STUDENTS' PERCEPTION ABOUT RELEVANCE OF MATHEMATICAL TOPICS FOR ENTREPRENEURSHIP DEVELOPMENT

by

Olaniyan, O. and Ezekiel, O. J

Department of Mathematics Federal College of Education (Special), Oyo and Department of Integrated Science Federal College of Education (Special), Oyo

ezekielolubiyi1@yahoo.com

Abstract

The study investigated students 'perception about relevance of mathematical topics taught at the senior secondary school level for entrepreneurship development. The population of the study consisted of all Senior Secondary II and Senior Secondary III students in Ajijio Local Government Area, Oyo State. The sample consisted of one hundred and forty students (61 males and 79 female) drawn randomly from seven senior secondary schools in Afijio Local Government Area. The research design adopted for the study was a descriptive survey. The research instrument used for data collection was a researcher's-designed questionnaire on Perception of Mathematical topics Relevance for Entrepreneurship Development (PMTRED). One research question and five hypotheses were tested using mean, standard deviation and F-test at 0.05 level of significance affect students' perception of relevance topics in mathematics for entrepreneurship development. It was recommended among others that more attention be paid to the practical aspects of mathematical topics to stimulate and propel students into entrepreneurship activities.

Introduction

The National Policy on Education (FGN, 2004) in its industry portion summarizes the mentality of education for the attainment of entrepreneurship development. Entrepreneurship is paramount; Nigeria at 54 years of independence is still facing the problem of unemployment Nigeria educational (institutions continue to churn out graduates annually and jobs remain inadequate for the ever expanding army of job seekers. As a result of this unpleasant situation many job seekers who are graduates of various tertiary institutions in the country have accepted any type of job such as armed robbery and kidnapping to mention a few. There is no doubt that our graduals may have employment Opportunities if they are adequately provided with the entrepreneurial education.

The concept of entrepreneurship has been viewed differently by different scholars. According to Usman and lweka (2013), entrepreneurship is the process of undertaking a business venture. Ubong (2013) defined entrepreneurship as the art of science and art of generating, developing and managing business ideas successfully. Ille, (2003) conceptualizes entrepreneurship in the context of the willingness and ability of an individual to seek out investment opportunities and run enterprises successfully. Looking at the various definitions above, an individual can inferred that entrepreneurship is a human endeavour targeted at inventions, building businesses as different from being employed.

The objectives of entrepreneurship are among others to create wealth, reduce dependency on government or other employers and to create jobs, financial independence. (Agim. Kulo and Effah. (2013). Furthermore, Nicole (2013) identified financial independence among others why entrepreneurship is awesome. Based on the significance of entrepreneurship, Ofodile (2013) advocates the need for entrepreneurial education in the school system to equip students with self employable skills. Although after independence, Nigeria has made attempts

to kick start the growth of entrepreneurship agencies for self employment. For instance, the National Youth Service Corps (NYSC). Small and Medium Enterprises Development Agency of Nigeria (SMEDAN) were some of the initiatives of the Federal Government of Nigeria aimed at promoting entrepreneurship development (Dahirus, 20l3).

However, it is worrisome that despite the initiatives the challenges of entrepreneurship still persist. Studies (Ezeh and Ugwanyi. 2013) attributed this largely to the fact that the initiatives have paid little attention to the issues of mathematics that is pertinent to effective entrepreneurship. This claimed was further supposed by Olaniyan (2014) that entrepreneurship in the 21" centuries has come to increasingly rely on quantitative method and having a solid foundation in mathematics would be of tremendous assistance.

In a related study Ogbo-ngu, Abalspa and Adika (2013) opined that occupation which students may choose to pursue are full of opportunities and the need to apply mathematics. Therefore from the forgoing, it implies that mathematics is the hub of every entrepreneurship. Throughout the history of man down to our own time, mathematics has been tremendously useful in very many aspects of human endeavours. It is saying the obvious that development of industries is mandatory for entrepreneurship and national development and science and mathematics is the bedrock. (Dahiru, 2013) Research studies (Usman and lwelta, 2013); Olaniyan and Tijani, 2010) Ezeh and Ugwanyyi, 2013, captured a huge variety of career opportunities in banking, engineering, architecture, information technology (IT), accountancy that heavily rely on mathematical principles that could generate entrepreneurship opportunities. The key issue arising from the discussions is that mathematics plays an overwhelming role in providing a variety of career opportunities. Sequel to the power of mathematics in entrepreneurship, there has been a global advocacy that every individual should be entitled to a full participation in mathematics at every stage of education. (NCT M, 2014).

