

THE POWER OF MATHEMATICS EDUCATION FOR EMPLOYMENT AND CHANGING COMMUNITIES IN NIGERIA

Mohammed Alhaji Liman
Department of Mathematics,
Niger State College of Education, Minna

Alhassan Dokochi Safo
Department of Mathematics,
Niger State College of Education, Minna

And

Yusuf Salahudeen
Department of Mathematics,
Niger State College of Education, Minna

Abstract.

Mathematics Education is a discipline encompasses several areas and is a pathway to many careers. This paper therefore, discusses an analysis of different ways of talking about power in relation to mathematics education. Furthermore, it discusses the present situation of Mathematics Education and skills inherent in the study of Mathematics Education that makes it an inevitable tool for employment in many fields, including natural science, engineering and technology, medicine and social sciences, small and medium scale enterprises, sport, law, politics and everyday life activity. The training from skills acquired from Mathematics Education give individual power for self-reliance in employment. The paper ends by advocating for good Mathematics Education in all level of education and individual should be made to release that Mathematics Education is the success to exponential growth in the employment sectors and changing communities in Nigeria.

Keywords: mathematics education, power and employment

Mathematical Knowledge is an essential tool in everyday human life. Almost all activities whether social, economic or political needs Mathematical knowledge to function properly (Abubakar, R. B., Charles-Ogan, G., Wokocha, A. & Okoro, J. 2015

). Mathematics Education (ME) is the act of imparting and acquiring of skills, knowledge, aptitude, abilities and attitude capable of making the individual functional and productive for effective all round achievement of a nations developmental goals(Gladys, 2014). Statistics have shown that mathematics has a key role to play in job creation, wealth generation, poverty alleviation, economics and finance, management, business and enterprise, information technology, agriculture and natural resources which are the core components of vision 20;2020 (Iji,2014). The purpose of teaching and learning ME is specifically to produce three kinds of intellectual capital: Scientists and engineers who will continue the research and development that is central to the economic growth of our country; technological proficient workers who are capable of dealing with the demands of a science-based high technology workforce and scientifically literate citizens who make intelligent decisions about public policy and who understand the world around them. Accordingly, effective Mathematics education is critical to enable students to acquire: 1) The deeper intrinsic value of ME to shape and define our common life history and culture among others. 2) Appropriate skills; abilities and competences that will enable them contribute meaningfully to the development of the society. (Obomanu, B. J., and Adaramola M. O. 2011)

Power is a connection between the quality of the mathematical education of a person and the person's potential and economic opportunity. This seems to imply that good ME gives "power" to a person because it gives people mathematical skills that are of paramount importance in current social processes. Also power is a connection between mathematics education with current economic and productive processes. The power of ME is also brought in relation to a person's participation in a global economy. The demands of the global economy should make educators rethink the kind of mathematical experience provided to all students. Powerful mathematical ideas are those that will allow people to think in ways that secure their success as working force in the 21st century, that is, in the global economy. (English, 2002). "Since mathematics is a *powerful* knowledge in our society, then it is important to improve the access of as many students as possible to a quality ME so that they get *empowered*. The concept is defined as the capacity of *Musa* to influence the behavior of another *Isah*. *Musa* has power over *Isah* if *Musa* can modify *Isah*'s actions and therefore the results of *Isah*'s actions. If power is such capacity, then *Musa* is in possession of a form of control over other people or situations. *Isah* accepts *Musa*'s influence on the grounds of *Isah*' acknowledgement of the legitimacy and desirability of *Musa*'s influence. The public recognition of *Musa*'s capacity allows *Musa* to exercise influence despite possible disagreement or even opposition from *Isah*'s side. Furthermore, on the grounds of *Musa*'s authority and legitimacy *Musa* can empower *Isah*, if desired. Power can be passed on the will of the powerful and the acceptance of the empowered (Skovsmose, O. & Valero, P, 2001)

