

Mathematics Anxiety and Emotional Intelligence as Predictors of Secondary Schools Students' Achievement in Mathematics in Imo State

Njoku Iheanyi Odochi, Okigbo Ebele. C.

Abstract— This study investigated how mathematics anxiety and emotional intelligence predicted secondary school students' academic achievement in Mathematic CCSSE. The purpose of this study was to determine how mathematics anxiety and emotional intelligence predicted secondary school students' academic achievement in Mathematics CSSE. The study was guided by five research questions and three hypotheses tested at 0.05 alpha level of significance. The study adopted a correlation survey design. Population of the study comprised 33, 073 SS3 students (16726 males and 16348 females) in 297 public senior secondary schools in Imo State from which a sample of 1654 SS3 students in public secondary schools was drawn using multi-state sampling technique. The instrument for data collection was mathematics Anxiety Scale (MAS) and emotional intelligence questionnaire (EIQ). The data collected were analyzed using mean and regression analysis. The findings of this study were as follows: Mathematics anxiety and emotional intelligence predict secondary school students' achievement in Mathematics CSSE. Based on the findings, it was recommended among others that curriculum experts should develop an affective instructional curriculum that incorporates emotional intelligence skills, positive academic self concept and reduce of mathematics anxiety with the objective of enhancing personal and career success of students.

Index Terms— mathematics anxiety, emotional intelligence, Centralized Secondary School Examination.

I. INTRODUCTION

Imo State government through the State Ministry of Education introduced Centralized Secondary School Examination (CSSE) in 2006 which was basically to get a reliable ground for preparation of students to enable them perform well in the public examinations. The objectives of CSSE are to organize qualifying examination into Senior Secondary school three (SSS 3) from Senior Secondary School two (SS 2) and to standardize the quality of students that will be presented for WASSCE (Imo State Ministry of Education, 2016). To achieve the above objectives, subject specialists (in setting questions and conducting examinations for senior secondary school students) are usually invited and given the responsibility of setting questions and conducting the CSSE (Imo State Ministry of Education, 2016). The CSSE is taken throughout the state and under the same

examination conditions as those public examinations and marked centrally by the various subject teachers like examiners in the public examinations. During the marking exercise, a committee made up of seasoned examiners and experts in the different subject areas that are employees of Secondary Education Management Board (SEMB) in Imo state secondary schools is constituted to oversee the preparation of the marking scheme.

The next is the coordination of examiners for marking the answer scripts which comes up in two stages namely central and zonal coordination. At the central coordination, each of the six education zones will send at least two representatives in various subject areas to the central coordination. The representatives from each education zone then train other examiners from their respective education zones. It is worthy of note that no examiner marks answer scripts from his or her school. At the end of the marking exercise, the results are submitted to the Secondary Education Management Board (SEMB) for onward transmission to the schools.

The analysis of the results shows that students perform well in the CSSE and this improved performance is expected to reflect in the students' performance in the public examinations especially in Mathematics. Regrettably however, the performance of students in Mathematics in public examinations in Imo State is persistently poor as shown by the WASSCE result in Imo State from 201-1 to 2018. The results show that the percentage of students that passed at credit level and above (A1-C6) in Imo State was persistently less than 50%. This poor academic achievement of students in Mathematics has become worrisome to Mathematics educators and other stakeholders in education. Many variables have been faulted for the poor achievements of students in mathematics in WASSCE. These factors are teacher, students and environmentally related. The teacher related factor includes shortage of qualified teachers, method of teaching and poor achievement motivation (Salman, Mohammed, Ogunlade & Ayinla, 2012; Osuafor & Njoku, 2016). the student's related factor includes mathematics anxiety (Azuka & Kurumeh, 2015), emotional intelligence (Nalah, 2013) and academic self-concept (Olango, 2016). Environmentally related factor includes poor facilities, inadequate equipment and instructional materials, large classroom size, some government policies (Salman et.al, 2012). These factors contribute to the difficulty or ease students experience in doing Mathematics tests and performing related tasks (Adown, 2016; Nalah, 2014). A great deal of research in Mathematics education has been

Njoku Iheanyi Odochi, Department of Statistics, Federal College of Agriculture Ishiagu, Ebonyi State Nigeria,

Okigbo, Ebele. C., Department of Science Education, Nnamdi Azikiwe University Awka, PMB 5023 Awka, Anambra State Nigeria.

