

# Evaluation of Mathematics Education in Developing Entrepreneurial Skills in Senior Secondary School in Kwara State

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**Abstract:** *The study examined skills learnt in Mathematics that promotes entrepreneur skills in secondary school students; knowledge of mathematics that help in acquiring entrepreneurial skills among secondary school students; and Influence of student's type on their knowledge of entrepreneurial skills in mathematics. The study used descriptive research designs. The population for the study consisted all secondary schools students in kwara state while the target populations were secondary school students in Ilorin East Local Government Area. . A sample of 150 students was randomly sample from both public and private secondary schools in Ilorin East. The sample was calculated using Fishers (1995) which has ideal formula for targeted population. The instrument used for the study was questionnaire titled "questionnaire on effective mathematics education in developing entrepreneurial skills in senior secondary school in Ilorin East, Kwara State Nigeria" Questionnaire adapted from the study of Uka (2015). Cronbach Alpha ( $\alpha$ ) was used to test validity of the research instrument. The output gave reliability statistics which showed cronbach's alpha of 0.85. Research questions were answered using mean and standard deviation and all the hypotheses were tested using chi-square statistical analysis at 0.05 significance level. The results showed that majority of the respondents agreed that attributes of mathematical mind can promotes entrepreneurial skills in students as all the skills listed had a mean higher than the benchmark of 2.50; students agreed with the items 2, 3, 6, 9, 10, 11 and 12 but disagreed with items 1, 4, 5, 7 and 8 which that had mean less than the benchmark while others had a mean above the benchmark and there is no significant difference between secondary school students' entrepreneurial skills and knowledge of mathematics based on school type ( $\chi^2 = 3.904^a$ ,  $p = 0.272$ ). The study concluded that attributes of mathematical mind can promotes entrepreneurial skills and students need knowledge of mathematics to really scale through in the acquisition of entrepreneurial skills.*

**Keywords:** Entrepreneur, Entrepreneurial skills, Innovation Mathematics, Students,

## Introduction

Mathematics holds a prominent place in the school curriculum as a result of its critical role in scientific and technical advancement, and as such, is the foundation for the development of entrepreneurial abilities (Uka, 2015). A solid understanding of Mathematics will improve one's ability to solve complex life challenges. According to Ale and Adetula (2010), the distinction between developed and developing countries is based on their level of mathematical ability and ingenuity. Mathematics is often considered an undeniable driver of economic growth and wealth creation. Mathematics is more than just the science of numbers that professors teach in schools and that many pupils either enjoy or fear. Mathematics plays an important role in people's lives and in the development of any society (Odumosu, 2010). Because we rely on mathematics to address our daily problems, this has become required. In today's increasingly technological culture, Mathematics is also essential for a variety of occupations and work prospects (Odumosu, 2010).

According to Udonsa (2015), the national objectives of primary and secondary education in relation to Mathematics education include laying a solid foundation for the concept of numeracy and scientific thinking; providing opportunities for the child to develop manipulative skills that will enable him to function effectively in society within his capacity; developing in the child the ability to adapt to his changing environment; and providing the basic tools for further learning. With these goals in mind, Oviawe (2010) observes that Nigeria, like most developing countries around the world, faces a slew of issues and harsh realities, including poverty, unemployment, conflict, and sickness. Poverty is one of the repercussions of unemployment. A state of poverty is a general shortage or a lack of a specific amount of material possessions or money. It's a multi-faceted idea with social, economic, and political components. Poverty eradication in all kinds and dimensions, including extreme poverty, is the most pressing global challenge and a prerequisite for national and long-term development.

The learning of entrepreneurial skills for employable individuals is critical to addressing the issue of unemployment and eradicating poverty in Nigeria. Mathematics knowledge prepares students to be actively engaged and responsible citizens, creative and imaginative, able to work cooperatively, and fully aware of and conversant with the complex difficulties that society faces (European Commission, 2015). Scientific knowledge aids in describing and comprehending the world around us. Science education is critical

for promoting a culture of scientific thinking and inspiring citizens to make decisions based on evidence, ensuring citizens have the confidence, knowledge, and skills to participate actively in an increasingly complex scientific and technological world, and developing problem-solving and innovation competencies, as well as analytical and critical thinking skills, that are required to empower citizens to live personally fulfilling lives. As a result, mathematics is one of the instruments required for entrepreneurial success.

