

## **Test Anxiety and Self-Concept as a Predictor of Biology Students' Academic Achievement**

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**Abstract:** *The aim of this study was to help ascertain test anxiety and self-concept as a predictor of biology students' academic achievement. Four research question and four null hypotheses guided the study. Correlational survey research design was adopted for the study. 6,890 senior secondary school two biology students in public secondary schools in Onitsha Education zone of Anambra state comprised the population of the study. 365 senior secondary two (SS2) students drawn from the population formed the sample size of the study. The instruments used for data collection were researchers developed Biology Test Anxiety Scale (BTAS); Self-concept Rating Scale (SRS) and Biology Achievement Test (BAT). The instruments were face validated by two biology lectures and one test development expert all from Department of Science Education of the University of Nigeria, Nsukka. A reliability index of 0.81 was obtained for BAT using Kuder-Richardson 20 (KR-20) formula. 0.79 and 0.83 reliability index were obtained for both BTAS and SRS respectively using Cronbach alpha formula. Research question 1 & 2 were answered using linear regression while 3 & 4 were answered using multiple regression. ANOVA regression was used in testing all the formulated null hypotheses at 0.05 level of significance. Findings of the study revealed that the variation in students' achievement in biology that can be attributed to their test anxiety is not significant; there is no statistical significant variation in students' achievement in biology that can be attributed to their self-concept; there is statistical significant variation in students' achievement in biology that can be attributed to their test anxiety based on school location; and there is statistical significant variation in students' achievement in biology that can be attributed to their self-concept based on school location. It was recommended among others that in-service biology teachers training should be organized by the state government in synergy with the school management so as to provide them with the best approach towards engaging students on various academic task and test preparation. This would help to acquaint the teachers on novel ways to step-up students' self-concept and test anxiety in order to improve the students' academic achievement.*

**Key Word:** *Test anxiety, Self-concept; Biology; Academic achievement*

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### **I. Introduction**

Human as a higher animal do not exist as an isolated being in the environment since they interact with other living organisms within the environment so as to provide balance within the ecosystem. In understanding this interaction between living organisms, the study of biology would not be neglected. This is because, biology equips us with the knowledge about ourselves and the environment thereby promoting effective environmental conservation and management for the next generation. Living things and their vital processes which deals with physiochemical aspect of life are better understood through biology (Kara, 2019). Biology is a branch of life science that is concerned with everything involving a life form, no matter how small or large including its structure, behavior, origin, growth and reproduction (Nam, 2018). From the above definitions we can infer that biology deals with the study of life form, organisms and its interaction with each other.

The study of biology in senior secondary schools is expected to prepare the students to acquire; adequate laboratory and field skills in biology; meaningful and relevant knowledge in biology; ability to apply scientific knowledge to everyday life in matters of personal and community health and agriculture; reasonable and functional scientific attitude (Federal Ministry of Education [FME], 2004). These objectives, when properly harnessed will foster acquisition of knowledge, skills and desirable attitudes germane for personal and societal development. Irrespective of the aforementioned objectives of biology, it could be affirmed that senior secondary school students have not fully attained these objectives as a result of their poor academic achievement in both external and internal biology examinations. Based on the external examinations of biology students, the chief WAEC examiners report specifically 2016/2017 & 2018/2019 showed the dwindling academic achievement of biology students. However, Umar, Fugu and Aliyu (2018) revealed that academic achievement of biology students in internal examinations is poor. This is supported by Ihekwoaba (2019), who observed a decline in the

academic achievement of biology students in Onitsha education zone of Anambra state. Thus, the need to determine whether test anxiety and self-concept contributes to biology students' poor academic achievement.

