

## Relevance of Mathematics Education to Entrepreneurship Skills Acquisition towards the Realization of Vision 20:2020

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### Abstract

*Over the years, Nigeria has been clamoring to be self reliance, self sufficient and self actualization. In realizing this desired dream, the country came up with vision 2020, which is to make Nigeria one of the 20 top economy nations in the world. To achieve this goal there is need for entrepreneurship education. One major ingredient of such education is mathematics. The study sought to find out the relevance of mathematics to entrepreneurship skills acquisition. The data consisted of 200 pre – service teachers selected from three colleges of Education in Lagos, Nigeria. The instrument used was twenty – four item questionnaires on the entrepreneurship skills acquisition. The results showed that the knowledge of mathematics could positively influence the computational skill, problem solving skill, innovative skill, analytical skill, decision making skill and creative skill of the subjects for successful entrepreneurship activities but the subjects could not see the relevance of mathematics to managerial skill, though, mathematics is an effective way of communicating managerial ideas. Furthermore, there was significant difference in the opinion of pre-service teachers towards the relevance of mathematics to entrepreneurship development based on gender. However, the school type did not have significant effect on the opinion of pre-service teachers.*

### 1. Introduction

In the last two decades, one of the problems facing Nigeria and many other developing nations has been that of unemployment. Majority of College leavers and university graduates are jobless. This perhaps may be because of over dependence on government jobs or white collar jobs. In the country today, graduates cannot create jobs; they strive to be employees of labour rather than being employers in their various fields. The problem keeps crying for solutions and government feels that something must be done to get out of the waterloo and so one of the measures put in place by the federal government of Nigeria is to mandate organizations like Administrative Staff College of Nigeria (ASCON), Centre for Management (CMD) and National Directorate of Employment (NDE) to engage themselves in training the youths as entrepreneurs

and also encourages colleges, polytechnics, and universities to include the teaching of entrepreneurship in their curriculum.

### 2. What is Entrepreneurship?

Entrepreneurship is the act of being an entrepreneur. According to the World Bank, entrepreneurs are people who perceive profitable opportunities and willing to take risks in pursuing them and have the ability to organize business. According to the Longman dictionary an entrepreneur is someone who starts a new business or arranges business deals in order to make money. [1] Sees entrepreneurship as the activity of the entrepreneur involving three main parts, which are generating business ideas which involves formation and formulation of goals, organization of cases which includes effective ways of enforcing such goals, and enforcement of such cases which could involve generating the choice of activities. of course, no one can succeed in life endeavours in general and in entrepreneurship in particular through sheer luck except through creative ideas, extensive research work, plenty of trials, doggedness, innovative ideas, precise decision making, accurate problem solving 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.

Mathematics is more than just the science of numbers taught by teachers in schools and either enjoyed or feared by many students. It plays a significant role in the lives of individuals towards the development of any society [6]. This became necessary because we rely on mathematics to solve our daily problems [6]. Also mathematics is crucial for many careers and job opportunities in today's increasing technological society as pointed out by [3]. The importance of this indispensable subject to individuals, artisans, traders, school subjects, economic activities, politics development, business advancement, technological knowhow, etc cannot be over-emphasized and this has been expressed in several research efforts such as [7], [5], [3], [4] and [8]. Nigeria, like every other nation in the world, depends upon mathematics as one of the most important subjects that could help the nation meet her objectives for science and technological

advancement towards the realization of the vision 2020, which is to be one of the first 20 countries economy in the world, depends greatly on the success of entrepreneurship education, which depends greatly on the knowledge of mathematics for her success. Vision 20:2020 was conceived by President Musa Yar'Adua in year 2007, the aim was to shift attention from Oil sector to other sector such as agriculture, tourism, solid minerals, technology and industrialization among others in order to harness human and materials potential. It is towards the achieving of industrialization that education comes which is one of seven point agenda plan to support the vision and mathematics which is one of the compulsory subjects in primary and secondary schools in Nigeria has a role to play.