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conducted on the teacher and environmental related factors (Anyichie, & Onyedike. 2012; Okigbo. 2010; Osuafor & Njoku, 2016). However, much research has not been conducted on students' related factors namely mathematics anxiety and emotional intelligence. To determine how these factors predict students' academic achievement especially in Mathematics CSSE is the main focus of the present study.

Nunez-Pena-Suarez-Pellieioni, and Bono. (2013) defined Mathematics anxiety as the physical, cognitive and emotional manifestations of tension, fear. Reduced focus and concentration, memory gaps, mental disorganization, and worry in Mathematics and Mathematics related subjects. Finlayson, (2014) added that it is a phobic reaction to academic courses that contain mathematical concepts as part of the course work. In this study therefore, Mathematics anxiety is the state of fear of working with numbers and solving mathematical problems which leads to an aversion and avoidance of Mathematics and any Mathematics related subjects by secondary school students. There are studies in the literature on the influence of Mathematics anxiety on students' academic achievement. For example Karimi and Venkatesan (2009) studied the predictive validity of Mathematics anxiety on students' achievement in USA and found that Mathematics anxiety is an important predictor of students' achievement but with a negative correlation. Similarly, Vukovic, Kieffer, Bailey, and Harari (2013) reported both concurrent and longitudinal associations between mathematics anxiety and academic performance among 113 children from second to third grade levels in the United States. Their finding further revealed that mathematics anxiety formed a unique source of individual differences in children's calculations and applications of Mathematics but not in their geometric reasoning. This finding by Vukovic, et al shows that mathematics anxiety does not predict achievement in all areas of mathematics in the secondary school.

In Nigeria, Akanbi (2010) reported that high mathematics anxiety reduced secondary school students' academic achievement in Mathematics. Similarly, Adewuyi (2012) found that secondary school students with high Mathematics anxiety performed poorly academically compared to those with low Mathematics anxiety. However, Olango (2016) reported that there is no significant relationship between Mathematics achievement and mathematics test anxiety. From the foregoing, the findings on the mathematics anxiety and students' achievement in

Mathematics are not in agreement. This justifies the need to investigate further on how Mathematics anxiety predicts academic achievement of students in Mathematics.

Emotional intelligence is the ability of an individual to identify, understand and manage emotions, Emotion management refers to the ability of an individual to control impulses and mood; suspend judgment and think before acting. Individuals who have developed high level of emotional intelligence are able to recognize and regulate their own and others emotions (Mcstre & Barchard. 2014). In this study, emotional intelligence is the ability of secondary school students to identify, understand, manage relationship with others well and balance emotions with rational thought.

It is, therefore, imperative to determine whether mathematics anxiety and emotional intelligence could predict students' achievement in Mathematics CSSE.

II. PURPOSE OF THE STUDY

The purpose of the study was to determine how Mathematics anxiety and emotional intelligence predicted secondary school students' academic achievement in Mathematics CSSIC. Specifically. The purpose of the study was to determining

- i. The mean Mathematics anxiety scores of secondary school students in Imo State.
- ii. The mean emotional intelligence scores of secondary school students in Imo State.
- iii. Whether Mathematics anxiety predicts secondary school students' academic achievement in Mathematics CSSE, '
- iv. Whether emotional intelligence predicts secondary school students' academic achievement in Mathematics CSSE.
- v. Whether Mathematics anxiety and emotional intelligence jointly predict secondary school Students' academic achievement in Mathematics CSSE.

III. RESEARCH QUESTIONS

The following research question guided the conduct of the study,

- i. What is the mean Mathematics anxiety score of secondary school students in Imo State?
- ii. What is the mean emotional intelligence score of secondary school student in Imo State?
- iii. Does Mathematics anxiety predict secondary school student's academic achievement in Mathematics CSSE?
- iv. Does emotional intelligence predict secondary school students' academic achievement in Mathematics CSSE?
- v. Do mathematics anxiety and emotional intelligence jointly predict secondary school students' academic achievement in Mathematics CSSE?