Gender is a social construct that results from society's assigning different tasks, responsibilities, behaviors, and mannerisms to the two sexes (Mangvwat, 2006). It's a psychologically sound social connotation that's used to describe certain cultural patterns of behavior that are assigned to the human sexes. Gender refers to both masculine and feminine cultural characteristics (Akpochafo, 2009). According to Lahey (2003), gender is the psychological experience of being a man or woman. It has to do with personality and self-concept fundamentals.

An entrepreneur is someone who takes the risk of starting and running a company. The entrepreneur looks inward into his or her environment to uncover problems that others are facing (or business possibilities) and introduces new products and services to make money (Ugwoke & Abidde, 2014). According to Moemeke (2013), an entrepreneur is a lifelong learner, a creative person, an initiate, and a potential industrialist, in addition to being an inventor. As a result, entrepreneurs control the destiny of nations because they shape, materialize, and bring any nation's developmental goals and economy to fruition. Entrepreneurial skills are business skills that an individual learns on their own in order to run a successful business and be self-sufficient (Umunadi, 2014; Nwafar, 2009). The skills entail the effective use of ideas, information, and facts to assist a learner in developing competencies, providing services, or becoming productive employees of an organization. Entrepreneurship is the process of using private initiative to transform a business concept into a new venture or to grow and diversify an existing venture or enterprise with high growth potential. It is the process of using private initiative to transform a business concept into a new venture or to grow and diversify an existing venture or enterprise with high growth potential (Mkpa, 2014; Ugwoke & Abidde, 2014). As a result, it is critical that entrepreneurial skills be incorporated into the basic science curriculum for children. The federal government of Nigeria has recently established a policy of entrepreneurship education as a compulsory field of study at all levels of education in Nigeria, notably at the secondary level of school, in response to continuing trends of youth unemployment (Obioma 2012). In light of current realities and the need to develop and empower society's youth, this change from general education to explicitly entrepreneurship education becomes vital. There appears to be agreement on the need for entrepreneurship in addressing several socioeconomic issues, particularly poverty, unemployment, and various social vices (Oviawe, 2010). Oviawe (2010) investigated the possibility of employing entrepreneurial education as a method or instrument for redirecting the necessary energy of Nigerian universities, faculties, and students away from paid work and toward self-employment, which is important for capacity building. Entrepreneurial education, where students are trained on the fundamentals of entrepreneurship and how to construct a successful company strategy, must be prioritized for entrepreneurs to flourish.

According to Adeyemo (2009), instructional leadership skills, management skills, communication skills, collaboration skills, vision development skills, change management skills, analysis skills, process skills, assessment skills, and parsimony/economy skills are among the talents learned or acquired. The managerial skills relate to the teacher's communicative abilities, which might be oral or written. Financial talent necessitates an understanding of accounting in a company setting. Marketing and general business skills include the ability to sell items and run various types of businesses to which one is exposed.

The problem of unemployment is not unique to Nigeria; it is a worldwide problem. The federal government of Nigeria has implemented a new policy of entrepreneurship education as a compulsory subject of study to assure the realization of self-reliance at all levels of education in Nigeria, notably at the secondary level (Obioma 2012). These abilities must be acquired, and their growth necessitates a sufficient understanding of mathematics education. Parents, teachers, the government, and the general public are all concerned about this trend. Mathematics, being a universal field that can accommodate various spheres of life, such as science, commerce, accounting, construction, and so on, is the most effective tool for sustaining such realization. The issue may thus lie in the degree to which acquiring mathematical knowledge influences the development of entrepreneurial skills. To reduce poverty, it is therefore necessary to discover techniques that science (mathematics) education teachers can utilize to foster entrepreneurial abilities in their students.

### **Objectives**

- examine the skills learnt in Mathematics that promotes entrepreneur skills in secondary school students.
- determine the knowledge of mathematics that help in acquiring entrepreneurial skills among secondary school students.
- determine the influence of student's type on their knowledge of entrepreneurial skills in mathematics.
- investigate the influence of student's gender on their knowledge of entrepreneurial skills in mathematics.
- evaluate influence of student's age on their knowledge of entrepreneurial skills in mathematics.

### **Research Question**

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- What are the skills learnt in Mathematics that promotes entrepreneur skills in secondary school students?
- Does knowledge of mathematics help in acquiring entrepreneurial skills among secondary school students?

**Hypothesis**

- There is no significant difference between secondary school students’ entrepreneurial skills and knowledge of mathematics based on school type.
- There is no significant difference between secondary school students’ entrepreneurial skills and knowledge of mathematics based on students’ gender.
- There is no significant difference between secondary school students’ entrepreneurial skills and knowledge of mathematics based on students’ levels of age.