Employment is action of someone getting a job usually for return of regular payment called wages or salary. Gainful employment brings peace of mind because

through the salary/wages attached to the employment, one's basic needs or wants are satisfied. Employment can be through white collar job or being owner or the chief executive officer (CEO) of one's company hence self-employment. Mostly, self-employment jobs range from small and medium scale jobs like catering, vulcanizing, buying and selling, farming, tailoring etc. (Abubakar, et al 2015). For someone to embark on self-employment, some mental ME principles must be employed. Some of them are outlined as follows: (i) Meditation:- This is an act of pondering over or calling to mind over and over an issue and relating the thought to one's life. At the end, the subject matter would either be accepted for an action or rejected for another line of meditation. (ii) Vision:- Advance learner's dictionary explains vision as ability to plan the future with great imagination and intelligence. A vision should have origin, purpose and result to attract acceptance for action. When the result is favorable, it will be embarked upon if otherwise, discarded. (iii) Belief:- Belief is accepting as true or workable even though one is not certain. Acceptance of belief leads one to focus for practical exercise. (iv) Focus:- The product of meditation, vision and belief leads to focus. Most actions have been both supportive and negative factors. On focus, both elements are considered and the aspect with greater advantage leads one to action. (v) Planning:- Planning is an outline or design showing what one intends to do. It involves other mental and physical exercise, hence it is expressed in words or diagrams. (vi) Evaluation:- This is also a combination of both mental and physical exercise. It is a review of what one has mediated and planned. This will enable one access the extent of reality, reliability and progress made as well as correcting errors. (vii) Discipline:- According to Webster dictionary, discipline is the training of the mind and character. It is also known as self-control or denying some comfort for a purpose. (Abubakar, et al 2015)

Current Situation of Mathematics Education in Nigeria

(Oriafo, 2002) argued that Science, Technology and Mathematics (STM) education in Nigeria are grossly characterized by inadequacy of content and ineffective methodology by teachers, paucity of facilities, equipment and materials in our laboratories, as well as dominated socio-cultural lapses. (Nwachuku, 2009) enumerated some of the problems confronting STM education in Nigeria to include, lack of funds to purchase equipment/materials, lack of adequate textbooks, overcrowded classrooms/laboratories, poor time table, lack of cooperation from administrator, the pressure of external certificate examinations, etc. Other challenges, include, lack of proper monitoring and feedback mechanisms, poor preparations of teachers who teach the new programs, lack of motivation among teachers, the rapid rate in which teachers are transferred from one school to another or out of the profession, the use of archaic/traditional teaching methods which ultimately hinders internalization of learned materials.

Other problems facing ME in Nigeria includes the absence of efforts to bring about meaningful self-reliance programs and projects to the communities. There are lack of planning in different sectors of Nigerian economy; including, poor policy implementation procedures, shortage of qualified mathematics teachers/educators, over whelming number of activities demanded by the new curricula, lack of clear-cut goals, scarcity of resources and non-usage of research reports on the performance of the programs (evaluation). These are clear challenges facing ME, and unless these challenges are tackled, the dying relevance of Mathematics Education for national development in Nigeria cannot be resuscitated.

The report of Shelter Right Initiative clearly stated that Nigeria trailed behind other West African countries for nine consecutive years in STM academic performance (Olubusuyi, 2003). According to (Uzoечи 2004), students do not only perform poorly at the cognitive level, they also perform badly at the affective and psychomotor domains respectively. And to the extent that it is difficult to have a good number of candidates with enough credits to secure admission at higher levels of STM disciplines. Furthermore, Mathematics achievement has never fared better, and has affected subjects like physics and chemistry adversely. (WAEC 2006) noted that the marks lost by each physics students as a result of poor knowledge in Mathematics accounts for fifty percentages (50%) of the marks lost for errors in that subject. While (Ndioho, 2007) believes that reoccurring poor performances recorded in biology is due to students' inability to understand some abstract concepts in that subject. In another breath, Mathematics is described as the queen or servant of the sciences and to that extent, the poor performance in this subject has negatively influenced the learning STME in schools in Nigeria. A number of studies and blue-ribbon commissions over the past decade have identified problems in the current system that hinders states and the nation from meeting ME goals. Many gaps exist, but this report briefly highlights five that states are addressing; (1) Inconsistent state standards in math and science; (2) Shortfall of qualified math and science classroom teachers; (3) Lack of preparation for postsecondary stem study;(4) Failure to motivate student interest in math and sciences; and (5) Failure of the postsecondary system to meet job needs (Thomas. 2011).

