



MATHEMATICS FOR ENTREPRENEURSHIP AND JOB CREATION IN NIGERIA

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Abstract

Unemployment remains one of the critical problems facing every nation today, including Nigeria. It is argued that curriculum implementers have not given sufficient attention to mathematics teaching and learning which is believed to provide a solution to the nagging problem. Mathematics is very important in many ways especially in the intellectual development of individuals and entrepreneurial skills. Economic growth and national development are the goals that most governments wish for their citizenry; entrepreneurial education should therefore be encouraged and supported to the highest levels. This could only be done when the study of mathematics which provides the pre-requisite skills needed for entrepreneurship is given the support it deserves. The writers were of the view that government should design larger and more realistic programs for job creation. They opined that the acquisition of entrepreneurial skills are the basic tool for molding employable individuals as they need skills to find new jobs. They looked at some of the aspects of mathematics needed for entrepreneurship which include; Mathematical laboratory practical, games and simulation, binomial theorem, algebra, regression analysis and so on. Recommendations were proffered, such as; encouraging mathematics teachers by organizing workshops and seminars to inculcate the right type of skills for self-reliance, jobs, encouraging the teaching of entrepreneurship education in schools, advocating problem-based learning and laboratory practical-based learning in the teaching and learning of mathematics and so on.

Keywords: Mathematics, Entrepreneurship, Job creation, Nigeria

Introduction

According to the World Bank Statistics (Uka, 2015), unemployment has remained one of the most critical problems facing every nation today, including Nigeria. Nigeria has an estimated population of 170 million people. It is endowed with solid minerals; oil and gas and a sizeable educated and skilled workforce. In spite of these, Nigeria has not been able to harness its blessing to progress the economy sufficiently to improve the welfare of its citizenry. She maintained that the unemployment rate among the youths is over 38 percent, with secondary

school graduates accounting for about half of the figure, while the rest was university and polytechnic graduates. It is a known fact that unemployment and poverty are the most critical problems ravaging many sub-Saharan African counties in recent times now. They are cankerworm that has eaten deep into the fabrics of many counties in Africa including Nigeria. Nigeria is often referred to as the giant of Africa by her citizens, but has not really been able to show dominance in many of the metrics used in comparing nations. The prevalence of corruption of both the public and private sectors, coupled with lack of adequate commitment and dedication as well as unwillingness of Nigerians to make sacrifices has made things worse. Every year Nigeria is turning out graduates who are without necessary skills and traits to secure jobs to be self-reliant. This may not be unconnected with the high premium accorded to the oil sector to the neglect of other sectors of the economy like agriculture and other solid minerals in the country (Uka, 2015). No wonder the present administration advocates for agriculture as an alternative to oil which has in recent times made Nigeria a mono economy.

However, if the rates as which unemployable graduates are turned out in this country every year are not properly checked, it will eventually lead to more of them recruited into the rank of militants and avengers, kidnappers, Boko Harams and armed bandits. One may ask whether the problem is with the curriculum or the implementers. The obvious truth is that the curriculum implementers have not given adequate attention to the subject (mathematics) that gives proper solution to the problem. Uka (2015) pointed out that the Nigeria government had made efforts to create jobs. Programmes such as the Youth Empowerment Scheme (YES) and the Youth Enterprise with Innovation (YOU-WIN) have only given a scratch on the surface of unemployment. She was of the view that government should design larger and more realistic program for job creation. It is also worthy of mention that the acquisition of entrepreneurial skills (entrepreneurship education) has been identified as the basic tool for molding employable individuals as unemployed individuals need more skills than they already have to find new jobs. These entrepreneurial skills cannot be efficiently acquired without effective mathematical knowledge and skills such as: manipulative skills, associative skills, distributive skills numeracy skills, and present value skills.