**Methodology**

The study used descriptive research designs. The population for the study consisted all secondary schools students in kwara state while the target populations were secondary school students in Ilorin East Local Government Area. . A sample of 150 students was randomly selected from both public and private secondary schools in Ilorin East. The sample was calculated using Fishers (1995) which has ideal formula for targeted population. The instrument used for the study was questionnaire titled “questionnaire on effective mathematics education in developing entrepreneurial skills in senior secondary school in Ilorin East, Kwara State Nigeria” Questionnaire adapted from the study of Uka (2015). Cronbach Alpha ( $\alpha$ ) was used to test validity of the research instrument. Data collected were analyzed using mean and standard deviation and all the hypotheses were tested using chi-square statistical analysis at 0.05 significance level.

**Results**

**Research Question one: What are the skills learnt in Mathematics that promotes entrepreneur skills in secondary school students?**

**Table 1**

*Mean and Standard deviation of the responses of students on skills of mathematics in entrepreneurial process*

S/N	Attributes of Mathematical Mind	Mean	SD	Decision
1	Optimistic	3.27	0.704	Agreed
2	Initiative	3.27	0.704	Agreed
3	Risk- taker	3.27	0.704	Agreed
4	Drive and persistence	3.27	0.704	Agreed
5	Resilience	3.27	0.704	Agreed
6	Critical and creative thinking	3.27	0.704	Agreed
7	Problem-solving ability	3.27	0.704	Agreed
8	Goal-setting	3.27	0.704	Agreed
9	Decision-making	3.27	0.704	Agreed
10	Planning and organizing	3.27	0.704	Agreed

Table 1 revealed Mean and Standard deviation of the responses of students on skills of mathematics in entrepreneurial process. The result shows that students agreed that attributes of mathematical mind can promotes entrepreneurial skills in students as all the skills listed had a mean higher than the benchmark of 2.50. Therefore, mathematical skills promote entrepreneurial skills in students.

**Research Question Two: Does knowledge of mathematics help in acquiring entrepreneurial skills among secondary school students?****Table 2***Mean and Standard deviation of students' responses on the need of knowledge of mathematics in acquiring entrepreneurial skills*

S/N	ITEMS	Mean	SD	Decision
1	I like mathematics.	2.39	1.08	Disagreed
2	I like acquiring skills apart from subject taught in my class	3.23	0.69	Agreed
3	I need Mathematics specifically to do well in some specific skills development	2.67	0.91	Agreed
4	Good mathematics students do better in entrepreneurial skills	2.32	1.03	Disagreed
5	Developing entrepreneurial skills needs general knowledge of mathematics.	2.41	1.04	Disagreed
6	Not all topics taught in mathematics has relevance to my skills development	2.65	1.02	Agreed
7	I can do well in entrepreneurial skills without mathematics.	2.32	1.01	Disagreed
8	I understood learning by doing as a result of my mathematical knowledge	2.41	0.97	Disagreed
9	Every entrepreneurial skill requires knowledge of mathematics.	2.61	0.97	Agreed
10	My doing well in entrepreneurial skills is build on my previously learnt ability	3.02	0.89	Agreed
11	Without knowledge of mathematics I cannot do well in entrepreneurial skills.	2.55	0.98	Agreed
12	My entrepreneurial skills cannot be developed with other school subject	2.93	0.84	Agreed

Table 2 revealed Mean and Standard deviation of students' responses on the need of knowledge of mathematics in acquiring entrepreneurial skills. The tables show that students agreed with the items 2, 3, 6, 9, 10, 11 and 12 but disagreed with items 1, 4, 5, 7 and 8 which that had mean less than the benchmark of 2.50 while others had a mean above the benchmark which is 2.50. Therefore, this implies that secondary school students believed that mathematics knowledge is needed for acquiring entrepreneurial skills among secondary school students in Ilorin East.

**Hypothesis One:** There is no significant difference between secondary school students' entrepreneurial skills and knowledge of mathematics based on school type.

**Table 3***Chi-square statistic of influence of school type on students' knowledge of mathematics and entrepreneurial skills*

School Type	Agreed	Disagreed	N	df	$\chi^2$	Sig.	Remark
	Observed (Expected)						
Private	33(36.8)	27(23.2)	150	3	3.904 <sup>a</sup>	0.272	NS
Public	59(55.2)	31(34.8)					

Table 3 revealed Chi-square statistic of influence of school type on students' knowledge of mathematics and entrepreneurial skills. The table revealed that chi-square value is 3.904<sup>a</sup> and *p*-value is 0.272 at 0.05 significances level. This implies that the *p*-value which is 0.272 is greater than the significance level (0.05). Therefore, the hypothesis 1 is not rejected. Hence, there is no significant difference between secondary school students' entrepreneurial skills and knowledge of mathematics based on school type.