Test anxiety could be seen as distress experienced by some test-taker while evaluating the knowledge, physical fitness, skills and aptitude of the test-taker in games, drama, audition and many more. In academic setting, test anxiety could be defined as a painful uneasiness of mind concerning impending or anticipated academic activities. Test anxiety is a psychological condition in which students experience extreme pain, worry and distress in test situation (Coon & Mittere, 2009). Though, lot of secondary school students are facing the problem of test anxiety today (Denwigwe & Obioma, 2019). This could be due to students feeling of helplessness towards their inability of finding solution to their academic problems. Cherry (2020) outlined some factors responsible for test anxiety which include; a history of poor testing outcome; being unprepared for test; fear of failure. In the same light, Mckenna (2016) opined that students are faced with fear of failure, fear of being identified as failure. This implies that fear makes students jumpy, nervous and could even take away their ability of making good use of their time during test or examination. Test anxiety may negatively affect students more if the anxiety is dealt with in an unhealthy manner and extends over a long period of time (Trifoni & Shahini, 2011). Test anxiety could also have affect student negatively when it is not seriously dealt with. On the other hand, test anxiety can help some students achieve their best academically by getting prepared for a test beforehand (Yusefzadeh, Iranagh, & Nabilou, 2019). Thus, we can infer that test anxiety has both positive and negative effect on students' achievement. Therefore, the need to checkmate if text anxiety contributes positively or negatively on biology students' achievement. Test anxiety could also occur as a result of individuals' self-concept of academic ability.

Self-concept could be seen as the perceptual image about how one sees himself or herself. This implies that the general thought of an individual concerning his or her behavior and abilities in taking a task is self-concept. One can see himself as a good person at all dealing and that is such persons' conception about himself. In academic environment, some students perceive themselves as dull students therefore should not be expected to perform excellent in examination. Self-concept according to Uier and Yousuf (2010) is defined as a composite image of what we think, care, what we perceive we can achieve, what we think others think of us and what we would like to be. To Liu and Wag (2012), self-concept could be well understood from the developmental point of view. Liu and Wag noted that self-concept is developed through students' experience within the environment which could influence their behavior, choice of peers, actions and persistence in academic task. Such environmental experience starts from birth and it's based on how parents, adults, caregivers establish emotional bond with the child (Rebecca, 2012).

Experience gotten from the environment could be of negative or positive effect to the student. Thus, self-concept of a student could be either negative or positive. Negative self-concept occurs when a student possesses low self-esteem about himself or herself (Lafata, 2015). Student with negative self-concept may likely experience depression, high level of stress, loneliness, anxiety which could lead to high risk of alcohol and drug abuse. On the other hand, Positive concept is defined as "can do" attitude or the ability of an individual to complete tasks with or without help (Rebecca, 2012). Positive self-concept is often valued as a desirable outcome in many disciplines such as educational development, sports and exercise, health, social personality, psychology and academic achievement (Marsh & Martin, 2011). Positive self-concept is very important to students since it enhances their effort to act in accepted manner to achieve stability and independence enough to take them through academic task and challenges of life. However, previous studies reported that students who had high achievement in psychology had a high academic self-concept (Marsh & Seaton, 2012; Akiko, 2011); there was a positive relationship between academic self-concept and academic achievement and this relationship was stronger for female students than that of male (Jaiswal & Choudhuri, 2017); academic self-concept is affected by learning disability status (Alrehaili, 2015); there is high correlation between academic self-concept and students performance in literature and mathematics (Ghazvini, 2011). None of these studies tried determine the extent in which self-concept predicts students' achievement specifically in biology. Hence, the need for this study.

However, a moderating variable of interest in this study is school location. School location is a particular place, in relation to other areas in the physical environment (rural and urban) where the school is sited (Okorie & Ezech, 2016). This is in-line with the view of Nduji (2019) who sees school location as the topographical point (urban or rural) where institution for instruction or education is situated. Ugwuanyi (2012) observed unequal construction of well-furnished laboratory, school library, workshop rooms and many more among rural and urban schools in Nigeria. When some of these facilities are lacking in a school, students are bound to encounter some academic distress which could lead to low or negative self-concept of the student and such would not improve the students' achievement. Thus, the researchers deemed it wise to bring in school location as a moderating variable in determining the extent of variation of test anxiety and self-concept on students' achievement in biology.

