

Relevance of Mathematics Education in the Attainment of Entrepreneurial Skills for National Development

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Abstract

This article reviews the role of mathematics education in the attainment of entrepreneurial skills for national development. It discusses mathematics education, entrepreneurship education and who an entrepreneur is. It also gives highlights on the qualities of a good entrepreneur. Recommendations are made among others that mathematics education should be practical oriented to arouse students's interest. Government should sponsor mathematics teachers to conferences and workshops to upgrade their knowledge in modern instructional techniques and should also provide startup funds for graduates to go into business for self-reliance, job creation, and national development to be achieved.

Keywords: Mathematics, education, entrepreneurial, skills, national, development

Introduction

About three or more decades ago, the possession of certificate was a guarantee for employment of graduates for white collar jobs; but this has reduced drastically. There is a need for change in perception about employment. Graduates and school leavers should devise ways of earning their living, so as to cater for themselves and families and to reduce the poverty level of the country. One way to resolve this problem is through self-employment which is invariably entrepreneurship.

Entrepreneurship is the act of being an entrepreneur. Jone (2010) defined entrepreneurship as a dynamic process of vision, change and wealth creation that requires application of energy and passion towards the creation and implementation of new ideas and creative solution. According to Bloomberg (2010), no one can succeed in life's endeavours in general and entrepreneurship in particular through sheer luck, except through creative ideas, extensive research work, plenty trials, identifying

problems accurately, having good managerial ideas and consistent persistence of efforts. All these and more that make entrepreneurship activities a success can be provided through the knowledge of mathematics. Hytho (2015) posits that the mathematics which students learn in school is applied in real-life situations and in daily activities. The contents of mathematics curriculum at all levels of education, if well implemented in the classroom inculcate knowledge, attitude, skills and values which help learners in any entrepreneurial skill development.

One of the goals of education in Nigeria as stated in the National Policy on Education (FRN, 2004) is the acquisition of appropriate skills and the development of mental, physical and social abilities and competencies as a tool for individual to live in and contribute to the development of the society. Therefore, the attainment of entrepreneurial skills in youths through mathematics education for job creation is no doubt a task worth embarking on, to be self-employed, self-reliant and to become a successful entrepreneur (Gimba, Hassan, Abdurahman & Bashir, 2015).

Who is an entrepreneur?

An entrepreneur is literally seen as a person who sets up a business, taking on financial risk with the hope of making profit. Ogbo (2012) viewed an entrepreneur as any individual who creates valuable ideas, which are put into practice to support economic development and job creation. In the same vein, Francis (2016) defined an entrepreneur as a person who identifies and solves problems; he is creative, innovative, opportunist, risk taker, self-starter and open minded. Hornby (2007) considered an entrepreneur as an individual who organizes and manages a business, undertakes and assumes risk with the aim of making profit.

According to Uverueh, Omole and Omorah (2016), an entrepreneur is a risk taker and an individual who braves uncertainty, strives on his own and through devotion to duty creates a business and industrial activity where none existed. Days have gone when individuals waited for white collar jobs; ability to create one is of paramount importance for national development. Entrepreneurs can change the way people live and work. If successful, their revolutions may upgrade people's standards of living. Entrepreneurs also create job opportunities for the unemployed.

Ogbo (2012) considered the following as qualities of a good entrepreneur:

- i. Disciplined, confident and humble: An entrepreneur should be humble and transparent. He or she should also be disciplined, as it is a tool for maintaining peace and order in any organization.
- ii. Open-minded and friendly relationship: To be a good entrepreneur, the person should exhibit friendly relationship with the employees and everyone around.

iii. Creativity and innovativeness: Every entrepreneur should be creative in terms of generating new ideas, new market strategies, programmes, identifying the latest method of production and bringing up alternative packages. He should also be ready to take risk.

iv. Responsible: He should be responsible in taking full control of the resources to ensure that they are not wasted.

v. Intelligence: A good entrepreneur should possess high level of intelligence so as to identify viable investment opportunities and to source for funds to pursue such projects.

vi. Pace-setter: A good entrepreneur maintains the lead in most competitive situations and proffer help to others in trouble.

vii. Honesty: A good entrepreneur should be honest and this will strengthen the faith, trust and confidence of others who have been dealing with him and take him to greater heights.

viii. Energy and drive: Every entrepreneur should possess high level of energy so as to be able to carry out various functions of the business effectively as required.

Entrepreneurship Education

Ibe (2013) viewed entrepreneurship as the process of creating something different with value by devoting the necessary time and effort, assuming the accompanying financial, psychological and social risk and receiving the resulting rewards of monetary and personal satisfaction. According to Watson (2006), the factors that set entrepreneurs apart include innovation, opportunities' recognition, progress and growth in business, employment strategies and management practice in business.