Many variables such as age, gender, future career have been found to influence individual perception of mathematics. Literature on the relationships between gender, age and perception on mathematics are many and contain conflicting reports. Report from research studies (Dowker, Ashcrat't and Krinzinger, 2012) has indicated no statistically significance difference in young children and adults in mathematics perception. The report of research studies (Skaalvik and Rankin, 2012) authentically showed no significant difference between male and female students mathematics perception. The research studies conducted by Olaniyan and Opayinka (2012), Olaniyan, Adebayo and Orogede (2013) concur that future career choice had significant effect on mathematics perception among secondary school students. In a related manner, in a study of the analysis of students' intention to further their studies after the secondary school, Nardi and Steward (2003) discovered that, students who intended to further their studies after secondary school had a higher mean perception than those who intended not to further studies. The foregoing discussions send a clear message that factors such as age, gender, future career and intention to further studies could influence students' perception on mathematics at the senior secondary school level of education.

The purpose of this study is to investigate senior secondary school students' perception of relevance of mathematics topics taught at the SSS level for entrepreneurship development. Specifically, the study sought to investigate the following:
i. Young children and adults perceptions of relevance of mathematics for entrepreneurship.
ii. Male and female students' perceptions of relevance of mathematics for entrepreneurship.

iii. Relevance of mathematics for entrepreneurship based on choice of future career.
iv. Students' perceptions of relevance of mathematics based on intention to work after school. '
v. Students' perceptions based on intention to further studies alter school.

Significance of the Study

Findings from this study will be significant for the following reasons. They include:

i. Provide the basis to access students' perceptions of mathematical topics taught at the senior secondary schools.

ii. Provide the basis for making statement about mathematical topics at senior secondary school and entrepreneurship development.

i. Help to improve the teaching and learning of mathematics at senior secondary school level of education.

Statement of the Problem

The philosophy of Nigerian education and the philosophy of mathematics education both aim at developing the skills, competencies and knowledge that could propel every individual into entrepreneurship activities. Mathematics education has come under heavy criticism from experts claiming that it leaves students unprepared for entrepreneurship development An angle that yet to receive attention is that weather students even perceive what they are being taught valuable for entrepreneurship development. An issue of note is that there have not been extensive research studies that focus on students' perception on mathematical topics and entrepreneurship development. This is a disturbing scenario to which experts and experienced educators in the hold of science education must be sensitive to. Therefore, concerned with this phenomenon, this study was conducted to investigate students' perception of relevance or mathematical topics taught at senior secondary school level of education for entrepreneurship development.

Research Questions

i. To what extent do young children and adults perceive relevance of mathematics for entrepreneurship?
ii. To what extent do male and female students' perceive relevance of mathematics for entrepreneurship?
iii. To what extent do students of mathematics perceive relevance of mathematics for choice of future career?
iv. To what extent do students perceive relevance of mathematics for their intention to work after school?
v. To what extent do students perceive relevance of mathematics for their intention to further studies after school?

Hypotheses

H_o1: There is no significant difference in the mean scores of young children and adults perceptions of relevance of mathematics for entrepreneurship.

H_02: There is no significant difference in the mean scores of male and female students' perceptions of relevance of mathematics for entrepreneurship.

H_03: There is no significant difference in the mean scores of students of mathematics about relevance of mathematics for entrepreneurship based on choice of future career.

$H_0 4$: There is no significant difference in the mean scores of students' perceptions based on intention to work after school. '

$H_0 5$: There is no significant difference in the mean scores of students' perception based on intention to further studies alter school.