**Hypothesis 2:** There is no significant difference between secondary school students' entrepreneurial skills and knowledge of mathematics based on students' gender.

**Table 4***Chi-square statistic of influence of gender on students' knowledge of mathematics and entrepreneurial skills*

Gender	Agreed	Disagreed	N	df	$\chi^2$	Sig.	Remark
	Observed (Expected)						
Male	41(38.5)	38(40.5)	150	3	4.144 <sup>a</sup>	0.246	NS
Female	32(34.5)	39(36.5)					

Table 4 revealed Chi-square statistic of influence of gender on students' knowledge of mathematics and entrepreneurial skills. The table revealed that chi-square value is 4.144<sup>a</sup> and *p*-value is 0.246 at 0.05 significances level. This implies that the *p*-value which is 0.246 is greater than the significance level (0.05). Therefore, the hypothesis 2 is not rejected. Hence, there is no significant difference between secondary school students' entrepreneurial skills and knowledge of mathematics based on students' gender.

**Hypothesis 3:** There is no significant difference between secondary school students' entrepreneurial skills and knowledge of mathematics based on students' levels of age.

**Table 5***Chi-square statistical analysis of influence of gender on students' knowledge of mathematics and entrepreneurial skills*

Age	Agreed	Disagreed	N	df	$\chi^2$	Sig.	Remark
	Observed (Expected)						
10-14years	36(34.3)	20 (21.7)	150	6	3.655 <sup>a</sup>	0.723	NS
15-20years	32(33.7)	23(21.3)					
21 & above	24(23.9)	15(15.1)					

Table 5 highlights the Chi-square statistical analysis of influence of students' levels of age on their knowledge of mathematics and entrepreneurial skills. The table revealed that chi-square value is 3.655<sup>a</sup> and *p*-value is 0.723 at 0.05 significance level. This implies that the *p*-value which is 0.723 is greater than the significance level (0.05). Therefore, the hypothesis 3 is not rejected. Hence, there

is no significant difference between secondary school students' entrepreneurial skills and knowledge of mathematics based on students' levels of age.

### Discussion of the Findings

This study investigated the effective mathematics education in developing entrepreneurial skills in secondary schools. According to the findings of this study, mathematical skills were proven to be useful in building entrepreneurial skills. The findings revealed that students agreed that mathematical mental traits can help pupils develop entrepreneurial skills. This existing component in students' entrepreneurial abilities could be linked to the function mathematics plays in the development of optimism, initiative, risk-taking, persistence, resilience, critical, and creative thinking. Problem-solving skills, goal-setting, decision-making, planning, and organizational skills are all beneficial to students who want to be better entrepreneurs. This study's findings are consistent with those of Odomosu & Olusesan (2016) and Udonsa (2015), who believe that knowledge of mathematics can positively influence the subjects' computational, problem-solving, innovative, analytical, decision-making, and creative skills for successful entrepreneurship activities. Tables 3, 4, and 5 show that the variables (gender, age, and school type) of mathematics students have little bearing on the development of entrepreneurial abilities. Extending the debate, it was discovered that there is no significant difference in entrepreneurship skills and mathematics knowledge among secondary school students based on gender. This is in line with Uka's (2006) concluded that gender has no substantial major effect on pupils' academic ability in mathematics. Overall, the type of school and the age of the children have no bearing on their mathematical knowledge or the development of entrepreneurial abilities.

### Conclusion and Recommendation

Based on the findings of this study, it was concluded that attributes of mathematical mind can promote entrepreneurial skills in students. The students need knowledge of mathematics to really scale through in the acquisition of entrepreneurial skills. School type, age and gender has less influence on students' mathematical knowledge and entrepreneurial skills as it was revealed in the study that male students performed significantly better and also their female counterpart when gender remains salient in the study.

### Recommendations

**Based on the major findings of this study, the following recommendations were made;**

- It is important to help students improve their math skills, because this will give them a strong foundation from which to grow their skills in the future.
- Teachers with a strong Mathematical foundation who are diverse in content and subject matter should be hired to teach entrepreneurship because this will allow for the integration of various teaching approaches such as problem solving, decision-making strategy, and creativity.
- Entrepreneurship education teachers who do not have a Mathematical background should seek training and retraining in order to improve their Mathematical abilities.
- Nigeria's government, through the ministry of education, should begin a general evaluation and implementation process that supports the country's current entrepreneurship education policy. Universities and other institutions of higher learning could take on this task.

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