Entrepreneurship education is an aspect of education that equips an individual with the mindset to undertake the risk of venturing into something new by applying knowledge and skills acquired in school. Entrepreneurship education builds in students the necessary skills for self-reliance. These skills could include resilience, focus, creativity, problem solving, and concentration, management of resources, goal setting and decision making, to mention but a few.

Venkataraman (2010) considered entrepreneurship as any activity that involves discovering, evaluation and exploitation of opportunities to introduce new goods and services, way of organizing and processing of raw materials and marketing the products in new and different ways that have not existed before.

In Nigeria, entrepreneurship education seeks to equip students in tertiary institutions with the knowledge, skills and motivation to encourage entrepreneurial success in different areas of ventures. Ekong and Williams (2016) posit that the aim of

entrepreneurship education is to develop the intellectual and non-intellectual abilities of the child, rather than filling the child with facts that are easily forgotten. The researchers also added that the purpose of this education is for learners to acquire the skills of understanding life situations, adapting to it, acting to influence it and contributing to development through useful employment.

Entrepreneurship education is then, a means of fostering creativity in technical and vocational education programmes with the aims of:

1. Making technical and vocational education an integral part of education for all.
2. Ensuring that training in specialized technical and vocational skills is made on a sound general education.
3. Ensuring that all genders are exposed to technical and vocational education.
4. Encouraging as much versatility as possible in learners, which reflects the dynamic nature of the world of works?
5. Exploring methods and strategies of making technical and vocational education affordable and encouraging the non-formal apprenticeship system.

Gimba et al (2015) opined that entrepreneurship education is an instrument that empowers youths to be in control of their future. He further enumerated the relevance of entrepreneurship education to include:

1. Development role: Entrepreneurship education helps to develop in both teachers and students the occupational knowledge, job skills and work experiences.
2. Skills acquisition: It will help students to establish bases for knowledge about the functions and operations of a business and develop some level of familiarity and comfort with the business environment such as technological change and the micro enterprise.
3. Creation of employment: It will offer opportunities to students for job experiences and for earning, saving and investing money at an earlier stage of life than their peers and also enhancing their abilities and sense of self-worth.
4. Minimizing unemployment and crime rate: There will be a minimal rate of unemployment and crime in the society. Self-employment and ownership of business will be viable for the aspiration of youths in the 21st century and beyond.

National development

Bownan (2010) viewed national development as the total effect of all citizens' forces and addition to the stock of physical, human resources, knowledge and skills. National development is a very comprehensive term that connotes all aspects of the life of an individual and the nation. It is also seen as growth plus change. This change can either be social, cultural, economic, qualitative or quantitative.

Mathematics education

Mathematics is everywhere and every activity is mathematics. Onyeachu (2006) opined that mathematics is a model for thinking, developing scientific situation, drawing conclusions as well as solving problems in a real life context. A study by Uka (2015) has shown that a positive relationship exists between problem solving and entrepreneurship education. Problem solving is an aspect of mathematics itself, just as creativity is an aspect of entrepreneurship. Hence there exists a connection between the variables.

Mathematics is the gate and key to developing entrepreneurship skills. Therefore, mathematics educators need to properly educate trainee teachers on how to effectively teach this subject, as this would serve as a springboard for the students who are prepared for self-sustenance in life. Mathematics is integral to everything about life (Eze, 2009). Every occupation which students may choose to pursue and much of every day's life are full of opportunities and the need to apply mathematics. Mathematics gives extra power of thinking and creative minds. This is why Adewumi and Adu (2012) noted that mathematics is made up of two dimensions as listed below:

- i. Mathematics knowledge: About what works and how things could be made.
- ii. Mathematics techniques/skills: These are the application of these knowledge to processes and tools for daily living.

Mathematics education is referred to as the practice of teaching and learning of mathematics in a way of solving problems which involves learning the algorithms and formulae necessary for computations. It is the system that encompasses aspects of teaching, learning and assessing mathematics.

The Role of Mathematics education in the attainment of entrepreneurial skills

Hassan (2013) posits that mathematics as a subject is now universally recognized and accepted as indispensable to self-reliance and sustainability of every nation's economy, because of its functional utility. Kurumeh and Igyu (2015) were of the view that with mathematics, especially coupled with the advent of the super processing computers, significant advancements are realized in science, technology and arts. The application of mathematics within the context of socio-cultural environment of man produces harmony, order and peace. It also provides beauty in man's physical environment. It will be difficult to imagine other disciplines such as land surveying, accountancy, engineering, natural and applied sciences, quantity surveying, banking & finance, architecture and so on give service to humanity without the use of mathematics.