It is the queen or mother of sciences. It should be used in the employment to transform communities as an essential tool in many fields, including natural science, engineering and technology, medicine and social sciences. Let us look at some these fields of employment and how it is used in changing communities;

➤ **Small And Medium Scale Enterprises(SME'S)**

Entrepreneurial subsector of the Nigerian economy constitute majority of SMEs that employ fewer than five persons or none at all. SMEs ranging from Artisans like Carpenters Mason, Plumbers, vulcanize etc all use and basically rely on ME in their job. Carpenter measures numbers, employing geometry to measures angles at which woods should be positioned for upholstery to take shape. Mason calculates number of bricks required for building, percentage of cement to be mixed with sand and quantity

of water for building. Tailors take down measurements using numbers and from this make a quick calculation of how many yards of fabric is required to sew attire. Vulcanizer pumps air into tires and measure the Pressure Standard International (PSI) to range 40-45, depending on the automobile.

➤ **Law**

It is well known that probability and statistical analysis are absolute necessities and serve as lawyer's tools if he is to plead his case on behalf of his client. ME at such critical times cannot be underestimated in its importance. 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 peer and opponent. Hence knowledge of good ME can help a lawyer solve his case.

➤ **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.

➤ **Sport**

Example of the use of ME are easier to find than in almost any other field. The sheer magnitude of sports statistics offer an opportunity to analyses and organize apparently diverse set of data. Furthermore, people use Mathematics/Statistics formulae to compare a player batting average for either regular season game or for World Series game. This could be done in order to support the idea that the player fared better than usual in World Series game

➤ **Stock Exchange**

Investors use a stockbroker to purchase securities from the stock exchange. Client asks for a quote from a stockbroker to make a purchase, stockbroker must calculate the purchase price which involves computing. The stockbroker must take the price/share of the stock at that minute and multiply it by the quantity that the client wants to purchase. Then the broker will add a commission fee to that total. The stockbroker will need to calculate this total rather quickly to give a client a quick and accurate estimate (Money How, 2011). All these calculations involve the use of ME

➤ **Banking Sector**

(Sanusi, 2011) stated that "Banking system plays the important role of promoting economic growth and development through the process of financial intermediation and is the conduit for the implementation of monetary policy". Transaction in banks is with money but money is valued, counted and recorded using numbers. Bank transactions are recorded using ME in stock bonds, asset base etc. Daily, monthly, quarterly transactions are prepared with applications from profit and loss, percentages and higher arithmetic. Banks recently consolidated with a capital base of N25billion naira, this is valuation using numbers, and this strengthened the banks.

➤ **Cryptography**

Cryptography is the study of hiding information for creating codes for Automated Teller Machines ATM/Credit cards. ATM cards use pins that are numbers and this gives access to accounts wherever it may be. Since the inception of ATM card in Nigeria, banking transactions have been less stressful. With just 4-number pin code, transactions ranging from, banking, money transfer, utility payments like electricity bills, Water rates, revenue, tax payments can be effected, even payments like Cable Television payments and mobile phones recharge cards can be paid. Cryptography is indispensable to safety in modern communication (Ugbebor, 2009). She further stress that Number Theory thought to be an abstract area of Mathematics has in modern times turned out to be the basis of Cryptography.

➤ **Medicine**

ME skill needed in medicine include basic Mathematical knowledge sufficient to calculate drug doses, concentrations, an understanding of the core statistical concepts most commonly represented in the medical literature, knowledge of Algebra to understand calculations of acid-base status ability to appreciate whether or not results are mathematically plausible. Logical reasoning that is necessary for the study of ME is an essential element of clinical reasoning. A medical practitioner need the ability to manipulate numbers, including fractions, ratios, powers of ten and logarithms. Basic understanding of Probability, graphs and simple Algebra are all needed by medical practitioners. Developed countries have low prevalent rate of spread of diseases, this is calculated using percentages, using ratios and Probability.