IV. HYPOTHESES

The following hypothesis was tested at 0.05 levels of significance.

- i. Mathematics anxiety does not significantly predict secondary school students academic Achievement in Mathematics CSSE,
- ii. Emotional intelligence does not significantly predict secondary school students' academic achievement in Mathematics CSSE.
- iii. Mathematics anxiety and emotional intelligence, jointly do not significantly predict secondary school students' academic achievement in Mathematics CSSE.

V. METHODOLOGY

The design adopted in this study was correlation survey. Population of the study comprised 33, 074 SS3 students (16726 males and 16348 females) in 297 public senior secondary schools in Imo State. The sample consisted of 1654 SS3 students in public secondary schools using multi-stage sampling technique. The researchers divided the population into clusters comprising the six education zones in Imo State. The researcher randomly selected four Local Government Areas (LGAs) from each cluster. Thereafter; 24 LGAs emerged. Then in each of these L.G.As one public secondary school that is co- educational was randomly selected.

Afterwards, 24 secondary schools emerged, from each school; class was also purposely selected because SS3 students participated in CSSE Mathematics. Finally, all the SS3 students from each of the selected secondary schools were used for the study. The instruments for data Collection were Mathematics Anxiety Scale (MAS) and Emotional Intelligence Questionnaire (EIQ). Mathematics Anxiety Scale (MAS) was adapted from Zakariya. (2018). The instrument is made up of two sections A and B. Section A was used to obtain bio data of the respondents while Section B was drafted to elicit information on the mathematics anxiety of senior secondary school students. In addition, section B contains 21 items with four scale response option of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree(SD), Weights of 4,3,2. And 1 was assigned to these options respectively. For positively cued items. The responses were assigned values ranging from 4 to 1, for negatively cued items. The values were reversed. EIQ was adapted from Mavroveli and Petrides (2000). It is made up of two sections A and B, Section A was used to obtain bio data of the respondents while Section B was drafted to elicit information on the emotional intelligence of senior secondary schools students, Section B also contains 36 items. The original instrument constructed and used by Mavroveli and Petrides had five response options of disagree completely, disagree, neither agree nor disagree, agree and agree completely. EIQ was adapted to five response options of

C. Table 1

Mean Rating and Standard Deviation Scores of Students of the Mathematics Anxiety

S/ n	Items	X	SD
1	I am a good student of Mathematics	3.30	1.33
2	I feel more nervous in mathematics than most of other students	3.23	1.34
3	Mathematics is hard for me	3.35	1.37
4	Mathematics confuses me	3.43	1.28
5	In mathematics, it's hard for me to decide what to do		
6	I have always had trouble with Mathematics	3.25	1.26
7	Usually I fell unable to solve mathematical problems	3.39	1.26
8	No matter what I do, I always get low grades in Mathematics	3.31	1.30
9	I'm not the type to do well Mathematics	3.21	1.26
10	Usually I have difficulty with Mathematics	2.39	1.34

never, rarely, sometimes often, and very often. The reason for this adaptation was that students were not familiar with the response pattern and did not understand the neither agree nor disagree which were observed during pilot testing. Weights of 5, 4,3,2. And 1 were also assigned to these options respectively, for positively cued items, the responses were assigned values ranging from 5 to 1. For negatively cued items. The values were reversed. The instruments were further subjected to face validity in order to establish the reliability of the instruments. The reliability index of the Instruments was established using Cronbach Alpha which yielded internal consistency reliability coefficient of 0.71 and 0.77 respectively, The SSE students who were used for the exercise were told to write their names correctly on the instruments given to them in order to enable the researcher match EIQ and MAS scores to Mathematics CSSE scores. There was strict supervision by the class teachers during the administration of the instrument. At the end of the exercise, all the data were collected for analysis in the study.