Mathematics education plays vital role as teachers are taught on how to present mathematical topics in the most simple and understandable form to learners. For

example, the proper teaching of geometrical shapes to learners helps the students that may learn tailoring in forming pattern on clothes. Drawing and cutting of trousers and arm hole of shirts or blouses need the proper knowledge of perpendicular angles. Fashion designers also need the proper knowledge of arithmetic, like the division of the clothe measurement into halves, quarter and so on. It will also help entrepreneurs who are into painting and drawing to properly measure where different colours are to be painted or drawn in a given area. The proper teaching and learning of arithmetic, ratios and percentages will help learners who may wish to go into small or large scale businesses to properly calculate the cost of production, interest, percentage discount among others. The carpenters, if properly taught and have learnt arithmetic and construction of angles in geometry, will find it easier in the production of furniture. Students learning hair dressing and barbing in the entrepreneurship education will also find this section very interesting. Farmers are not left out and other entrepreneurial skills.

Since entrepreneurship is about creativity and innovation, mathematics plays a significant role in its development. Therefore, venturing into a new business requires a careful appraisal to measure the viability of such venture of which the appraisal requires mathematical technique (Abubakar, 2010). While undergoing feasibility and viability appraisal, mathematics skills are required to put in place the projected cash flow budget, projected statement of income expenditure and so on. The gradual planning process and decision making on what will be done in the future requires a good deal of mathematics. For instance, the knowledge required for quantity production in any business should involve mathematics.

According to Malik and Malik (2016), various functions of an entrepreneur and the role of mathematics in developing these entrepreneurial skills include:

- i. The selection of a conducive environment bearing in mind the proper cost of transportation, supply of raw materials for which the entrepreneur needs to have thoroughly learnt arithmetic/calculations.
- ii. Calculations involving cost of transportation of finished products to the area where products are likely to be sold need proper knowledge of arithmetic.
- iii. The entrepreneur needs to work out the cost of production which requires the sound knowledge of calculations.
- iv. An entrepreneur needs to have mathematical knowledge to be able to plan and work out business activities effectively.
- v. Knowledge of mathematics will help an entrepreneur to preserve his financial resources effectively and utilize available financial resources to meet all his needs.
- vi. This mathematical knowledge, if properly learnt in school, will help an entrepreneur to calculate the gains and losses to know if the business is growing or not.

vii. Some areas of mathematics like percentages, decimal, fraction will enable an entrepreneur to manage business operations effectively.

It was observed by Nnenna (2015) that mathematics can contribute to the realization of the general aims of education among others by:

1. Developing habits of effective critical thinking and computational skills.
2. Developing the ability to recognize problems and solve them with related mathematical knowledge.
3. Stimulating and encouraging creativity, preciseness, logical and abstract thinking.
4. Developing the habit of systematic thinking, reasoning objectively, drawing of conclusions, generalizations and drawing of inferences.

There are some traits/skills/behaviour which are expected of one to acquire if one has to be a successful entrepreneur. These skills among others include problem solving skills, decision making skills, innovative skills, computational and analytical skills, managerial skills (ability to manage time, financial resources and people successfully), communicative skills (ability to sell ideas and persuade others). A critical look at the objectives of studying mathematics and attitudinal traits of mathematics minded people, makes it almost obvious that the entrepreneurial skills listed above are embedded in mathematics.

Conclusion

The knowledge of mathematical skills is the foundation on which entrepreneurial education can stand and which is required for self-reliance, self-sufficiency and self-actualization. Mathematics therefore should not be seen as only computational or reasoning skills, but also as problem solving and more so, as a necessary ingredient in the preparation and production of successful entrepreneurs. This means that mathematics education remains significant for entrepreneurship skills and job creation to Nigerian youths, as learners are properly taught mathematics at various levels of education with the most appropriate teaching strategy to enhance effective comprehension of the subject.

Entrepreneurship education has contributed a lot to national development in that it can revive the economy of the nation, improve the standard of living of people everywhere, develop indigenous technological base, reduce rural-urban migration and create employment opportunities.

Recommendations

- i. Basic mathematics skills and rules necessary for effective communication and problem solving in enhancing successful managerial positions for entrepreneurship education should be thoroughly taught in schools.
- ii. Mathematics curriculum planners should emphasize apprenticeship and entrepreneurship training, which will prepare the products of such curriculum to think creatively and transform knowledge through technological processes into wealth generating ventures.
- iii. Teachers of mathematics should encourage group and practical activities that will enhance development of leadership, communicative and manipulative skills necessary for entrepreneurial skills and to boost learners' interest in the subject.
- iv. Government at all levels should provide start up funds for graduates who have acquired entrepreneurial and mathematics skills to enable them set up businesses.
- v. Government should sponsor mathematics teachers to conferences, workshops and seminars to upgrade their knowledge in modern instructional techniques/skills that will enhance students' learning in entrepreneurial skills and development.
- vi. Government should intensify efforts in sponsoring youths in entrepreneurial skills to make them self-reliant and employers of labour.

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