The questions now are: What are the perceptions of Pre – Service Teachers on basic mathematics skills towards entrepreneurship development in achieving Vision 20:2020? Can mathematics skills improve entrepreneurship activities in achieving Vision 20:2020? Can the knowledge of mathematics have positive effect on entrepreneur activities?

Answers to these questions will therefore, give insight into the usefulness of mathematics to entrepreneurship activities and also sensitize entrepreneurs the needs to acquire basic mathematics skills needed for successful entrepreneurship activities.

Specifically, the study sought to find out if mathematics could improve: computational skill; problem solving skill; innovative skill; analytical creativity skill; decision making skills and managerial skill of an entrepreneur.

### 3. Research Questions

The study sought to answer the following questions.

1. What are the perceptions of pre – service teachers on basic mathematics skills towards entrepreneurship development?
2. What are the perceptions of pre-service teachers on entrepreneurship development based on gender?
3. What are the perceptions of pre-service teachers on entrepreneurship development on school type?

### 4. Research Hypotheses

1. There is no significant difference in the opinion of pre-service teachers towards the relevance of mathematics to entrepreneurship development based on gender.
2. There is no significant difference in the opinion of pre-service teachers towards the relevance of mathematics to entrepreneurship development according to school types.

### 5. Research Method

The study is primarily a survey research.

The simple random sampling technique was employed to select two hundred college students from three Colleges of Education in Lagos state. The three Colleges have special attributes, that is, one is a College of Primary Education, one is College of Technical Education and the third one is a regular College. The College of Primary Educations trains teachers who teaches in primary schools. The College of technical Educations trains teachers who teaches technical subjects, while the regular College trains teachers who teaches basic one to nine in all school subjects. The instrument used for data collection is a twenty – four items self-constructed questionnaire administered and collated by the investigators. Each item has two options, agreed and disagreed. Scoring was done by awarding two marks to agree and zero mark to disagree for positively worded statements while scoring was in reverse order for negatively worded statements. The questionnaire was used in finding out if mathematics could enhance computational skill, problem solving skill, innovative skill, analytical skill, decision making skills, creativity skill and managerial skill of an entrepreneur. The questionnaire was given to two experts in mathematics education for face validity. The reliability coefficient of the instrument was computed to be 0.87 using Cronbach Coefficient alpha ( $\alpha$ ) method. Frequency count and simple percentage method used to answer the research questions, while t- test and analysis of variance were used to take decision about the hypotheses.

### 6. Results

Results are presented in the following tables.

Table 1 shows that 80% of college students believed that success in entrepreneur activities depends on the knowledge of mathematics. To collaborate this, 72% agreed that it is impossible to be a successful entrepreneur without the knowledge of mathematics.

Table 2 shows 71% agree that mathematics provides adequate tools in decision making of entrepreneur activities. Item 4 has the least percentage (19.5. %) where college students agreed that knowledge of mathematics does not enhance decision making skill of entrepreneur.

Table 3 shows that 76% agreed that mathematical skills acquisition brings innovation to entrepreneurship activities. Interestingly 85% agreed that the knowledge of mathematics helps to minimize challenges in entrepreneur activities.

Table 1. Responses of college students to problem solving skill

S/N	ITEM	AGREED	DISAGREED
1	Day to day problems arising in business transactions can be solved with relevant mathematical knowledge.	133 (66.5%)	67 (33.5%)
2	It is impossible to be a successful entrepreneur without the knowledge of mathematics.	144 (72%)	56 (28%)
3	Success in entrepreneur activities depends on the individual's critical thinking ability which is the fulcrum of entrepreneur activities.	161 (80.5%)	39 (19.5%)
4	Ability to think fast in arriving at a right decision will not enhance profit margin of an entrepreneur.	48 (24%)	152 (76%)

Source. Field Survey 2015

Table 2: Responses of college students to decision making skill on entrepreneurship