➤ **Weather /Forecast**

In Meteorology, primitive equations are a version of the Navier-Stokes equations that describes hydro dynamical flow on the sphere. Thus, they are a good approximation of global atmospheric flow and are used in most atmospheric models. Synoptic forecasting is based and rooted with the QG-Omega equation, calculus, differential equations and partial differential equations are all essentials tools of a meteorologist. Weather reports are expressed using numbers 30 C, 70 C, -2 C, 500km below sea level etc.

➤ **Agriculture**

The number of crops to be planted, amount of fertilizers to be used in ratio is estimated using numbers. The planting of root and tree crops involves knowing the dimensions and spacing between each crop and the number of crops and required plot it will take for its proper propagation is mathematically calculated. Knowing the quantity of chemical which will induce the hatching of eggs to fingerlings and the capacity of fingerling that each pond will contain depends on Mathematical knowledge (Otunu et al, 2009). Harvests are recorded using numbers. Rainy/dry season are predicted using Probability. Animal in animal farming are recorded using numbers, chicken feeds are measured using kilogram and ratio of chickens to the feed. Ratio is used to share

tractors to agriculture rich states as well as fertilizers; this in all will improve National food security.

➤ **Economy**

The growth rate of real income per capital averaged uses % for calculation. Gross domestic product (GDP), a primary indicator to gauge the health of a country is obtained by dividing total Naira value of all goods and services produced over a specific time period. Information on GDP is an indication of a nation's health. If a negative or very low GDP is obtained from calculation, it is a sign of recession, while a high GDP implies a healthy economy. Crude oil on which Nigeria's bulk of income comes from is estimated in millions of barrels per day estimated at millions and billions worth of Naira. Decision making, budgetary allocations, fiscal policies and planning in every sector of the economy as well as equitable distribution of goods and services in different zones of the country as a whole depend on statistical parameters and inferences (Otunu et al, 2009).

➤ **Mass Communication, Journalism And Print Media**

Mass communication is a field that greatly relies on statistics. Students of Journalism and mass communication need Mathematics, Statistics, computer work, trigonometry, applied calculus. In print media, numbers are used for columns pages so as not to flush to another broadcast side. Newspaper companies use the estimated population of Nigerians to project their daily production, the use of probability to predict sales, % profit and loss is also calculated in percentages.

➤ **Everyday Life Activity**

In everyday life, ME is still central to the wellbeing of our day-to-day activities. We project to wake up using time, take account of budget for the day, how much the daily/weekly/monthly expenses will consume, this contribute to GDP of the nation. We consider how many people are our dependent, use ratios to share money to them according to age, need, size or priority. At school/work, we check our work load and project % of accomplishment that will give us satisfactory pass mark. We consider weather report that meteorologist have used Mathematics to deduce if we need to take umbrella, or it will be best to stay at home. We use computer that is founded on the principles of abacus and binary operation, mobile phones are result from technology that Mathematics is its foundation base to connect to our friends, family and business associates. At the end of the day, assess the % of accomplishment for the day.

Conclusion

With areas highlighted above, there is no doubt that ME plays a major role in employment for changing communities in Nigeria. The training from skills acquired from learning ME prepare individual for self-reliance in employment. Also, these skills are needed in the build-up of any security system, financial, household, economic, food, safety, health, safety and environmental security.

Recommendations

- i. The teaching of the needed and required in each aspect of ME should be intensified at all levels of Education in Nigeria
- ii. Students and Individuals should be made to realise that ME is the success to exponential growth in Business and the major tool in being self-employed
- iii. Security is the watchword of safety consciousness and it cuts across all sphere of human endeavour.
- iv. Individuals, organizations are enjoined to be security conscious in whatever they do and wherever they find themselves.
- v. Mathematics is the main key to being self-employed and being power conscious

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