Though, various researchers have carried out studies on test anxiety, self-esteem and academic performance among secondary school students in cross-river state (Ekeng & Bassey, 2018); test anxiety and

academic concept of students (Kaur & Jayaraman, 2016); self-concept, test anxiety and achievement motivation as predictors of academic achievement in physics among secondary school students in Rivers state, Nigeria (Onukwufor, 2017); academic achievement, self-concept, personality and emotional intelligent in primary education: analysis by gender and culture (Herrera, Al-lal & Mohamed, 2019); test anxiety and self-concept of university students enrolled in B.Ed honors degree program (Malik, Fatima, & Hussain Ch, 2016). But, none of these studies determined the amount of variation in students' achievement particularly in biology that can be attributed to their test anxiety and self-concept as moderated by school location. Thus, the importance of this study.

The following research questions were posed to guide the study;

1. What amount of variation in students' achievement in biology can be attributed to their test anxiety?
2. What amount of variation in students' achievement in biology can be attributed to their self-concept?
3. What amount of variation in students' achievement in biology can be attributed to their test anxiety based on school location?
4. What amount of variation in students' achievement in biology can be attributed to their self-concept based on school location?

The following null hypotheses were formulated to guide the study and was tested at 0.05 level of significance.

1. There is no statistical significant variation in students' achievement in biology that can be attributed to their text anxiety.
2. There is no statistical significant variation in students' achievement in biology that can be attributed to their self-concept.
3. There is no statistical significant variation in students' achievement in biology that can be attributed to their text anxiety based on school location.
4. There is no statistical significant variation in students' achievement in biology that can be attributed to their self-concept based on by school location.

## **II. Methods**

Correlational survey research design was adopted for the study. The population of the study consisted of 6,890 senior secondary school two biology students in public secondary schools in Onitsha Education zone of Anambra state. The distribution of the population from urban schools follows thus; Onitsha North Local Government 4,120 students, Onitsha South Local Government 1,686 students, and from rural schools; Ogbaru Local Government 1,084 students (Post Primary School Service Commission Onitsha [PPSSCO], 2019). The sample size of the study was 365 senior secondary two (SS2) students drawn from the population. 275 SS2 students are from urban and 88 are from rural schools. The sample size was determined using confidence level of 95 per cent based on the population size as opined by Cohen, Manion and Morrison (2011). Sample size was drawn using proportionate stratified sampling technique from the three local governments since the local government areas do not have equal number of schools and students. The instruments used for data collection were titled Biology Test Anxiety Scale (BTAS); Self-concept Rating Scale (SRS) and Biology Achievement Test (BAT) all developed by the researchers. BTAS has 10 items that sought respondents' information on biology students' test anxiety while SRS has 10 items that solicited respondents' information on biology students' self-concept. BAT was developed using test blue print which was based on the six levels of cognitive domain of Bloom's taxonomy to ensure content coverage. PAT was arranged in two sections (A and B). Section A elicited information on the demographic data (i.e. school location) while Section B contained 10 multiple choice question with options from 'a' to 'd' where students are expected to select the answer that best suits the question. The instruments were face validated by two biology lectures and one test development expert all from Department of Science Education of the University of Nigeria, Nsukka. The reliability of the instruments was determined by administering the instruments to SS2 biology students in Anglican Girls' Secondary School, Ogidi which is not part of the sampled schools but possesses the same characteristics with the biology students under investigation. A reliability index of 0.81 was obtained for BAT using Kuder-Richardson 20 (KR-20) formula. 0.79 and 0.83 reliability index were obtained for both BTAS and SRS respectively using Cronbach alpha formula. Research question 1 & 2 were answered using linear regression while 3 & 4 were answered using multiple regression. ANOVA regression was used in testing all the formulated null hypotheses at 0.05 level of significance.

III. Results

**Research Question One:** What amount of variation in students' achievement in biology can be attributed to their test anxiety?

**Table 1:** Linear regression analysis for analysis of amount of variation in students' achievement in biology that can be attributed to their test anxiety

N=365						
Variables	$\bar{x}$	SD	R	R Square (R <sup>2</sup> )	Adjusted R Square	Std. Error of the Estimate
B.Test	58.04	14.697	.008 <sup>a</sup>	.000	-.003	14.717
T.Anxiety	32.46	3.662				

a. Predictors: (Constant), t.anxiety

**NB:** B.Test = Biology test scores; T.Anxiety = Test anxiety scores;  $\bar{x}$  = Mean; SD = Standard deviation; N = Number of respondents; R = correlation coefficient; R<sup>2</sup> = coefficient of determination