S/N	ITEM	AGREED	DISAGREED
1	Knowledge of mathematics enhances individual's critical thinking in arriving at precise solution that can contribute positively to entrepreneur activities.	132 (66%)	68 (34%)
2	Knowledge of mathematics enhances reasoning power of an individual in taking right decision in business activities.	125 (62.5%)	75 (37.5%)
3	Knowledge of mathematics provides adequate tools in decision making of an entrepreneur.	142 (71%)	58 (29%)
4	Knowledge of mathematics does not enhance decision making skill of an entrepreneur.	39 (19.5%)	161 (80.5%)

Source. Field Survey 2015

Table 3. Responses of college students to innovative and creative skills

S/N	ITEM	AGREED	DISAGREED
1	Those who are mathematically inclined are not innovative when it comes to entrepreneur activities.	37 (18.5%)	163 (81.5%)
2	The knowledge of mathematics helps to maximize challenges in entrepreneur activities.	170 (85%)	30 (15%)
3	The knowledge of mathematics helps to minimize opportunities in entrepreneurship	35 (17.5%)	165 (82.5%)
4	Mathematical skills acquisition brings about creativity in entrepreneurship activities.	160 (80%)	40 (20%)

Source. Field Survey 2015

Table 4. Responses of college students to computational and analytical skills

S/N	ITEM	AGREED	DISAGREED
1	A good computational skill is essential ingredient in achieving success in entrepreneur activities.	169 (84.5%)	31 (15.5%)
2	Ability to calculate effectively enhances entrepreneurship activities.	131 (65.5%)	69 (34.5%)
3	Deficiency in calculations has negative impact in entrepreneurship activities.	120 (60%)	80 (40%)
4	Knowledge of simple arithmetic operations on whole numbers, fractions, decimals and approximations will not enhance entrepreneurship activities.	75 (37.5%)	125(62.5%)
5	Exposure to mathematical knowledge helps in developing analytical mind.	181 (90.5%)	19 (9.5%)
6	Mathematical knowledge is not needed in arrangement of	27 (13.5%)	173 (86.5%)

	ideas and accurate expression of thought in entrepreneurship activities.		
7	Current and future trends of business can be computed with the knowledge of mathematics.	144 (72%)	46 (23%)
8	Investment opportunity (ies) could be taken with relevant analytical skills.	168 (84%)	32 (16%)

Source. Field Survey 2015

Table 5. Responses of college students on managerial skill

S/N	ITEM	AGREED	DISAGREED
1	Managing personnel calls for skilful mathematical inclined entrepreneur.	75 (35.5%)	125 (65.5%)
2	Managing productivity requires the Knowledge of mathematics.	83 (41.5%)	117 (58.5%)
3	Mathematical knowledge is not needed in managing of ideas and accurate expression of thought in.	124 (62%)	76 (38%)
4	Knowledge of mathematics is essential for managerial skill required for success in entrepreneurship activities.	48 (24%)	152 (76%)

Source. Field Survey 2015

On contrary, only 35 (17.5%) agreed that the knowledge of mathematics helps to minimize opportunities in entrepreneurship activities. Interestingly, 80% agreed that mathematical skills acquisition brings about creativity in entrepreneurship activities.

Table 4 shows that 84.5% of the college students agreed that a good computational skill is an essential ingredient in achieving success in entrepreneur activities while 60% agreed that deficiency in calculations has negative impact in entrepreneurship activities also, 62.5% disagreed, that knowledge of simple arithmetic operations numbers will not enhance entrepreneurship activities. Item 5 has the highest percentage, 90.5% agreed that exposure to mathematical knowledge helps in developing analytical mind, while in item 8, 84% agreed that investment opportunities could be taken with relevant analytical skills. Also a very large number of respondents 173(86.5%) disagreed that mathematical knowledge is not needed in arrangement of ideas and accurate expression of thought in entrepreneurship activities.

Table 5 shows that 62% of the subjects agreed that mathematical knowledge is not needed in managing of ideas and accurate expression of thought in entrepreneurship activities while 76% disagreed that Knowledge of mathematics is essential for managerial skill required for success in entrepreneurship activities.