A. Method of Data Analysis

All the data were cleaned to ensure that outliers were not present in the data and negatively worded items were reversed. Afterwards, the data were analyzed using mean and regression analysis. In particular, mean and standard deviations were used to answer research questions 1 and 2. The following real limits of numbers 2.50 and 3.00 were used as average to interpret the means in respect of research questions 1 and 2. The Pearson Product Moment:

Correlation Coefficient(R) and coefficient of determination (R^2) were used to answer research questions 3 and 4. For hypotheses, simple linear regression analysis (ANOVA) was computed. In taking decision, if the p-value was less than or equal to the significant value of 0.05($P < 0.05$), the null hypotheses were rejected; otherwise ($P > 0.05$) they were not rejected.

B. Results

Research question 1: What is the mean Mathematics anxiety score of secondary school students in Imo State?

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11	I do not know how to study Mathematics	1.16	1.51
12	Mathematics is one of the most boring subjects	2.18	1.31
13	I don't think I could handle more difficult mathematics		
14	I will always have difficulty on learning mathematics	3.28	1.26
15	I'm one of those people who were not born to learn Mathematics	3.00	1.35
16	I know I can do well in Mathematics	3.35	1.34
17	I don't feel comfortable studying Mathematics like I feel with other subjects	3.33	1.28
18	I hate studying Mathematics, even the easiest parts	3.26	1.42
19	Except for a few cases, no matter how much effort I put out, I cannot understand Mathematics	2.28	1.32
20	I am always under a terrible strain in a Mathematics class.	3.24	1.33
21	I am afraid to ask questions in Mathematics class	3.20	1.33
	cluster	3.11	1.34

The results in Table 1 shows that the students have mean scores between 2.16-3.43 and standard deviation 1.26 -1.1. Table 1 shows also the cluster mean of 3.11 which indicate the students have high Mathematics anxiety.

Research Questions 2: what is the mean emotional intelligence score of secondary school students in Imo State?

D. Table 2

Mean Rating and Standard Deviation Scores of Students on Emotional Intelligence

S/n	Items	X	SD
1	I try to be in a good mood	3.50	1.09
2	I like meeting new people	3.37	1.04
3	I find it hard to get used to a new school year	3.42	1.26
4	I feel great about my self	3.42	1.35
5	When I feel sad, I try to do something to change my mood	3.31	1.27
6	I do feel sad	3.44	1.25
7	If I'm happy with someone, I will tell him or her	3.21	1.16
8	I do get along with everyone	2.82	1.23
9	I feel angry	3.57	1.08
10	The kids at school like playing with me	3.33	1.09
11	When I'm in a new place, I get used to it quickly	3.08	1.32
12	I'm not happy with myself	4.01	1.27
13	I don't think before I do something	3.94	1.24
14	I'm very good at understanding how other people feel	3.42	1.19
15	I don't like, working hard for something	3.77	1.31
16	It's easy for me to understand how I feel	3.39	1.22
17	If I have to do something, I know I can do it very well	3.51	1.25
18	I get angry very easily	3.64	1.22
19	I try to do my homework as well as I really can	3.62	1.26
20	I talk about my feelings	3.10	1.12
21	I don't like waiting to get what I want	3.64	1.36
22	I'm a very happy kid	3.74	1.35
23	I don't like studying hard	4.05	1.32
24	It may not be well with me when I grow up	4.11	1.35
25	Most people like me	3.55	1.25
26	I think very carefully before I do something	3.73	1.21
27	I'm not good at controlling the way I feel	3.57	1.16
28	I get used to strangers very quickly	2.57	1.16
29	I can't find the right words to tell others how I feel	3.30	1.19

30	I don't like trying out new things	3.55	1.25
31	I like being with other people	3.44	1.16
32	I know how to show others how much I care about them	3.36	1.26
33	I'm confused about the way I feel	3.55	1.21
34	When I fail something I don't like trying again	3.98	1.28
35	If I don't do something well, I don't like trying again	3.72	1.36
36	I think very carefully before I talk	3.73	1.29
	cluster	3.51	1.47

Table 2 indicates that all the 36 items have mean scores ranging between 2.57-4.11 with the standard deviation which ranges from 1.04 -1.47. Table 2 shows the cluster mean of 3.52. Based on the real limits of number, it indicates high level of emotional intelligence of the students.