Result of the analysis on **Table 1** shows that the biology students had achievement score of ( $\bar{x}$  = 58.04, SD = 14.697) and test anxiety score of ( $\bar{x}$  = 32.46, SD = 3.662). The result showed the coefficient of determination (R<sup>2</sup> = 0.000) and correlation coefficient (R = 0.008) between students' achievement in biology and test anxiety. This implies that 0% of the variance in students' achievement in biology can be attributed to their test anxiety. This means that 100% variance of students' achievement in biology can be attributed to other variables. Also the result showed the value of (Adjusted R<sup>2</sup> = -0.003) which reveals that -0.003 variation can explain test anxiety of biology students that actually affected students' achievement.

**Hypothesis one:** There is no statistical significant variation of students' achievement in biology that can be attributed to their text anxiety.

**Table 2:** ANOVA regression of variation of students' achievement in biology that can be attributed to their test anxiety.

Model		Sum of Squares	df	Mean Square	F	Sig.	Dec.
1	Regression	5.314	1	5.314	.025	.876 <sup>b</sup>	NS
	Residual	78619.069	363	216.581			
	Total	78624.384	364				

a. Dependent Variable: B.test

b. Predictors: (Constant), t.anxiety

**NB:** B.test = Biology test scores; T.anxiety = Test anxiety scores; df = degree of freedom; F = Fcal-value; Sig = Probability value; Dec. = Decision; NS = Not significant.

Result on **Table 2** shows ANOVA regression on the amount of variation in students' achievement in biology that can be attributed to their test anxiety. The result shows that the probability value associated with the calculated value of (F(1, 364) = 0.025, p < 0.05) is 0.876. Since the associated probability value of 0.876 is greater than 0.05 level of significance, the null hypothesis was accepted. Hence, the decision not significant. This implies that there is no statistical significant variation in students' achievement in biology that can be attributed to their test anxiety.

**Research Question Two:** What amount of variation in students' achievement in biology can be attributed to their self-concept?

**Table 3:** Linear regression analysis for variation in students' achievement in biology can be attributed to their self-concept

N=365						
Variables	$\bar{x}$	SD	R	R Square (R <sup>2</sup> )	Adjusted R Square	Std. Error of the Estimate
B.Test	58.04	14.697	.102 <sup>a</sup>	.010	-.008	14.641
S.concept	30.93	5.061				

a.Predictors: (Constant), S.concept

NB: B.Test = Biology test scores; S.concept = Self-concept scores; $\bar{x}$ = Mean; SD= Standard deviation; N= Number of respondents; R= correlation coefficient; R<sup>2</sup>= coefficient of determination

Result of the analysis on **Table 3** shows that the biology students had achievement score of ( $\bar{x}$ = 58.04, SD=14.697) and self-concept score of ( $\bar{x}$ = 30.93, SD= 5.061). The result showed the coefficient of determination (R<sup>2</sup>=0.010) and correlation coefficient (R=0.102) between students' achievement in biology and self-concept. This denotes that 1.0% of the variance in students' achievement in biology can be attributed to their self-concept. This implies that 99% variance of students' achievement in biology can be attributed to other variables. The result also showed the value of (Adjusted R<sup>2</sup> =-0.008) and this indicates that -0.008 variation can explain self-concept of biology students that actually affected students' achievement.

**Hypothesis Two:** There is no statistical significant variation of students' achievement in biology that can be attributed to their self-concept.

**Table 4:**ANOVA regression for variation of students' achievement in biology that can be attributed to their self-concept.

Model		Sum of Squares	Df	Mean Square	F	Sig.	Dec.
1	Regression	816.424	1	816.424	3.809	.052 <sup>b</sup>	NS
	Residual	77807.959	363	214.347			
	Total	78624.384	364				

NB: B.test = Biology test scores; S.concept = Self-concept; df = degree of freedom; F = Fcal-value; Sig = Probability value (*P-value*); Dec.= Decision.

Result on **Table 4** shows ANOVA regression on the amount of variation in students' achievement in biology that can be attributed to their self-concept. The result shows that the probability value associated with the calculated value of ( $F(1, 364) = 3.809, p < 0.05$ ) is 0.052. Since the associated probability value of 0.052 is greater than 0.05 level of significance, the null hypothesis was accepted. Hence, the decision not significant. This implies that there is no statistical significant variation of students' achievement in biology that can be attributed to their self-concept.

