MATHEMATICS EDUCATION AS A TOOL FOR SELF–EMPLOYMENT AND SECURITY

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ABSTRACT

Mathematics as a discipline encompasses several areas and is a pathway to many careers. This paper considers skills inherent in the study of Mathematics that makes it an inevitable tool for self–employment. Security is the protection from danger or worry which indicates measures taken to guarantee the safety of an individual, structure, organization or a nation. The different forms of security and the role Mathematics play are examined. The paper ends by advocating for the effective teaching and learning of Mathematics in our Schools. This paper emphasized the useful tool from Mathematical skill in Security and self-employment.

Keywords: Mathematics Education, Self-employment, Security.

INTRODUCTION

Mathematical Knowledge is an essential tool in everyday human life. Almost all activities whether social, economic or political needs Mathematical knowledge to function properly. Despite these, Mathematics as discipline seems neglected by most people either deliberately or otherwise. The reasons for this according to Ugorji (2000) were:

i.   Mathematical Knowledge is centred on practical exercise
ii.   Extra ordinary care is needed to arrive at an accurate result
iii. Constant practices are employed to acquaint one with the procedure
iv.   Extra time is always spent in repeating one thing
v.   Extra time is spent to evaluate what had been done

In spite of these assertions, observation in the society today reveals that there is no human employment without Mathematical knowledge either in the area of planning or finance. To this end, Ogunkunle and Adeyemi (2013) explained that, Mathematical knowledge is simply concerned with the ability to count, identify, reading of figures, manipulation of numbers, reading of charts as well as recording the information numerically. This is why Mathematics advocates reasoning practical and evaluating exercise to achieve expected goal for self-employment. 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. Security is the act of keeping safe. Safety is the watch word of people that are security conscious. Security system comes in all forms and types. Mathematics is evident in each form of Security. These roles will be examined. This study basically stressed the importance of Mathematics education in being self-employed and Security consciousness.

MENTAL TOOLS FOR SELF EMPLOYMENT

For someone to embark on self-employment, some mental Mathematical principles must be employed. Some of them according to Alobari (2014) 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. Hogan (1995) asserts that meditation implies going over a matter in one's mind to arrive at better decision. 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.

The application of these factors encourages one to persist in event of challenges. The Bible book of proverb (6:10-11) explains it this way: 'Yet a little sleep, a little slumber , a little folding of the hands to sleep: so shall thy poverty come as one that travelleth…'.Mathematics should be encouraged by all and sundry for it enhances self-employment.

Mathematical knowledge as an objective and planning tool for self-employment

A Mathematical objective is a systematic procedure by an organization or an individual to arrive at expected result. This implies that there must be participation, commitment and efficiency. It also means a process of converting ones thought into action to achieving ones purpose. Alobari (2014) outlined five Mathematical objectives tools for any business to flourish as follows:

i.   The arrangement procedure should be in their order of importance from one step to another
ii.   Each stage must be realistic and achievable
iii.   Each stage should also be quantified and possible to achieve
iv.   The approach to each step should be consistent
v.   There should be evaluating procedure at the end of each stage.

In view of these, Mathematics knowledge quickens the formation of any business procedure as it helps in creativity as well as evaluating and remedial course. To achieve this, the minimum resources should be matched with the objectives as a means of setting out the goal for self-employment. No one involves himself into a meaningful business without calculating

the gain or loss, he might derive from it. He has to mediate strategies he would employ to achieve success. His success will depend on his Mathematical ability to manipulate numbers and material as his planning strategies. Ntukidem (1990) explained planning as a process of preparing a set of decisions for action in future. The planning will be directed towards achieving a goal by optimal means. By this therefore, a plan should be organized and clarified for action. The action should be coherent and analytical in approach. Therefore, the plan should be in line with decisions, resources allocation as well as alternative guide for growth. Amadi (1990) pointed out five principles that guide a good Mathematical knowledge plan as: The plan should be coherent with the user's interest and ability which will enable him to be committed in the business. The plan should take into cognizance available resources as a minimum step for setting out. Also, locality for the business, the utility of the product as well as alternative process foe replacement when there are acute challenges should be considered. It is therefore important to state here that the planner should also be the executor so as to transform the spirit of the vision into action for maximum self-employment.