Research Questions 3: Does mathematics anxiety predict secondary school students' academic achievement in Mathematics CSSE?

E. Table 3

Model summary of mathematics anxiety as predictor of mathematics CSSE

Variable	X	SD	R	R ²	Adjusted R Squared	B	Beta
Mathematics	52.06	4.21					
Anxiety			0.67	0.45	0.43	76.18	-.050
Achievement in Mathematics CSSE	68.86	11.77					

Table 3 shows that, the correlation coefficient of 0.67 with the associated coefficient of determination (R²) 0.45. This coefficient of determination (R²) indicates that mathematics anxiety accounted for 45% of students' academic achievement in Mathematics CSSE. This is an indication that 55% of the variation in students' academic achievement in Mathematics CSSE is attributed to other factors. The regression equation for Mathematics anxiety derived from Table 3 is as follows: CSSE = 76.18-0.05MATHANXIETY

Research Question 4: Does emotional intelligence predict secondary school students' academic achievement in Mathematics?

F. Table 4

Model summary of emotional intelligence as predictor of mathematics CSSE

Variable	X	SD	R	R ²	Adjusted R Squared	B	Beta
Emotional Intelligence	108.3	9.78					
Achievement in Mathematics CSSE	68.86	11.77	0.70	0.40	0.37	58.36	.089

In Table 4, the correlation coefficient R is 0.70 with an associated coefficient of determination R² 0.40. The results indicate that emotional intelligence accounted for 40% of the variation in academic achievement in Mathematics CSSE. In other words, emotional intelligence could account for 40% of the variance of academic achievement in Mathematics CSSE of students. The regression equation for Mathematics anxiety derived from Table 4 is as follows: CSSE () = 58.36+0.089EMOITELIGENCE.

Research Questions 5: do mathematics anxiety and emotional intelligence jointly predict secondary school students' academic achievement in Mathematics CSSE?

G. Table 5

Model summary of joint mathematics anxiety and emotional intelligence as predictors of mathematics CSSE

Variable	X	SD	R	R ²	Adjusted R Squared	B	Beta
Mathematics	52.06	4.21					-.049
Anxiety							
Emotional Intelligence	108.3	9.78					.087

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			0.65	0.54	0.51	70.33	
Achievement in	68.86	11.77					
Mathematics CSSE							

The results in Table 5 show that the correlation coefficient R and coefficient of determination (R^2) are 0.65 and 0.54 respectively. The coefficient of determination of 0.54 shown in Table 5 means that 54% of students' academic achievement in Mathematic CSSE is accounted for by combined mathematics anxiety and emotional intelligence. This is an indication that 26% of variation in achievement of students in SSCE is attributed to other factors other than mathematics anxiety, and emotional intelligence. The

H. Table 6

Summary of ANOVA Table for regression analysis of Mathematic anxiety as predictors of CSSE

Model	Sum of Squares	DF	Mean Square	F	Sig.
Regression	580.667	1	580.667	4.197	.041
Residual	228573.725	1652	138.362		
Total	229154.392	1653			

Hypothesis 1 was tested with the regression analysis and presented in Table 6. From the table $F_{(1,1652)} = 4.197, P = 0.041$. Since the exact probability value of 0.041 associated with the computed F – value of 4.197 was less than 0.05 level of significance, the null hypothesis was rejected. Thus, Mathematics anxiety significantly predicts secondary school

I. Table 7

Summary of ANOVA Table for Regression Analysis of Emotional Intelligence as Predictors of CSSE

Model	Sum of Squares	DF	Mean Square	F	Sig.
Regression	1797.071	1	1797.071	13.058	.000
Residual	227357.321	1652	137.625		
Total	229154.392	1653			

In order to test hypothesis 2, regression analysis was used. The result is presented in Table 7 and shows that $F_{(1,1652)} = 13.058, P = 0.005$. This probability value of 0.0005 was compared with 0.05 and it was found to be significant because 0.005 was less than 0.05. The null hypothesis was therefore rejected and inference drawn was that, emotional

