday situations and to solve problems (DOE, 2003: Pg. 9)

This signifies that mathematics literacy according to what has been written above could be applied in solving quite a number of societal problems and menace – poverty being one of them. School in this regard can serve the purpose of imparting learners with poverty-alleviating skills through engaging them in the learning of mathematics. This could be achieved especially at formative ages when the learner could be considered to be readily available or ready to be shaped and conditioned to respond to a particular stimulus – mathematics literacy. Because mathematics literacy plays an important role in the modern world, it could as well be used to make learners become acquainted with how they can use it to develop entrepreneurial skills so that they may be at parallel with poverty. Through mathematics literacy, they would be made to understand and acquire commercial skills, bargaining power, exchange rates and so on, failure of which their ability to carry out these enterprises may be delusional.

Similarly, Edge (2009) maintained that an individual has to be literate in mathematics so as to be functional in an optimal level. Also the need and importance of competence in mathematics content, processes and situation faced by individuals in daily lives, job-education lives of individuals can be seen to be the origin of mathematics literacy (Ozgen & Bindak, 2011). Mathematics literacy as such is central in making an individual become fit to be in certain enterprise in the community that is capable of making that person become free of poverty. Poverty alleviation through education has been emphasized over the years. It has been argued that abject poverty is the evidence of the failure of societies in the world to adopt social and economic policies that are beneficial to all people and which subsequently deprive people of their dignity and denies them the opportunity to be citizens who are participating in the state of affairs of the nation, with a sense of self-respect and a feeling of well being (UNESCO, 2003). This means for vibrant and viable social and economic policies to be executed by government; that will be aimed at curtailing the menace of poverty and the enhancement of national development, the use of mathematical literacy has to be employed. The interpretation of these social data such as population census, poverty index, monetary policies all rely to a very large extent on the ability of individuals to be mathematically literate.

Henceforth, mathematical literacy is a pivot through which many policies could be translated into real life situations and whose profound impact could be noticed if carefully utilized for proper policy formulation and implementation-poverty alleviation being one of them so that national development could be attained.

## 3. Poverty Phenomenon.

Many individuals and organizations viewed poverty in a number of ways (World Bank, 2010; Wagle, 2013; Nyasulu, 2013; Lamarche, 2003). Each of these opined that poverty could be looked at from different perspectives. Depending upon the circumstances, poverty could be as a result of economic situation, nutritional

 

status, shelter provision, literacy level, access to portable drinking water and lack of representation and freedom. In terms of definition, many of it were advanced by scholars and many world economic policy agencies; part of which would be looked at and follow suit with its impact, consequences and solution to its (poverty) menace. Poverty portrays poor nutrition, inadequate accommodation and shelter and low or poor health standard (World Bank, 1990). Poverty could be depicted by a drawn poverty line across countries and communities in the world. Poverty line in this respect is the value of income or consumption necessary to purchase or afford the minimum standard of nutrition and other life necessities. Therefore countries, communities, societies and individuals across the world could be rated as poor if their measured standard of living in terms of income or consumption is below the poverty line. In his words on poverty, Townsend (1992) defined poverty as lack of material resources for a certain period of time to such an extent that participation in normal activities and possession of amenities and living condition becomes virtually impossible or limited. Poverty has further been viewed as a phenomenon under which individuals have low calorie intake, poor housing condition, inadequate health facilities, and poor qualities of educational facilities, low life expectancy, high infant mortality, low income, unemployment and underemployment (Oye, 2012).

However, poverty has a wider coverage and profound impact on peoples' day-to-day activities especially now that the world is experiencing economic recession and austerity is bedeviling some countries across the world. Dimensionally, poverty cut across deprivations such as vulnerability, weakness in physical appearance, isolation, social inferiority, humiliation, powerlessness and seasonality.

## 4. Poverty and National Development.

The hallmark of civilization in every society is the level of its national development. This hinges on every sphere and ramification of that society which includes but not limited to economic, social, educational, scientific, technological and political aspects of that society. For country to be fully developed in such areas, it has to fight poverty among its citizens so that they (citizens) would not serve as an impediment to the actualization of such issues of national importance. Development in education for example, demands the educational institutions to be vibrant with seasoned academics, whose level of training is of international standard so that the product of the system would equally stand to compete favourably with their peers internationally. It is only when the system is sound that its products would be expected to have acquired poverty-alleviating skills so that while outside the system, such knowledge acquired would enable them become self reliant. In line with this, Dienye (2011) stressed that qualitative education for a country that wants to break the cycle of poverty, ignorance and disease is imperative and indispensable as well. He further reiterated that a society whose education system is in shambles cannot expect any reasonable level of development and progress so much so that when policy makers pay lip service to issues that border on improving the education system, development will continue to be a mirage.

In similar vein, development was considered to be a process of increasing the ability, capacity and capabilities of people to exploit the resources of their environment in order that their needs may be satisfied at any given time (Imo, 2012). When peoples' needs are satisfied, they are said to be free from the shackles of poverty. Poverty is always triggered by idleness and lack of a prescribed work to do that is capable of taking one's mind away from what others are doing. This has far reaching consequences on the nation's national development and may hardly allow prosperity to reign in such type of society.

## 5. Role of Mathematics in Poverty alleviation.

Mastery of mathematics is key to success in the modern economy whereby the better educated a country and its citizens; the more likely they are to prosper in all spheres of human existence so much so that few qualifications confer an economic advantage like mathematics qualifications. Whether it's writing the code behind a new software breakthrough, mapping new frontiers in bioscience, drawing up the business plan for a new music portal or remodelling the IT which guarantees the performance of a high-performance car; mathematical knowledge is the essential driver of progress (Gove, 2011). When mathematical skills acquired from school are applied appropriately, poverty alleviation could be made easy. This is because many of the enterprises embarked upon by individuals rely to a greater extent on the knowledge of mathematics. For instance, before an individual could become an entrepreneur he must be knowledgeable in mathematics so that in the process of his entrepreneurship, all transaction he may come across and filling of documents like voucher, ledger, invoice that may require the knowledge of mathematics would be done with ease.

## 6. Conclusion.

For poverty to be alleviated, the use of mathematics has to be employed because it affords one the opportunity to become knowledgeable in many mathematical computations that are capable of making them to live in the society without having any problem whatsoever that has to do with mathematics. To do this, emphasis

has been laid by the paper on the need to become acquainted with mathematical literacy-a skill which if acquired will enable individual to be rid of poverty at all level and in all its ramifications.

## 7. Recommendations

- Nigerian citizenry need to be well taught the concept of mathematics literacy so that they would become acquainted with it and use it to develop poverty-alleviating skills.
- The introduction of Mathematics Literacy in Nigerian mathematics syllables from primary through tertiary institution would go a long way in complementing the effort of government in inculcating the skills of entrepreneurship to the citizens.
- Teachers should be exposed to more rigorous academic training so that they too would become more acquainted with the concept of mathematics literacy which will invariably enable them to impart it effectively well.

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