Methodology

Research design: The research design adopted for the study was a descriptive survey design. The ppulation of the study consisted of all 582 and SS3 students in Afijio Local Government Area. The sample consisted of 140 (61M, 79F) students drawn randomly from $S2 and SS3 from seven secondary schools in Afijio local Government area, Oyo State. The research instrument used for data collection was a researcher-designed questionnaire on Mathematical Topics Relevance for Entrepreneurship Development (MTRED). The first section of the questionnaire was used to elicit general information such as age, gender, future career, and intention to further studies after secondary school. The second section consists of a checklist of mathematical topics in SS2 and SS3. The questions were of Likert type structure. The questions were pilot tested on 100 students in schools not originally selected for the study. The questionnaire was given to three mathematics lecturers for validation. The questionnaire was administered with the help teachers of mathematics.

Data Analysis: Mean, and Standard Deviation were used to test the research questions while F-test was used to test the hypotheses at 0.05 significant level.

Table 1: *Students' perception on relevance mathematical topics for entrepreneurship development*

S/N	TOPIC	MEAN	STANDARD DEVIATION	REMARK
1	Simple interest	3.71	1.06	Positive
2	Discounts	3.81	1.12	Positive
3	Constructions	0.68	1.26	Positive
4	Estimation	2.51	1.15	Positive
5	Everyday Arithmetic	2.83	1.21	Positive
6	Geometric	3.81	1.06	Positive
7	Measurement	2.61	1.17	Positive
8	Polygons	2.62	1.12	Positive
9	Trigonometry	2.79	1.07	Positive
10	Number theory	2.46	1.07	Negative
11	Algebraic processes	2.36	1.04	Negative
12	Equations	2.49	1.13	Negative
13	Linear inequalities	2.36	1.05	Negative
14	Probability	2.73	1.20	Negative
15	Statistics	2.57	1.17	Negative
16	Longitudes and Latitudes	2.45	1.08	Negative
17	Circle theorems	2.47	1.14	Negative
18	Linear functions	2.51	1.15	Negative
19	Graphs	2.66	1.07	Negative
20	Logarithms	2.39	1.22	Negative
21	Profit and loss	3.84	0.78	Negative
22	Variation	2.40	1.10	Negative
23	Sine and cosine rules	2.33	1.01	Negative
24	Quadratic functions	2.44	1.12	Negative
25	Bearing	2.42	1.03	Negative

From table 1, it can be seen that the mean ($\bar{X}$) ranged from 2.33 to 3.84. The standard deviation ranged from 0.78 to 1.26. Fourteen (56.0%) out of the twenty five items recorded positive perceptions i.e means $\overline{(X)}$ above 2.50. While eleven (44.0%) items had means between 2.33 and 2.46. Only four items (16.0%) recorded perceptions with mean above 3.0

Hypothesis 1

Table 2: *Age differences of students perceptions about relevance of mathematical topics for entrepreneurship development*

Age	N	Mean	Standard deviation	Df	F	Sig
21-25years	18	62.63	16.6	138	0.319	0.727
16-20years	70	66.67	13.2			
11-15years	52	66.69	16.1			

The analysis in table 2 shows that the oldest set students (21-25years) had the least perception of value of mathematical topic for entrepreneurship development but the difference in mean is not statistically significant at 0.05 levels. Hence the hypothesis is upheld.

Hypothesis 2

Table 3: *Gender differences of students perceptions about relevance of mathematical topic for entrepreneurship development.*

Sex	N	Mean	Standard deviation	Df	F	Significant
Male	61	67.95	16.168	138	0.576	0.575
Female	79	65.38	13.976			
Total	140					

The mean perception of male students is high than that of female students but the difference is not significant at (p<0.05), hence the hypothesis is accepted.

Hypothesis 3

Table 4: *Category of students and perception of relevance of mathematics for choice of future career*

Category	N	Mean	Standard deviation	Df	F	Significant
Male	60	68.05	17.098	138	0.456	0.675
Female	80	63.08	11.876			
Total	140					

Table 4 shows that the two groups of students had the least perception of value of mathematical topic for choice of future career but the difference in mean is not statistically significant at 0.05 levels. Hence the hypothesis 3 is upheld.

Hypothesis 4

Table 5: *Category of students and perception of relevance of mathematics for their intention to work after school?*

Category	N	Mean	Standard deviation	Df	F	Significant
Male	70	69.55	18.008	138	0.376	0.795
Female	70	70.03	17.796			
Total	140					

Table 4 shows that the two groups of students had the least perception of value of mathematical topic for their intention to work after school but the difference in mean is not statistically significant at 0.05 levels. Hence the hypothesis 4 is upheld.