J. Table 8

Summary of ANOVA Table for Regression Analysis of Joined Mathematics Anxiety and Emotional Intelligence as Predictors of CSSE

Model	Sum of Squares	DF	Mean Square	F	Sig.
Regression	2457.455	3	819.152	5.962	.000
Residual	226696.938	1650	137.392		
Total	229154.392	1653			

In order to test hypothesis 3, multiple regression analysis was used. The result in Table 8 shows that the obtained F-value was $F_{(3,1652)}$, with an associated probability value of 0.0005. This probability value of 0.0005 was compared with 0.05 and it was found to be significant. The null hypothesis was therefore ^{rejected} and inference drawn was that, combined Mathematics anxiety and emotional intelligence predict secondary school students' academic achievement in Mathematics CSSE.

VII. DISCUSSION

The finding revealed that Mathematics anxiety is a

regression equation for joint prediction of mathematics anxiety and emotional intelligence derived from Table 5 is as follows: $CSSE () = 70.33 - 0.049MATHANXIETY + 0.087EMOITELIGENCE$.

VI. TESTING NULL HYPOTHESES

Hypotheses 1: Mathematics anxiety does not significantly predict secondary school students' academic achievement in Mathematics CSSE.

students' academic achievement in mathematics. It implies that Mathematics anxiety predicts secondary school student's academic achievement in mathematics.

Hypothesis 2: Emotional intelligence does not significantly predict secondary school students' academic achievement in Mathematics CSSE.

intelligence predicts secondary school students' academic achievement in Mathematics CSSE.

Hypothesis 3: Mathematics anxiety and emotional intelligence jointly do not significantly predict secondary school students' academic achievement in Mathematics CSSE.

significant predictor of secondary school students' academic achievement in Mathematics CSSE. The finding of this study is in line with the finding of Chukwu (2014) and Sieber (2015), who respectively found that mathematics anxiety significantly predicts academic achievements of students. This finding also agrees with findings of Olango (2016) and Puteh and Khalin (2016) who reported in their respective studies that mathematics anxiety significantly predicted Mathematics achievement of students. This finding may be linked to the student's prior experience with formal instruction in mathematics at the primary school which resulted in mathematics anxiety: and was carried over to

secondary school.

The finding of this study showed that emotional intelligence is a significant predictor of secondary school students' academic achievement in Mathematics CSSE. The finding of this study is much similar with the findings of Maliha (2011), Maryam (2011) and Fayombo (2012) studies which reported that emotional intelligence predicts students' achievement in Mathematics. Similarly, this finding agrees with the findings of Ukeni (2014), Manish and Md nehajul (2017) and Amalu (2018) who reported in their respective studies that emotional intelligence predicted students' academic achievement.

From the findings of this study, emotional intelligence helps in combating persistent poor achievement of students in Mathematics at secondary school level. Perhaps, the reason is that the emotional intelligence helps students cope with emotions in the academic environment, maintain their relationships with teachers, students, and family. That is, they can call on friends and teachers to help them when they struggle with academic work or call on others for emotional support.

The finding in this study equally revealed that the joint prediction of Mathematics anxiety and emotional intelligence on students' achievement in Mathematics CSSE is significant. This finding agrees with the finding of Obajemu (2016) who reported that the combination of transition and Mock Examination scores significantly predicted students' achievement in SSCE Mathematics.

VIII. CONCLUSION

Based on the findings presented and discussed in this study, the following conclusions have been made. The mathematics anxiety significantly predicts the students' achievement in Mathematics CSSE. Similarly, the emotional intelligence significantly predicts the students' achievement in Mathematics CSSE.

IX. RECOMMENDATIONS

From the findings of this study, the following recommendations are made:

1. Teacher preparation institutions should incorporate Mathematics anxiety, emotional intelligence and academic self-concept in the relevant areas of their curriculum units in order to expose both the pre-service and in-service teachers to their predictive effect on Mathematics achievement. This will develop in the teachers the competencies necessary for teacher-student interaction in the classroom.
2. Curriculum experts should develop an effective instructional curriculum that incorporates emotional intelligence skills, positive academic self concept and reduction of mathematics anxiety with the objective of enhancing personal and career success of students.