However, Mathematics is a world of wonder a place where with only a few numbers and points at our command, the most amazing formulas and geometric figures appear as out of a magician's hat. Mathematics is a tool – a servant to our needs. It is needed in all facets of life. It has its own logic that is, a way of thinking by applying this way of thinking and reasoning to numbers and to space, we can come up with ideas and conclusions that only the human

mind can develop these ideas often lead us to the hidden secrets of the ways in which nature works. It is in line with these hidden secrets of mathematics that an attempt is being made to develop entrepreneurship and job opportunity through mathematics.

The concept of Entrepreneurship Education

The creation of a nation's wealth and dynamism depends upon the competitiveness of its business and this, in turn, relies fundamentally on the capabilities of its entrepreneurs. The essence of the modern organizations or business lies in the specialization of functions. The businessmen manage the economic activity of the firm whereas the entrepreneur without participating significantly in terms of capital controls the firm. He supervises the process of combining resources and efficiently manages the firm's portfolio (Leiberstein, 1979).

Moreover the entrepreneurial function implies the discovery, assessment and exploitation of opportunities, in other words, new products, services or production process, new strategies and organization forms new markets for products and inputs that did not previously exist (Shane and Venkataraman, 2000) Entrepreneurship however is a process that provides learners knowledge, skill and motivation thereby encouraging entrepreneurial success in different lifelong learning setting (Onyeagwu, 2013). He further asserts that, the focus of entrepreneurship learning process is to develop understanding and capacity for pursuit of entrepreneurial behavior, skills and attributes in different contexts. Mansor and Othman (2011) identified the entrepreneurial skills as one of the long term strategies assisting in curbing unemployment, transforming mathematics education curriculum to produce job creators not job seekers among mathematics graduates in the country. This means that entrepreneurship education is a process whereby the mathematics skills are inculcated in our undergraduates in the country.

However, entrepreneurship is the willingness and ability of an individual to seek for investment opportunities to establish and to run an enterprise successfully. Also in entrepreneurial spirit is a pre-requisite to an entrepreneurial society and culture. It is generally believed that an entrepreneurial attribute is essential to a successful enterprise.

Moreover, entrepreneurship is often discussed under the title of the entrepreneurial factor, the entrepreneurial function, entrepreneurial behavior often referred to as the entrepreneurial "spirit". Entrepreneurial factor is a new factor in production apart from land labour and capital which must be explained through remuneration via income for the entrepreneur along with the shortage of people with entrepreneurial capabilities. An entrepreneurial function refers to the discovery and exploitation of opportunities, or to creation of enterprise, while entrepreneurial behavior is the behavior that emerges to combine innovation, risk taking and

proactiveness (Miller, 1993). This means that entrepreneurial spirit emphasizes exploitation, search and innovation, as opposed to the exploitation of business opportunities pertaining to managers. One can rightly understand from the explanations that entrepreneurship is attributable to identification and assessment of opportunities, the decisions to exploit, obtain resources and the development of the strategy and organization of the new project.

In another development, economic growth and national development are the goals that most government wishes for their citizenry, entrepreneurial education should therefore be encouraged and supported to the highest levels. This could not be achieved as expected without the corresponding support from the study of mathematics which provides the prerequisite skills needed for entrepreneurship. It is therefore necessary to expose some of the aspects of mathematics needed for entrepreneurship.

Mathematics Education and job creation

Mathematics as a subject is very essential for the development of any society. No wonder it is presented as a compulsory subject for learners in both primary and secondary school and also a pre-requisite for gaining admission to tertiary institutions. At the tertiary levels, it is taught so as to produce graduates who are highly skilled to make positive impact on the society (Adeyemo, 2011).

The National policy on Education (FRN, 2004) states the broad aims of secondary education as:

- i.** Preparation for useful living in the society
- ii.** Preparation for higher education

In specific terms, the secondary school should

Diversify its curriculum to cater for the differences in talents, opportunities and roles possessed by or open to students after their secondary school course

Equip students to live effectively in our modern age of science and technology

Raise a generation of people who can think for themselves, respect the views and feelings of others, respect the dignity of labour, and appreciate these values specified under our broad national aims, and live as good citizens

Inspire its students with a desire for achievement and self-improvement both at school and in later life. (Obodo, 1997 in Uka, 2015)

The main aim of senior secondary education as enshrined in the national policy on education is to ensure that every student on leaving school is well prepared for higher education as well as acquired relevant functional trade! entrepreneurship skill capable of preparing him/her for

useful living. The curriculum focuses on value re-orientation, job creation, wealth generation and poverty alleviation.