Hypothesis 5

Table 6:
Students' perceptions about relevance of mathematics topics to further studies

Category	N	Mean	Standard deviation	Df	F	Significant
Yes	126	69.70	14.9	138	0.533	0.581
No	14	66.00	15.7			
Total	140					

The analysis in table 6 has indicated that majority of students showed intention to further their studies after senior secondary school had a higher perception on mathematics than those who would not but the difference was not statistically significant at 0.05 level of confidence hence the hypothesis 5 is therefore accepted.

Discussion

Research questionnaire that states "that what is students' perception on mathematical topics for entrepreneurship development". The results expressed in table 1 indicated that fourteen (66.0%) out of the twenty five items recorded positive perceptions while eleven representing (44.0%) items had negative perceptions. This finding may not be too striking at first if an individual considers mathematical topics like simple interest, discounts, profit and loss and a host of others that students might consider valuable for entrepreneurship. The result of the test of research question one is consistent with the findings of Usman and Iweka (2013) that observed that the gamut of mathematical topics taught at the senior secondary school level could be of immense benefit for entrepreneurship development. However, a major reason that could account for greater perception on mathematical topics might be due to the dominance of commercial and business mathematics.

The analysis in table 2 revealed that age did not significantly affect the students' perception on mathematics. Surprisingly, an individual would have expected that the adults had higher perception on mathematics. The factors that are responsible for the equal perceptions are not known. However, the result of the findings seem to have corroborated the findings of Dowker, Asheraft and Krinzinger (2012) that indicated no statistical significance difference in students' perception on mathematics based on age levels. The results in table 3 indicate that gender did not significantly affect students' perception on mathematics and individual would have expected the students to have had a higher mean score of perception considering the quantitative nature of mathematics that is regarded as masculine subject. Among plausible explanations that could be given for the equality of perceptions of both sexes could be the dominance of the female students. However, the results of the test of typothesis two seem to have supported the finding of previous researchers (Skaaliek, and lankin (2011) that showed no significance differences between the sexes on mathematics perception.

The results expressed in table 4 indicated that future career did influence students' perception on mathematics. The findings may not be too striking when an individual considers the substantial amount of mathematics knowledge required in the choice of careers in STEM fields. However, the result findings is consistent with the findings of Olaniyan and Opayinka (2012; Ogbo-ngu, Abakpa and Adiku (2013) that document that future career predicted students perception on mathematics.

The statistical analysis in tables confirms that, mathematics perception of students who intend to work for a living after secondary school education is slightly lowers but the difference is not statistically significant. The result expressed in tables 4, 5 and 6 indicated

that a higher mean score of students perception on mathematics for students who intend *to choose mathematics as future career, have intention to work after school and* further their studies after secondary school. The findings may not be too striking when an individual considers the strategic position of mathematics in further once of studies. However, the fringing of the test of hypotheses three, four and five is consistent with findings of previous research studies (Nardi and Steward, 2003) that captured a higher mean score perception on mathematics for students who intended to further their studies.

Conclusion

In today's business world, a strong preparation in the fundamentals of mathematics is crucial to effective entrepreneurship development. The variables like age and gender, future career and intention to further studies did not significantly affect students' perception of mathematics. Therefore, it is evidently clear that mathematics is the hub of entrepreneurship development. With this background information, it becomes imperative for the teachers to pay more attention to the practical aspects of mathematics topics and emphasize how they can be used to stimulate and propel students into entrepreneurial activities.

Recommendations

Based on the findings of this study, the following recommendations were made:

i.   Mathematics students should be made aware of the objectives of mathematics teaching (i.e. inculcator of self-reliance)

ii.   Teachers should endeavour to emphasize and teach practically the aspects of mathematics

a.   that can be used to develop entrepreneurial activities.

iii.   Mathematics textbooks that emphasizes topics to be taught in an entrepreneurship way should be developed.

iv.   Workshops, seminars, conferences should be organized for the teachers of mathematics on how to practically teach and emphasize mathematical topics that are of entrepreneurship value.

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