REFERENCES

- [1] Akanbi, S.T. (2013). Comparisons of test anxiety level of senior secondary school students across gender, year of study, school type and parental educational background. *Ife Psychologia*, 21,40-54.
- [2] Amalu, M. N. (2018), Emotional Intelligence as Predictor of Academic Performance among Secondary School Students in Makurdi Metropolis of Benue State. *International Journal of Scientific Research in Education*, 11(1), 63-70
- [3] Anyichie, F.T., & Onyedike, B.L (2012), Effects of self-instructional learning strategy on secondary schools students academic achievement in solving mathematical word problems. *An International Multidisciplinary Journal*, 6 (4), 2070,-2078
- [4] Azuka, B.f, & Kurumeh, M.S (2015). Effects of emotional intelligence skills acquisition on students' achievement in senior secondary school geometry in Keffi Education Zone, Nasarawa State, Nigeria. *Asian Journal of Education and e-Learning* 3(4), 243-257.
- [5] Chukwu, C.U (2014). *Influence of emotional intelligence on secondary school students' achievement in chemical quantitative problem solving* (Unpublished master's thesis) University of Nigeria, Nsukka.
- [6] Foyombo, G.A, (2012), Emotional intelligence and gender as predictors of academic achievement among some university students in Barbados, *International Journal of Higher Education*, 1(1), 102-111.
- [7] Karimi, A., & Venkatesan, S. (2009). Mathematics anxiety, mathematics performance and academic hardness in high school students', *International Journal of Education Sciences*, 1 (1), 33-37
- [8] Manish, A and Md Nehajul, S. K (2017). Predictors of Academic Performance: Emotional Intelligence and Stream among students of Aligarh Muslim University. *India. Int. J. of Education and Applied Social Science*, 8(3) 743- 750.
- [9] Maryam, M. (2011). The relationship between emotional intelligence and academic success, *Journal of Technology & Education*, 5. (3), 201-204.
- [10] Mavroveli, S. & Petrides, K. V. (2000). *Trait emotional intelligence questionnaire, child-form*. Institute of Education, University of London.
- [11] Maestro, J.M. & Barchard, K.A. (2017). Four signs of you have high emotional intelligence. *IFL Science*. Retrieved from <http://www.iflscience.com/editors-blog/four-signs-you-have-high-emotional-intelligence>.
- [12] Nalah, A. B (2014). Self- concept and Students' Academic Performances in College of Education, Akwanga, Nassarawa State, Nigeria. *World Journal of Young Researchers*. 3(2):32-37.
- [13] Nunex-Pena, M. I., Suarez-Pellicioni, M., & bono, R. (2013). Effects of math anxiety on student success in higher education. *International Journal of Educational Research* 58, 36-43.
- [14] Obajemu, S. F (2016). *State based transition and mock examination as predictors of students' achievements in senior secondary school examination in Kogi State*. (Unpublished Masters Thesis)University of Nigeria, Nsukka.
- [15] Okigbo, E.C. (2010). *Comparative effectiveness of mathematical game and instrumental analogy as advance organizers on students' achievement and interest in mathematics*. (Unpublished doctoral dissertation). Nnamdi Azikiwe University, Awka. Retrieved from <http://www.naulibrary.org>
- [16] Olango, M. (2016). Mathematics anxiety factors as predictors of mathematics self-efficacy and achievement among freshmen science and engineering students, *African Educational Research Journal*, 4 (3): 109-123.
- [17] Osuafor, A. M & Njoku. C. (2016). Effect of prior knowledge of behavioral objectives on mathematics achievement of high and low mental ability secondary school students in Imo state, Nigeria. *People: International Journal of Social Sciences*, 2 (1)255-264.
- [18] Puteh M, & Khalin S. Z. (2016). Mathematics anxiety and its relationship with the achievement of secondary students in Malaysia. *International Journal of Social Science and Humanity*. 6(2) 102-109.
- [19] Siebers, W. M. (2015). *The relationship between math anxiety and student achievement of middle school student* (Doctoral Dissertation). Colorado State University.