Security Systems

Security is a tradable financial asset of any kind. Securities systems are broadly categorized into debt securities, equity security and derivatives security. Types of security include:

    i. Home/residential security system:- This includes locks, barred windows, fences, carbon monoxide detectors, exterior lightening, television monitoring, security guards.
    ii.Commercial security:- This include business internal debt, account injectures, card reader, automatic assess control button alarms.
    iii.Computer security:- Safety of information stored on computer, hardware security system
    iv.Fire alarms systems:- Smoke detectors, fire alert, fire extinguishers
    v.Personal Safety systems:-Personal alarms, self-defense sprays, child locators, assassination assault, kidnapping

The Role of Mathematics in Security Systems

There are different forms of security. We shall examine them under the headings: Financial security, household Security, food security, medical security, economic security and the role that Mathematics plays in each of them.

I. Financial Security

Financial Security involves financial instrument which is a tradable asset of any kind, either cash, evidence of an ownership interest in an entity or a contractual right to receive or deliver cash or another financial instrument. Financial securities will be grouped into Fraud, ATM, Banks, Personal financial Security

    a. Personal Financial Security:- This is the security relating to one's personal finance, First, Mathematics education under counting is used to weigh personal asset like fifty million naira (₦50 million). The day to day spending involves the use of Mathematics which will be called budget, like budgeting to spend two thousand naira daily meanwhile as the budget is posed, there will be a reduction in asset and equally the amount of money coming in as income/wages is also calculated.

b. Automated teller Machine (ATM):- The ATM is first of all constructed using cryptography. Cryptography is the study of hiding information for creating codes for ATM/ credit cards. The basis of cryptography is number theory in Mathematics. With ATM cards, all that is needed is a 4-digit code. Hence, the identification of numbers is essential for the easy assessing of ATM cards. Hence, primary school pupils can as well asses ATM cards. With ATM card, a person asses to the world of opportunities of transactions, banking, money transfer, utility payment like electricity, water rates, revenue, tax, payment, cable television even recharging of telephones through this 4-number digit code.

c. Fraud security:- Fraud is a deception deliberately practiced in order to secure unfair or unlawful gain. Defrauding people or organization of money or valuable is the usual purpose of fraud but it is sometimes instead involves obtaining benefits without actually depriving anyone of money or valuable such as obtaining a driver's license by way of false statement made in an application for same. For detection of fraud, predictive analytic or forensic analytic .Incidentally, committing fraud and detecting fraud required Mathematics education because for detecting fraud. Fraud is mostly valued in amount of money.

d. Bank:- Bank is an organization or a place that provides a financial service. Customers keep their money in the bank safely and it is paid out when needed by means of cheques, bank draft. Savings/assets in the bank is another form of security. In the bank, money are counted using numbers, bonds and assets are valued using numbers. Loans are given out based on simple interest rates or compound interest rates. Commission on transaction (COT) are charged on the money using interest rates. Algebra, the Mathematics of counting: addition, multiplication, division, subtraction is highly needed. Even individuals saving money in banks need to have this Mathematical knowledge, you can be sure you have not been surcharged unnecessarily when given bank statements.

e. Financial Mathematics (quantitative finance):- Financial Mathematics is a field of applied Mathematics concerned with financial market. Here, mathematical consistency is required. A financial Mathematician takes the share price as given in attempt to use stochastic calculus to obtain the corresponding value of derivatives of the stock. Mathematical finance focuses on application

II. Food security

Food security is a condition related to the ongoing availability of food. Household food security exists when all members at all times have access to enough food for an active healthy life. There has been an incessant food shortage the world over. Carletto, Zezza and Banerjee, (2013) identified the elements of a strategy built around a combination of short term fixes, and long term methodological advancements to reverse the existing trends of poor coordination and slow methodological innovation in food measurements and monitoring. Food security indicators are all derived from country's level household income and expenditure surveys to estimate per capital caloric availability several measures that have been developed by United state action on development (USAID) funded and nutrition technical assistance (FANTA) include:

a. Household food in security access scale (HFIAS)
b. Household dietary diversity scale (HDDS): measures the number of different food groups consumed over a specific reference period (24HRS/48HRS/7DAYS)

c. Household hunger scale (HHS): measures the experience of household food deprivation based on a set of predictable reaction based on a set of predictable reactions captured through a survey and summarized in a scale.

d. Coping strategies index (CSI): assess household behaviour and rates them based on asset of varied establishment behaviours on how households cope with food shortages .Methodology for this research is based on collecting data on a single question What do you do when you do not have enough food, and do not have enough money to buy food?''. Food security can be explicitly explained using percentages, rates, graph and numbering.