The new senior secondary curriculum has the following subjects as compulsory, which include; English language, General mathematics, and one trade/entrepreneurship subject. The general objectives for mathematics education among others include;

- i. To generate interest in mathematics and to provide a solid foundation for everyday living.
- ii. To develop computational skills -.
- iii. To foster the desire and ability to be accurate to a degree relevant to the problem at hand
- iv. To develop precise, logical and abstract thinking
- v. To develop the ability to recognize problems and to solve them with related mathematical knowledge
- vi. To provide necessary mathematical background for further education.
- vii. To stimulate and encourage creativity (Obodo, 1997 in Uka 2015)

It is opined by Sidu (2006) in Uka (2015) that the aim of learning mathematics is not only for knowledge and understanding objectives, it includes Skill Application, Attitude, Appreciation and Interest Objectives of which among other things, the learner.

- i. Acquires and develops skill in the use and understanding of mathematics,
- ii. Learns and develops technique of problem solving,
- iii. Develops the ability to apply mathematics in his future vocational life,
- iv. Develops the habit of systematic thinking and objective reasoning,
- v. Develops self-confidence for solving mathematical/other problems,
- vi. Shows originality and creativity
- vii. Develops, appreciate skill in drawing, reading, ' interpreting graphs and statistical tables,
- viii. Develops skill in measuring, weighing and surveying

There are some traits or attitudes which mathematically minded people or learners possess. This means that if a student acquires mathematics efficiently, these traits will be embedded in him. The traits among others are; persistence, self- confident and patient, inquisitive, thorough, competent, risk-taker, resourceful, rationalization of every act,' optimistic process, determined, very hardworking, resilience (Bolaji, 2002; Erukoha, 2002; Eshiet, 2002). The mentioned traits and skills will help mathematics minded graduate to develop centers for the production of Mathematics teaching resources; production of materials for mathematical games and so on.

Problem-based learning and experimental learning methods

Entrepreneurship mathematics education needs different teaching instruction like problem solving. Problem solving is a technique that comprises of identifying and choosing mathematical problems which grow out of the experiences of individual students, placing these problems before the students and guiding them in their solutions. It follows the steps of scientific method as well as those of reflective thinking. The teaching should emphasize more on the areas that are work related learning, action learning and entrepreneurial training. It should be more of learning to combine experience, skills and knowledge acquired from mathematics to prepare one for new venture ahead in the long run it will be capable of creating a new mindset in our undergraduates towards job seekers. This means that practical mathematics should be able to encourage students to build positive attitude towards entrepreneurial skills of establishing their own business ventures on graduation to become self-reliant and employer of labour.

Laboratory practical based learning

Entrepreneurship education is best acquired in the mathematics laboratory. According to Obodo (2004), laboratory practical based learning is an activity In mathematics teaching and learning carried out by a student or teacher so as to make personal observation of processes, product or event. He observed that the approach is a means of practical zing one or more of the cognitive and psychomotor skills. These include the ability to construct, measure, arrange, observe, classify and interpret data. This practical approach of teaching mathematics makes it imperative for the students to learn mathematics skills needed to equip one for lifelong problems ahead. One can infer from these that mathematical laboratory practical expose one to be enterprising and practical oriented to achieve success in life.