Hypothesis 1: There is no significant difference in the opinion of pre-service teachers towards the relevance of mathematics to entrepreneurship development based on gender

Table 6. Mean scores, Standard Deviation and t-test of pre-service teachers' perception based on gender

Sex of student	Number	Mean Scores	Standard Deviation	t.cal
Male	100	30.55	2.21	13.85*
Female	100	30.45	1.95	

\*Significant at  $p \leq 0.05$

Table 6 revealed that calculated t - value was significant ( $t_{cal} = 13.85$ ,  $p \leq 0.05$ ) i.e,  $t_{cal} = 13.85 > 1.96 = t_{crit.} = t_{0.05/2, 198}$ . The null hypothesis which states that there is no significant difference in the opinion of pre-service teacher towards the relevance of mathematics to entrepreneurship development based on gender was rejected. Based on the result, there was a significant difference in the opinion of pre-service teachers towards the relevance of mathematics to entrepreneurship development based on gender. The female pre-service teachers have better opinion on the relevance of mathematics to entrepreneurship development. This may not be unconnected to the fact that female are usually good and naturally inclined to business activities.

Hypothesis 2: There is no significant difference in the opinion of pre-service teachers towards the relevance of mathematics to entrepreneurship development based on the school type.

Table 7 revealed that the calculated F was not significant ( $F = 2.59$ ,  $p \leq 0.05$ ), that is  $F_{cal} = 2.25 < 3.07 = F_{0.05, 2, 197}$ . The null hypothesis was therefore not rejected.

Table 7. ANOVA table of pre-service teachers' perception based on the school type

Sources	Df	Ss	Ms	Fcal	Fcrit	Decision
Treatment	2	1737.69	368.85	2.59	3.07	Do not reject
Error	197	9792.96	141.92			
Total	199	10530.65				

This means, there is no significant difference in the opinion of pre-service teachers towards the relevance of mathematics to entrepreneurship development based on the school type. The implication of this result is that, irrespective of the type of school, a teacher attends, the opinion remains the same. That is, pre-services teachers in college of primary education, college of technical education and those in the regular colleges of education have the same opinion concerning the importance of the knowledge of mathematics towards entrepreneurship development.

## 7. Discussion of Results

The results showed that the pre-service teachers agreed that some important skills such as computational skill, problem solving skill, innovative skill, analytical skill, decision making skill and creativity skill acquired in mathematics are essential ingredients for success in entrepreneurship activities. This is not surprising since the knowledge of mathematics affords an individual the opportunity to be able to calculate profit and loss, prepare balance sheets, make cash plans, compute sales forecasts, prepare expense budgets, ratio analysis, break-even analysis, quality control and sales which are basic mathematics skills required for successful entrepreneurship. It is therefore interesting that the pre – service teachers in all the Colleges of education have positive disposition towards the usefulness of mathematics in enhancing entrepreneurship development.

An entrepreneur may need to interpret results obtained from data analysis of sales, cash flows etc to be able to arrive at useful decisions. This calls for the knowledge of mathematics and so basic mathematical knowledge and skills are required to authenticate the results which will certainly make an entrepreneur to succeed. Also, facts could be presented by using frequency distribution, bar charts, pie charts, histograms, which are all in the domain of mathematics. An entrepreneur with average mathematics skills can manage his entrepreneurial work efficiently and so the importance of mathematics in the world of business is such that most successful entrepreneurs are, by default, good at mathematics.

Mathematics education would no doubt offer an entrepreneur opportunity to do abstract thinking

which is usually required for the growth and development of entrepreneurship activities. Mathematics has the power to develop individuals reasoning power which are crucial for entrepreneurial development. More so that, Mathematics learning provides opportunity to accept what can stand the test of reasoning and what is true and acceptable in real life situation which could make an entrepreneur to succeed in life. This is so because, teaching of mathematics entails accuracy and systematic arrangements of results which are tools necessary to excel in entrepreneurship activities. Mathematics skills acquisition such as data analysis and test statistics could help individuals to learn the process of distinguishing between what is essential and what is not so as to make appropriate/crucial decisions in light of many available options for entrepreneurship development.