Source: FAO.
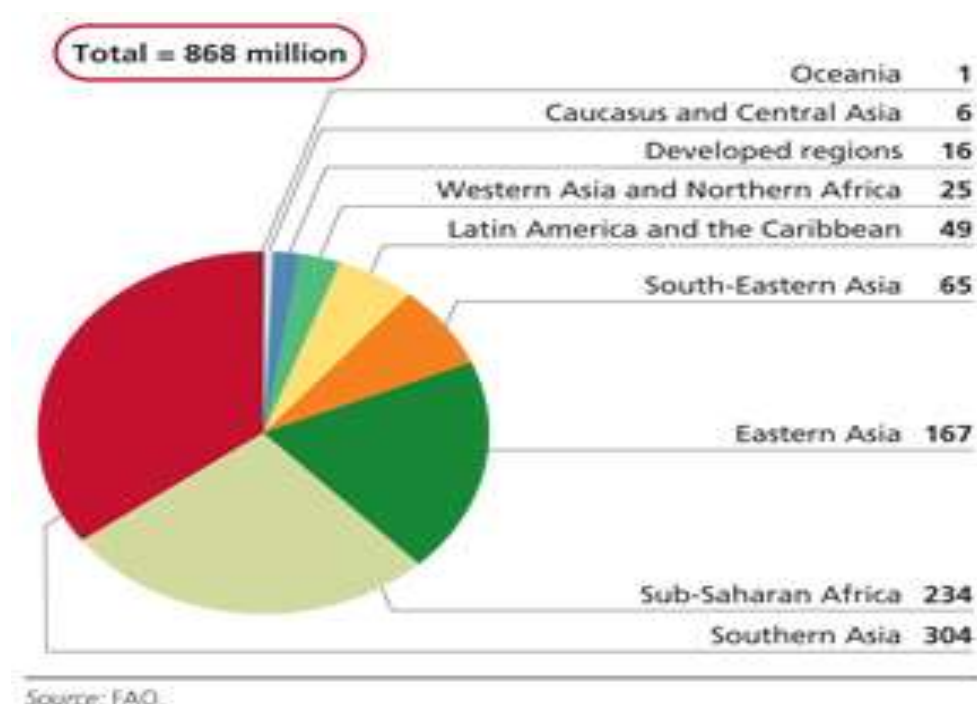
III. Economic Security

The economic indices of a country are the Gross domestic product (GDP), a primary indicator to gauge the health of a country is obtained using Mathematics

$$a.\text{GDP} = \frac{total\ naira\ value\ of\ all\ goods}{services\ provided\ over\ a\ specific\ time}$$

A negative GDP is a sign of recession which signify an unhealthy economy while a high GDP implies a healthy and booming economy. Other economic indicators that requires Mathematics education are

b.Human Capital Index which is a composite statistic of life expectancy, education, and income indices used to rank countries into four tiers of human development is obtained

$$\text{Life Expectancy Index (LEI)} = \frac{LE-20}{82.3-20}$$

$$\text{Education Index (EI)} = \frac{\sqrt{MYSI - EYSI}}{0.951}$$

$$\text{Mean Years of Schooling Index (MYSI)} = \frac{MYS}{13.2}$$

$$\text{Expected Years of Schooling Index (EYSI)} = \frac{EYS}{20.6}$$

$$\text{Income Index (II)} = \frac{In\,(GNIpc) - In\,(100)}{In\,(107.721) - In\,(100)}$$

Finally, the HDI is the geometric mean of the previous three normalized indices:

$$\text{HDI} = \sqrt[3]{LEI - EI - II}$$

where

LE is the Life expectancy at birth, MYS is Mean years of schooling (Years that a 25-year-old person or older has spent in schools)

EYS is Expected years of schooling (Years that a 5-year-old child will spend with his education in his whole life)

GNIpc is the Gross national income at purchasing power parity per capita .Ultimately, the aspects of ratio, percentages, ordinal counting ,and algebra of numbers are essential Mathematics to be able to interpret the economy of any nation

c. Inflation is calculated using Consumer Price Index CPI which is the change over time in prices of 740 goods. The inflation rate in Nigeria was recorded at 8.40 percent in June of 2013. Nigeria Inflation Rate averaged 10.56 Percent from 2006 until 2013, reaching an all-time high of 15.60 Percent in February of 2010 and a record low of 3.00 Percent in July of 2006 (National Bureau of Statistics, 2013). The formula for calculating the Inflation Rate looks like this:

$$\text{Inflation rate} = \frac{B - A}{A} \times 100$$

Where "A" is the Starting number and "B" is the ending number.