**Research Question Three:** What amount of variation in students' achievement in biology can be attributed to their test anxiety based on school location?

**Table 5:** Multiple regression analysis for variation in students' achievement in biology can be attributed to their test anxiety based on school location.

N=365						
Variables	$\bar{x}$	SD	R	R Square (R <sup>2</sup> )	Adjusted R Square	Std. Error of the Estimate
B.Test	58.04	14.697				
T.anxiety	32.46	3.662	.501 <sup>a</sup>	.251	-.247	12.754
S.location	1.24	.428				

a. Predictors: (Constant), t.anxiety

NB: B.Test = Biology test scores; T.anxiety = Test anxiety scores; S.location = School location; $\bar{x}$ = Mean; SD= Standard deviation; N= Number of respondents; R= correlation coefficient; R<sup>2</sup>= coefficient of determination

Analysis on **Table 5** reveals the amount of variation in students' achievement in biology that can be attributed to their test anxiety based on school location. The result of the analysis shows that the biology students had achievement score of ( $\bar{x}$ = 58.04, SD=14.697) and test anxiety score of ( $\bar{x}$ = 28.13, SD=10.398) while based on school location, biology students had scores of ( $\bar{x}$ = 1.24, SD= .428). The result showed the coefficient of determination (R<sup>2</sup>=0.251) and multiple correlation coefficient (R=0.501) between students' achievement in biology and test anxiety based on school location. This denotes that 25.1% of the variance in students' achievement in biology can be predicted from the variables of test anxiety and school location of the students while 74.9% variance can be predicted by other variables. The result also showed the value of (Adjusted R<sup>2</sup> =-0.247) which indicates that -0.247 variation can explain test anxiety and school location of the biology students that actually affected students' achievement.

**Hypothesis Three:** There is no statistical significant variation of students' achievement in biology that can be attributed to their text anxiety based on school location.

**Table 6:** ANOVA regression for variation of students' achievement in biology that can be attributed to their test anxiety based on school location.

Model		Sum of Squares	df	Mean Square	F	Sig.	Dec.
1	Regression	19743.538	2	9871.769	60.692	.000 <sup>b</sup>	S
	Residual	58880.846	362	162.654			
	Total	78624.384	364				

a. Dependent Variable: B.test  
 b. Predictors: (Constant), t.anxiety, S.location

**NB:** B.test = Biology test scores; T.anxiety = Test anxiety scores; S.location = School location; df = degree of freedom; F = Fcal-value; Sig = Probability value.

Result on **Table 6** shows ANOVA regression on the amount of variation in students' achievement in biology that can be attributed to their self-concept. The result shows that the probability value associated with the calculated value of ( $F(1, 364) = 60.692, p < 0.05$ ) is 0.000. Since the associated probability value of 0.000 is greater than 0.05 level of significance, the null hypothesis was not accepted. Hence, the decision significant. This implies that there is no statistical significant variation of students' achievement in biology that can be attributed to their self-concept based on school location.

**Research Question Four:** What amount of variation in students' achievement in biology can be attributed to their self-concept as moderated by school location?

**Table 7:** Multiple regression analysis for variation in students' achievement in biology can be attributed to their self-concept based on school location

Variables	$\bar{x}$	N=365		R	R Square (R <sup>2</sup> )	Adjusted R Square	Std. Error of the Estimate
		SD					
B.Test	58.04	14.697					
S.concept	30.93	5.061	.502 <sup>a</sup>	.252	-.247	12.750	
S.location	1.24	.428					

a. Predictors: (Constant), S.concept

**NB:** B.Test = Biology test scores; S.concept = self-concept scores; S.location = School location;  $\bar{x}$  = Mean; SD = Standard deviation; N = Number of respondents; R = correlation coefficient; R<sup>2</sup> = coefficient of determination