Mathematics has made it possible for many individuals to solve problems successfully through careful calculations, thereby building self-confidence and encouraging persistence efforts in carrying out entrepreneurship activities a crucial ingredient of a successful entrepreneur. A successful entrepreneur needs persistent efforts.

Mathematics is an important tool in transforming our economy into a global force especially in addressing Millennium Development Goals (MDGs) and in realization of the desired dream of vision 2020 which hinge on the development of entrepreneur activities [6]. It is the backbone of all the sectors of development hence would be entrepreneur must be well groomed in it.

The realization of a world without poverty by the year 2020, which is around the corner, would represent a massive and hugely significant shift away from a growing inequality we witness today. The application of mathematical ideas, knowledge and skills will be the driving force behind achieving the vision 2020 which will make Nigeria one of the first 20 economy in the world, a global agenda. This is a clarion call for mathematicians to find global solutions to problems besieging nations worldwide.

Mathematics, if well taught can encourage self-reliance and enable individual to learn to solve his personal problems which can translate to solving problems on entrepreneurship activities thereby enhancing entrepreneurship skills.

However, more than half the population of pre-service teachers agreed that knowledge of Mathematics is not needed in managing of ideas, accurate expression of thought of personnel and productivity which are crucial for successful entrepreneurship activities. Mathematicians are concerned about problem solving. People make use of mathematics ideas, knowledge and skills to solve nearly all problems besieging human beings. For example, mathematics exposes an individual to identifying opportunities within ones environment

and also affords individual courage to take decisions that would benefit self and the society. It is a necessary ingredient in economic activities [7] it equips individual's skills necessary for achieving success in entrepreneur activities and career aspirations to attaining personal fulfillment.

Effective communication is very crucial to record success in entrepreneurship activities, mathematics has an excellent role to play as a universal language, since concepts such as graph, frequency distribution etc are simple and effective ways of communicating ideas, concepts etc. One could gladly say, basic mathematics skills are the backbone of entrepreneurship education, without which, entrepreneurship activities may not succeed.

## 8. Conclusion

There is no doubt that the knowledge of basic mathematics skills is the foundation or tripod on which entrepreneurship education could stand. Mathematics is one of the ingredients – an essential one in the building of entrepreneurship education which is required for self-reliance self-sufficient and self-actualization which the country is clamoring for. Mathematics has been revealed as a major ingredient in the preparation of entrepreneur; failure to have adequate knowledge of this all important subject would make the nation to be far away from achieving the vision 2020 and hinder Nigeria of her dream of becoming one of the first 20 economy nation. Mathematics therefore, should not be seen as only computational or reasoning skills but also as problem solving and more importantly as a necessary ingredient in the preparation and production of successful entrepreneurs.

## 9. Recommendations

The following recommendations are therefore made for successful entrepreneurship:

1. Mathematics curriculum planners should emphasize apprenticeship and entrepreneurial training which would prepare the products of such curriculum to think creatively and transform knowledge through technological process into wealth generating ventures.
2. Basic mathematics skills, principles, rules and mechanics necessary for effective communication and problems solving for successful managerial position for entrepreneurship education must be thoroughly taught in colleges.
3. College students should be exposed to necessary basic skills in mathematics which will awake in them necessary innovative idea or ideas to start their own business.
4. Nigerian school system should accord priority to the culture of entrepreneurship activities.

5. Government all over the world should evolve mathematics policy that will serve as a pivot for rapid development of every nation.
6. Government should convene stakeholders meeting which will have in attendance professional bodies especially the National Universities Commission (NUC), National Board on Technical Education (NBTE), National Commission for Colleges of Education (NCCE), where issues in entrepreneurship skill acquisition and how the nation's education sector could buy into the modern entrepreneurship scheme could be discussed. By so doing, it will empower the products of tertiary education the opportunity to be independent and self-reliance.

## 10. References

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