Games and simulation

Games and simulation play great role in instilling in learning social traits such as corporation, planning and strategy, interpersonal skills, self-confidence and discipline. For instance, Salman (2003) rightly observed that, games often require prerequisite skills on the part of the participants. It was explained further that, there are some games that can be used in the introductory stage of instruction, because they develop the skills as the activities proceed, such games include Ludo game. Mathematically related games can help teachers and students connect mathematical concepts to a positive real-life environment Itwasfui4her-4educed that all games require problem-solving and mathematical reasoning which enhances entrepreneurial skills. Simulation can be seen as approximating real life scenario in the classroom inform of role play. It actually includes scripted representation that enable learner

to closely experience real-life event in the classroom. Ezeamenyi (2014) opined that both games and simulation are characterized by rules and their performance allows strategies to be developed. This means that games and simulation involvement in the teaching of mathematics are important for individual economic empowerment particularly in improving the quality and quantity of future entrepreneurs.

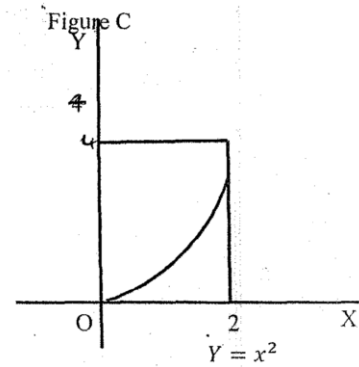
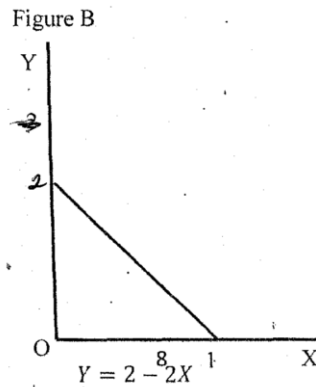
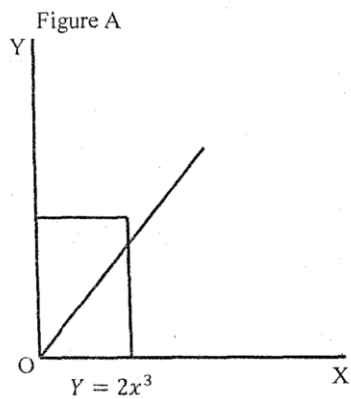
Binomial Theorem in Entrepreneurship

Binomial theorem as an aspect of mathematics is an important tool in the nation's economic prediction. Entrepreneurship use binomial theorem to count probabilities that depends on numerous and very distributed variables to predict the way the economy of their business will behave in the next few years; to be able to come up with realistic predictions. It will help entrepreneurs to calculate market situation in the production of goods and services and taking into consideration, the basic lays of demands and supply in economic situation. The architectures make use of it in the design of infrastructure. It enables engineers to calculate the magnitude of the projects and thus delivering accurate estimates of not only the cost but also some required to construct them. it is also a veritable tool that is applied to entrepreneurship in ensuring the costing project is competent enough to deliver profits.

Algebra in management of Accounting Firms

The application of algebraic methods is an element of many management accounting practices and techniques in entrepreneurship. Such methods may involve expressing the relationship between variables in the form of equations and carrying out calculations involving powers and roots. The technique concerns Chattered Institute of Management (CIMA) subjects which include fundamentals of business mathematics, business economics, performance operations and performance management. One feature characteristics that runs through areas of management accounting is the identification of relationship between variables and the expression of these relationships in the form of simple mathematical models which can be used as a guide to both decision making and control. The model indicates the idea that marginal cost per unit declines as output increase which can be incorporated within a "Learning Curve" model.

The following graphs below provide simple examples of the kind of algebra that is involved.



In the figures A, B and C, the two variables X and Y are relationships we wish to model. In figure A for example, an increase in X is associated with the corresponding increase in Y and vice versa. This model can be used as a decision support tool in business. A case study may be in the sales of juice drinks. If the price of the drink is reduced the consumption rate will increase etc. An entrepreneur who is well grounded in mathematics may as well do better in business because he had the knowledge of computation and operations in mathematics (addition, subtraction, multiplication, and division) these are the chief skills to be developed by individuals in order to do well in buying and selling. Agbo-Egwu, Abakpa and Adikwu (2013) were of the view that competence in mathematics helps entrepreneur to determine the sort of articles and size of each article to stock. They maintained that knowledge of mathematics assists entrepreneurs to decide on the source of purchase while thinking of minimizing costs and maximizing profits.