Analysis on **Table 7** reveals the amount on variation in students' achievement in biology that can be attributed to their self-concept based on school location. The result of the analysis shows that the biology students had achievement score of ( $\bar{x} = 58.04, SD = 14.697$ ) and test anxiety score of ( $\bar{x} = 30.93, SD = 5.061$ ) while based on school location, biology students had scores of ( $\bar{x} = 1.24, SD = .428$ ). The result showed the coefficient of determination ( $R^2 = 0.252$ ) and multiple correlation coefficient ( $R = 0.502$ ) between students' achievement in biology and self-concept based on school location. This denotes that 25.2% of the variance on students' achievement in biology can be predicted from the variables of self-concept and school location of the students while 74.8% variance can be predicted by other variables. The result also showed the value of (Adjusted R<sup>2</sup> = -0.247) which indicates that -0.247 variation can explain self-concept and school location of the biology students that actually affected students' achievement.

**Hypothesis Four:** There is no statistical significant variation in students' achievement in biology that can be attributed to their self-concept based on school location.

**Table 8:** ANOVA regression on the amount of variation in students' achievement in biology that can be attributed to their self-concept based on school location.

Model		Sum of Squares	df	Mean Square	F	Sig.	Dec.
1	Regression	19774.808	2	9887.404	60.820	.000 <sup>b</sup>	S
	Residual	58849.576	362	162.568			
	Total	78624.384	364				

a. Dependent Variable: B.test  
 b. Predictors: (Constant), S.concept, S.location

**NB:** B.test = Biology test scores; S.concept = Self-concept scores; df = degree of freedom; F = Fcal-value; Sig = Probability value (p-value); Dec. = Decision; S = Significant

Result on **Table 8** shows ANOVA regression of moderating influence on the amount of variation in students' achievement in biology that can be attributed to their self-concept based on school location. The result shows that the probability value associated with the calculated value of ( $F(2, 364) = 60.820, p < 0.05$ ) is 0.000. Since the associated probability value of 0.000 is less than 0.05 set as level of significance, hence the decision

was significant. This implies that the null hypothesis was not accepted. Thus, inference drawn is that there is statistical significant variation in students' achievement in biology that can be attributed to their self-concept based on school location.

### **III. Discussion**

The finding of this study showed that students' achievement in biology that can be attributed to their test anxiety is of zero percentage. This implies that there is no variation in students' achievement in biology that can be ascribed to their test anxiety. This is strengthened by the null hypothesis which showed that the variation in students' achievement in biology that can be attributed to their test anxiety is not significant. This could be as a result of students' scores in their achievement test. Hence, test anxiety has no contribution on students' achievement in biology. The finding of this study is in agreement with the finding of Dami, James and Gogwim(2019) who discovered that test anxiety is a significant predictor of students' academic performance in biology examination. Also, the finding is in-line with the finding of Oluoch, Aloka, and Odongo (2018) who observed that there was statistical significant negative correlation between test anxiety and Chemistry academic achievement and that the variation in test anxiety that can be accounted for achievement of chemistry students is low. The findings of Amalu (2017) contradicts with the present study. Amalu's finding revealed that cognitive test anxiety predicts students' academic achievement. Newton (2015) finding is not in agreement with the finding of this study. Newton (2015) who unveiled that there is significant linear relationship between exam anxiety and students' achievement in public secondary schools. Ekeng, and Bassey (2018) investigation on test anxiety, self-esteem and academic performance among secondary school students in Cross River state, Nigeria revealed that test anxiety predicts the academic performance of secondary school students. Ekeng and Bassey's finding is not in-line with the findings of this study.