So, the aspect of ratio, fraction and percentages are needed to calculate Inflation. So if exactly one year ago the Consumer Price Index was 178 and today the CPI is 185, then the calculations would look like this:

$$\text{Inflation rate} = \frac{185 - 178}{178} \times 100 = \frac{7}{178} \times 100 = 0.0393 \times 100 = 3.93\,\%$$

which equals 3.93% inflation over the sample year (Abubakar and Wokocha, 2014)

IV. Safety Security

Safety is the state of being protected from danger and harm which involves, accidents, incidents. Accident is an unplanned, undesired event or chain of events that could lead to personal physical harm, property damage or business interruption. An incident is an event or chain of events which has, or could have caused injury or illness and or damage (loss) to people, asssets, the environment or reputation. Classes of incidents include nearmiss, dangerous occurrence, minor accident(s), and fatal occurrence. It is important to be safety

conscious, necessary to investigate and report accidents as a way to learning to prevent re-occurrence, establish / recognise the trend so as to improve performance and establish basis for possible compensation. This applies to employees, stake holders, investors, host communities or it could just be a public requirement to prevent legal implications which could run into millions of naira. Safety statistics can only be carried out through the use of Mathematics as is evident in the concepts in safety statistics which include :

  a. Exposure Man-hours:- Exposure Man-hours are the total number of hours worked, including overtime and training, but excluding leave, sickness and absence.
  b. Kilometres driven:- Kilometres driven refer to all 'work-related' kilometers travelled on land by all company-owned or managed vehicles.
  c. Lost time injuries (LTI):- Lost time injuries are the sum of injuries due to fatalities, permanent partial disabilities, permanent total disabilities and lost workday cases but exclude restricted work cases and medical case
  d. Total reportable cases (RTC):- TRC are the sum of lost time injuries, restricted work cases and medical treatment cases, excluding first aid cases and near misses.
  e. Lost Time injury frequency(LTIF): LTIF is the number of LTI recorded in every million man hours worked

$$\text{LTIF} = \frac{LTI}{Man\ hours} \times 10^6$$

  f. Total Reportable case frequency (TRCF):- This is the total number of reportable cases thet occur in every one million man-hours worked.

$$\text{TRCF} = \frac{TRC}{Man\ hours} \times 10^6$$

  g. Potentially serious injury frequency (PSIF):- This is the number of potentially serious incident cases that occur in every one million man-hours worked. It includes only incidents that have a potential rating of 3 and above and which have a consequence to human life.

$$\text{PSIF} = \frac{PSI}{Man\ hours} \times 10^6$$

  h. Road Traffic accident frequency (RTAF):- Road traffic accident is an incident which has involved and /or damage (loss) to people , assets, the environment or the company's reputation. RTAF is the number of road traffic accidents that occur in every one million kilometres driven.

$$\text{RTA} = \frac{RTA}{Number\ of\ kilometres\ driven} \times 10^6$$

i.Total reportable occupational illness frequency (TROIF) :- The total reportable occupational illness frequency is the number of occupational illness per million exposure hours. Benefits of safety statistics security include performance monitoring at a glance, target setting following trends, budget planning input into CEQRS and other relevant safety reports (NISP,2012)

V. Health Safety and Environments Risk Security

Risk is defined as a function of the probability of occurrence of an undesired event together with a measure of its adverse consequences. Risk analysis seeks to answer questions such as

how likely and how seriously can things go wrong? What is the potential loss or damage/ Or, what can go wrong? How likely is it? What are the impacts? Generally, risks associated with the hazards of activities include: Potential loss of life, asset, production, insurance; potential damage to health including injury and sickness, environment. All types usually manifest in serious financial and adverse consequences.

VI. Household Security

This is the form of security for the household. The most useful form of Mathematics needed in household security is measurement. Measurement is a reference value of a quantity used to express other values of the same quantity. Unit of measurement is the reference value of quantity to express size, length or amount of something by comparing it with a standard unit. There are different units of measurement used in security include fraction as can be used in measuring insecticide, pesticide, Time: ordinal measurements, length and height , capacity 500ml of sulphuric acid can be harmful to the body, distances : safe distance from fire incident, duration, speed and velocity while driving, area, volume, percentages.
Mathematical household tips are:
   a. Trim bushes to less than 3 feet to eliminate possible hiding places of criminals
   b. Trim tree canopies to at least 8 feet to allow visibility into your property
   c. Replace solid walls in front yards with open fencing to eliminate hiding places and to climbing of fence more difficult.

CONCLUSION AND RECOMMENDATIONS

With areas highlighted above, there is no doubt that Mathematics plays a major role in self-employment and in Security of individual and a nation in general. The training from skills acquired from learning Mathematics 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. Based on these, the following recommendations were made:

   i.   The teaching of the needed and required in each aspect of Mathematics should be intensified at all levels of Education
   ii.   Students and Individuals should be made to realise that Mathematics 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 security conscious.

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