Application of Regression Analysis in Entrepreneurship

Regression is a statistical tool to understand and quantify the relation between variables in the business. It ranges from simple models to complex equations. It is used primarily in business in forecasting and optimization in addition to helping entrepreneurs predict future manufacturing and delivery process.

Regression analysis is the estimation of the ratio between variables, for instance, if one wants to estimate the growth in food sales (FS Growth), based on economic growth (GDP Growth). If the previous data indicates that the growth in food sales is double the growth in economy, the regression would look as follows;

$$\text{FS Growth} = (\text{GDP Growth}) \times 2.$$

The most common use of regression in entrepreneurship is to predict events that have yet to occur. For instance in most cases, demand analysis predicts how many units consumers will purchase at a time. Insurance companies also rely heavily on regression analysis to estimate

how many policy holders will be involved in accidents. Another use of regression which is an aspect of mathematics is in the optimization of business process.

Combinatory: This is an aspect of mathematics that involves counting of numbers. Every entrepreneur needs to know how to count numbers as his business depends largely on counting and conversion of numbers and units. He needs to know the quantities of goods supplied to him. He needs also to know the skills involved in the conversion of units as it necessary in his business.

Mathematical Theory and Equations

The mathematical theory known as Maxwell’s equation is used in building industries that enhances job creation by entrepreneurs. By the help of the equation, one can sit at home and watch live matches played in London kilometers away. James Clerk Maxwell, while studying the behavior of electricity and magnetism, found that electrical disturbances travel through space as waves, move with the speed of light. The theory was later proved by a German scientist, Hertz by sending messages at end of the room and receiving them at the other end. This was the beginning of radio. This is how radio and television was manufactured. There are some entrepreneurs that own radio and or television stations which give jobs to people. These equations show how useful a mathematical theory can be. A few mathematical equations written on paper led to a great industry that gives jobs to hundreds of thousands of people, and serves millions of people who own radio television set s. At home, or in the workshop, or in the laboratory, mathematics is a tool that helps us every day. Mathematics, therefore, is a tool that helps an entrepreneur to achieve this fact. Maxwell found out that. he could sum up the behaviours of electricity and magnetism in these four equations below:

$$\Delta \times \mathcal{E} = \frac{\partial B}{\partial t} \dots \dots \text{Farada's law} \dots \dots \dots i$$

$$\Delta \cdot D = \rho \dots \dots \text{Gauss Law of electricity} \dots \dots \dots ii$$

$$\Delta \cdot B = 0 \dots \dots \text{Gauss law of magnetism} \dots \dots \dots iii$$

$$\Delta \times H = j_c + \frac{\partial D}{\partial t} \dots \dots \text{Ampere's law} \dots \dots \dots iv$$

Conclusion

In concluding, therefore, the authors believe that with mathematical knowledge and skills at the school level of mathematics teaching and learning the quest for entrepreneurship development and job creation will be guaranteed. A mathematical skill enhances significantly creativity in all human endeavours especial in business development. It therefore believe the

federal Ministries, Department and Agencies (MDA) in charge of economic planning, labour and productivity to start the entrepreneurship and reemployment development by first of all encouraging financially the development of mathematics from primary school level to the tertiary level.

Recommendations

1. All the three tiers of government should encourage mathematics teachers by organizing workshops and seminars-so as to inculcate the right type of skills necessary for self-reliant jobs.
2. Government and the stake holders in mathematics education should encourage the teaching of entrepreneurship education in our schools.
3. Problem based learning and laboratory practical based learning should be advocated in teaching and learning of mathematics which makes it imperative for the students to learn mathematical skills needed to equip one for lifelong problems ahead.

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