From the finding, the variation in students' achievement in biology that can be attributed to their self-concept is very low. This depicts that the percentage of students' achievement in biology that can be accounted for their self-concept is very low. Thus, self-concept contributes little to students' achievement in biology. The finding also revealed that there is no statistical significant variation in students' achievement in biology that can be attributed to their self-concept. The finding of this study is in-alignment with that of Laryea, Saani and Dawson-Brew (2014) whose study revealed that self-concept does not directly predict students' academic achievement. Also, the finding of Jaiswal and Choudhuri (2017) who uncovered that there is low variation between academic self-concept and students' achievement, is in agreement with this study. Jaiswal & Choudhuri (2017) reveals that there is positive relationship between academic self-concept and academic achievement of secondary school students. The finding of this study is also in alignment with the assertion of Ajayi (2011) who opined that self-concept and students' attitude predicts students' achievement in senior secondary school. Sagar (2014) assertion supports the finding of this study. Sagar (2014) inferred that self-concept was only slightly positively associated with academic achievement of the students. On the contrary, the study disagrees with the report of Dulay (2017) who discovered that self-concept had a medium positive effect on students' achievement. The finding did not support the assertion of Berg and Coetzee (2017) who showed that there is significant variation between self-concept, motivation and students' academic achievement. Guay, Ratelle, Roy and Litalien (2010) found that students who performed higher academically had higher self-concept. This indicated that Guay, Ratelle, Roy and Litalien (2010) finding is not in alignment with the finding of this study.

The finding of this study unveiled that the variation in students' achievement in biology can be predicted from the variables of test anxiety and school location of the students is low. This means that the variables of test anxiety and school location has low contribution to students' achievement in biology. Hence, test anxiety contributes little to biology students' achievement under the condition of their school location. Also, the finding showed that there is statistical significant variation in students' achievement in biology that can be attributed to their test anxiety based on school location. Thus, school location has moderating influence on the amount of variation in students' achievement that can be accounted to test anxiety. The finding of this study is not in consonance with that of Olutola (2017) whose study indicated that students' performance in WASSCE multiple choice test in biology is not statistically significant based on school location. On the contrary, the finding of Adesegun, Adekunle and Emmanuel (2017) who revealed that there is high variation among school location and students' achievement in biology, is in agreement with the finding of this study. Adesegun, Adekunle and Emmanuel (2017) further observed that schools located near border town and places of economic interest distract students' attention and thereby contributing to their poor academic achievement. Also, the finding of this study supports the affirmation of Figueroa, Lim and Lee (2016) whose study revealed that there was significant variation and differing effects of school location, sizes and utilities on the academic achievement of students across the study area.

Based on the finding, the variation on students' achievement in biology that can be attributed to self-concept and school location is low. This means that the variables of self-concept and school location has low contribution to students' achievement in biology. Thus, self-concept contributes little to biology students'

achievement under the condition of their school location. Also, the finding showed that there is statistical significant variation in students' achievement in biology that can be attributed to their self-concept based on school location. This implies that school location has moderating influence on the amount of variation in students' achievement that can be accounted to self-concept. The finding of this study is in-line with the finding of Dramanu and Balarabe (2013) whose study found that there is significant difference between academic concept of students urban and rural junior high schools. This study supports the assertion of Nuthanap, (2007) who discovered that students in rural schools had a higher self-concept than their counterpart in urban school. Ichipi-Ifukor (2017) study on relationship between school location and students' academic achievement in introductory technology subject showed that there was significant variation between school location and students' academic achievement. Ichipi-Ifukor (2017) finding is in support with the finding of this study. Also, the finding of this study is in-line with the affirmation of Owoeye and Yara (2011) who opined that there is significant variation between students' achievement in secondary school and school location.

#### **IV. Conclusion**

The aim of this study was to ascertain biology students test anxiety and self-concept as a predictor of their academic achievement. Based on the findings of the study and discussion that follows, the following conclusion were made: the variation in students' achievement in biology that can be attributed to their test anxiety is not significant; the variation in students' achievement in biology that can be attributed to their self-concept is not significant; there is statistical significant variation in students' achievement in biology that can be attributed to their test anxiety based on school location; and there is statistical significant variation in students' achievement in biology that can be attributed to their self-concept based on school location.

#### **V. Recommendations**

Based on the above-mentioned conclusion of the study, the researchers made the following recommendations:

1. In-service biology teachers training should be organized by the state government in synergy with the school management so as to provide them with the best approach towards engaging students on various academic task and test preparation. This would help to acquaint the teachers on novel ways to step-up students' self-concept and test anxiety in order to improve the students' academic achievement.
2. Government should distribute instructional materials on equal proportion to schools, irrespective of the point where the school is located in order to enhance the academic achievement of students, self-concept and test anxiety of the students.
3. Different seminars and lectures should be organized by school management for students on how to develop a positive self-concept and reduced test anxiety irrespective of their location.

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